Item B-53: Load Break Switch

DESCRIPTION

Historical Background

This NUREG-0471[1] item arose in the course of the NRC review of the McGuire application, where the applicant proposed relying on the generator load break switch for isolating the generator from the stepup transformer following turbine trip. A consultant report on the issue appears in Appendix E to NUREG-0422,[2] SER for McGuire Nuclear Station, Units 1 and 2 (March 1978).

Safety Significance

GDC-17 (10 CFR Part 50, Appendix A) requires that two offsite circuits be available (one of them within a few seconds) to supply vital plant loads following a loss of all onsite AC power supplies. Most existing and proposed nuclear power plants in the United States meet (or propose to meet) this requirement by designs that involve startup transformers and unit auxiliary transformers, but do not involve a generator load break switch or breaker. However, for those few plants that involve designs relying on a generator load break switch (or circuit breaker), the switch is relied on to isolate the plant's generator from the stepup transformer to the grid following a turbine generator trip to allow power to be fed from the grid through the stepup transformer in a reverse direction to continue power feed to the plant's auxiliary loads. A generator circuit breaker, when used, has the added requirement that it be capable of interrupting 100% of any fault current to assure isolation of the generator during fault conditions, for the purpose of providing the immediate-access offsite source to plant vital loads as required by GDC-17. The issue involves testing requirements to demonstrate functional capability, even though the switch is not regarded as Class 1E (safety-grade) equipment.

The issue establishes safety requirements for an alternative design approach preferred by some applicants. The requirements to be established are expected to leave safety not significantly changed by virtue of the use of the load break switch.

CONCLUSION

This Regulatory Impact issue was RESOLVED with the issuance of Appendix A to SRP[3] Section 8.2 in July 1983.

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[1] NUREG-0471, "Generic Task Problem Descriptions (Categories B, C, and D)," U.S. Nuclear Regulatory Commission, June 1978.
[2] NUREG-0422, "SER for McGuire Nuclear Station Units 1 and 2," U.S. Nuclear Regulatory Commission, March 1978.
[3] NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," U.S. Nuclear Regulatory Commission, (1st Ed.) November 1975, (2nd Ed.) March 1980, (3rd Ed.) July 1981.