



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 101 TO
FACILITY OPERATING LICENSE NO. NPF-6
ARKANSAS POWER AND LIGHT COMPANY
ARKANSAS NUCLEAR ONE, UNIT NO. 2

DOCKET NO. 50-368

INTRODUCTION

By letter dated June 13, 1989, Arkansas Power and Light Company (AP&L or the licensee) requested an amendment to the Technical Specifications (TS) appended to Facility Operating License No. NPF-6 for Arkansas Nuclear One, Unit 2 (ANO-2). The proposed amendment would delete TS Section 4.3.1.1.4. This TS only contains the surveillance requirements for the existing Core Protection Calculator (CPC) isolation equipment.

EVALUATION

Arkansas Power and Light (AP&L) is presently in the process of replacing part of the hardware in the ANO-2 Core Protection Calculator System. This effort is scheduled for completion during the current 2R7 refueling outage, which began on September 25, 1989. A portion of the hardware upgrade includes new fiber-optics devices to provide interchannel isolation for the CPC/Core Element Assembly Calculator (CEAC) data links and the control element assembly (CEA) position isolation amplifiers. The use of fiber-optics equipment for data transmission offers superior isolation capabilities compared to the existing system, which uses conductive wiring and optical isolators to achieve the required channel isolation.

This fiber-optic cable which will be installed at ANO-2 transmits digital information using light instead of electric current and is a unique isolator which possesses inherent characteristics that eliminate ground loops and common ground shifts in electronic circuits and provides complete electrical ground isolation between transmitter and receiver. Fiber-optic cables present no fire hazards when their fibers are damaged. In addition no local secondary damages can occur because fiber optics neither produce sparks nor dissipate heat.

The construction of the fiber-optic cable is such that the cable contains no electrically conductive material. The relative permittivity (dielectric constant) of a material is a measure of the material's isolation capability. The dielectric constant of a material is referenced relative to free space (a vacuum) and is a dimensionless number. Dry air possesses a dielectric constant of 1.00059. Glass possesses a dielectric constant in the range of 4.0 to 7.0 depending upon the specific type. The higher the dielectric constant, the

greater the isolation that is provided. Thus, fiber-optic cables have an isolation capability that is 4 to 7 times greater than dry air. The voltage breakdown rating of a typical fiber-optic cable is on the order of 250 KV per meter.

A fault at either end of the data link might destroy the modem but will not propagate over the fiber-optic cable. For example, one of the tests that must be performed to qualify an isolator is the application of the maximum credible fault (voltage, current) to the output of the device to verify that the fault does not propagate or degrade the input (Class 1E) side. This postulated failure does not affect fiber-optic cable, and as stated above, the optical fibers are totally dielectric (i.e., the electrical energy resulting from the fault will not propagate through the optical fiber). Another characteristic of the optical fiber cable is its nonsusceptibility to the coupling of cross-talk and electromagnetic interference (EMI).

Technical Specification 4.3.1.1.4 only contains the surveillance requirements for the specific isolation equipment in the existing CPCS hardware. Testing of the new devices in accordance with the existing TS is neither necessary nor practical, as the new equipment uses non-conducting fiber-optics cable as described above. The existing TS will no longer be appropriate upon completion of the CPCS upgrade and, therefore, the staff approves the request to remove these requirements.

ENVIRONMENTAL CONSIDERATION

The amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20, and changes to surveillance requirements. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposures. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR Section 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Date: October 17, 1989

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