HELPING BUILD ARKANSAS

ARKANSAS POWER & LIGHT COMPANY

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March 19, 1979

DONALD A. RUETER
DIRECTOR
TECHNICAL AND
ENVIRONMENTAL SERVICES

1-039-10

Director of Nuclear Reactor Regulation
ATTN: Mr. R. W. Reid, Chief
Operating Reactor Branch #4
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
Fire Protection
(File: 1510, 2040)

Gentlemen:

In reference to your letter dated March 5, 1979, we take exception to items 1b and 1d. As indicated in the ANO-1 Fire Protection SER, we were to provide you with additional information in the form of design details, test results, or acceptance criteria for the Cable Spreading Room and Corridor deluge systems. We provided you with these design details and acceptance criteria in our January 18, 1979 and January 31, 1979 letters. At the time we wrote these letters no tests of the deluge systems had been proposed.

Item 1b of your March 5, 1979 letter requires that we perform a test to ensure that the number and placement of the smoke detectors in the Cable Spreading Room and Corridor is sufficient to actuate the deluge systems in time to prevent damage to the safe shutdown cables in conduit. From our conversation March 9, 1979 we understand that you are concerned that smoke generated in a fire might disperse in such a way that the smoke detectors might alarm late or not at all. You also indicated in the March 9 conversation that we were one of the few plants not having an alternate safe shutdown system not routed through Cable Spreading Room, making protection of the safe shutdown cables in conduit paramount.

Our basis for believing that the proposed tests are not necessary or beneficial is as follows:

1) In both the Cable Spreading Room and the Corridor we have installed twice as many smoke detectors than what is required to meet the smoke detector vendor's recommendations and those in NFPA 72-E 1974.

2) The smoke detectors installed in the Cable Spreading Room are not indiscriminately sited, but are installed as per the recommendations of NFPA 72-E 1974. The detectors are installed at the ceiling (flat, with no obstructions) where smoke would naturally rise to, due to buoyancy forces acting upon the smoke. The buoyancy forces acting together with the volume expansion of the smoke due to its temperature above the ambient ensure that sufficient quantities of combustion products are present at the ceiling to activate the smoke detectors. The only other possible force acting upon smoke from a fire would be the slight existing draft due to the ventilation system. The small horizontal component this draft would add to the smoke flow is negligible when compared to the smoke movement due to buoyancy forces and volume expansion.

3) We know of only two methods of performing the subject tests. The first method, utilizing smoldering fires or chemical smoke bombs, is impractical due to the corrosive fumes such a test would produce, and due to the sooty deposits that would be formed on everything in the area. The second method, utilizing a non-corrosive tracer gas, is unacceptable due to the fact that the gas does not have the same driving force that smoke produced in a fire does. The dispersion patterns of the smoke from a fire and the tracer gas would be different, thereby, rendering the tracer gas test results useless. This would also be true to a smaller degree for the smouldering fire or chemical smoke bomb tests.

4) One division of safe shutdown cables in the Corridor will be protected by Kaowool wrap.

Item 1d of your March 5, 1979 letter requires that we modify the actuation logic of the Cable Spreading Room and Corridor deluge systems to include actuation by two heat detectors or two smoke detectors. We understand from our March 9 conversation that the staff is concerned that actuation by one smoke detector and one heat detector may not be the quickest way to actuate the deluge system. The staff emphasized that quick actuation of the deluge system is important in the Cable Spreading Room due to ANO-1 not having an alternate safe shutdown system.

Our basis for believing that the proposed logic modifications are not necessary and are actually counterproductive are as follows:

1) As stated in the ANO-1 Fire Protection SER and agreed upon by your staff and ours in the fire protection meeting held May 24, 1978, at the Phillips Building, the deluge systems, if installed should be actuated by smoke and heat detectors. We feel that the method of deluge system actuation was agreed upon before the SER was issued and that modifications in the actuation logic are not design details, but a major new requirement.

2) By increasing the actuation options, the circuit complexity is increased to where it can no longer be supervised without the help of a small computer.

3) By increasing the complexity of the system the probability of a spurious actuation of the deluge system is increased. At this time a spurious actuation can only be initiated in Panel C463. If the suggested logic modifications are implemented the number of points where a spurious actuation can originate increases to include the heat detector panel, smoke detector panel, C463, and the computer.

4) We believe that before a fire could generate enough heat to spread past the first tray the Protectowire in that tray would actuate an alarm in the control room (warning that there is a fire) and the smoke generated would actuate one or more smoke detectors completing the actuation of the deluge system. As shown in NUREG/CR-0376 flame spread in vertical stacks of trays is a complicated process and is not instantaneous. For a fire to propagate, first the cables in the tray above the donor tray must begin to gasify. In the case of a donor fire initiated by electrical overcurrents (the only credible source of fire in the Cable Spreading Room) and trays 10.5 inches apart, it takes approximately 1 minute for the cables in the tray above the donor tray to gasify*. As stated in the above referenced NUREG, second paragraph on Page 1, "After the fire in tray #1 had been burning for 5 minutes, a fireball ignited against the underside of tray #3. The fireball grew downward in 15 seconds and ignited tray #2 from above. Then the fireball burned out. Further spread to higher trays proceeded similarly." This quote supports our contention that enough heat and smoke would be generated to actuate the deluge system as it is now designed before the fire could spread to a second tray or effect cables in conduit.

5) One division of safe shutdown cables in the Corridor will be protected by Kaowool wrap.

6) In addition to the automatic mode of actuation, the systems can be actuated manually. Upon the receipt of an alarm from any one detector a fire brigade member would, with all possible haste, go to the affected zone to assess the situation personally. The Cable Spreading Room and Corridor are immediately below the Control Room keeping the delay time to visual inspection minimal. Once a fire in either zone is detected the deluge system in that zone can be actuated manually. The deluge valves (one of the two points where the systems can be actuated manually) are immediately outside the two zones.

*NUREG/CR-0376, Page 15, case (i)

7) We can find no reference to any similar requirements in BTP 9.5-1, Regulatory Guide 1.120, any of the Staff Fire Protection Positions we have received, or within any of the NFPA codes. We have not seen any test results which would indicate to us that the proposed logic modifications would actuate the deluge systems significantly quicker than our present arrangement. Our fire protection consultant has advised us that these requirements are not common industry practice and are not necessary.

In addition to our technical basis for not modifying the systems' logics, our 3rd refueling outage is scheduled to begin March 30, 1979, which makes implementation of the logic modifications during this outage impossible. We are presently installing the deluge systems using the one heat detector and one smoke detector logic. The remaining work must be finished during the upcoming refueling outage or it will be delayed appreciably. Therefore, if our basis for the installation of this system as presently designed is not sufficient please notify us by March 26, 1979 so that we may delay installation of these systems until the 4th refueling outage.

Very truly yours,

Donald A. Rueter

Donald A. Rueter

DAR:MOW:vb