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FACIL:50-269 Oconee Nuclear Station, Unit 1, Duke Power Co. 05000269
50-270 Oconee Nuclear Station, Unit 2, Duke Power Co. 05000270
50-287 Oconee Nuclear Station, Unit 3, Duke Power Co. 05000287

AUTH.NAME AUTHOR AFFILIATION
TUCKER,H.B. Duke Power Co.
RECIP.NAME RECIPIENT AFFILIATION
DENTON,H.R. Office of Nuclear Reactor Regulation, Director
STOLZ,J.F. Operating Reactors Branch 4

SUBJECT: Forwards four addl exemption requests from 10CFR50,App R, Section III.G.2 requirements per 831024 initial request.No addl license fees necessary.

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November 11, 1983

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. John F. Stolz, Chief
Operating Reactors Branch No. 4

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287

Dear Sir:

My letter of October 24, 1983 submitted an initial request for exemption to 10 CFR 50, Appendix R, and indicated that as a result of on-going internal reviews, additional exemption requests would be forthcoming.

Accordingly, please find attached four exemption requests related to 10 CFR 50, Appendix R, Section III.G.2.

The request for exemption is considered to supplement a previous request for which license fees were provided. As such, no additional license fees are deemed necessary.

Very truly yours,

Hal B. Tucker

Hal B. Tucker

RLG/php

Attachment

cc: Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
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Atlanta, Georgia 30303

Mr. J. C. Bryant
NRC Resident Inspector
Oconee Nuclear Station

Mr. John F. Suermann
Office of Nuclear Reactor Regulation
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Attachment
Duke Power Company
Oconee Nuclear Station
Request for Exemption to 10 CFR 50, Appendix R, Section III.G.2

Pursuant to 10 CFR 50, §50.12, Duke Power Company requests the following exemption to 10 CFR 50, §50.48 and Appendix R. Section 50.48(b) requires that Appendix R, III.G, Fire Protection of Safe Shutdown Capability, or alternately, III.L, Alternative and Dedicated Shutdown Capability, be implemented at Oconee. By letter dated March 28, 1980, Duke submitted a design description of the Standby Shutdown Facility (SSF). This design was approved by NRC letter dated April 28, 1983. The SSF design incorporates 3-hour fire barriers between SSF required systems and balance of plant systems. As such, the requirements of Section III.G.2 apply.

Section III.G.2 states,

> 2. Except as provided for in paragraph G.3 of this section, where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground to redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided:
>
> a. Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel forming a part of or supporting such fire barriers shall be protected to provide fire resistance equivalent to that required of the barrier;
>
> b. Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; or
>
> c. Enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area;
>
> Inside noninerted containments one of the fire protection means specified above or one of the following fire protection means shall be provided:

d. Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards;

e. Installation of fire detectors and an automatic fire suppression system in the fire area; or

f. Separation of cables and equipment and associated non-safety circuits of redundant trains by a noncombustible radiant energy shield.

Duke has reviewed the design of the Oconee fire protection systems and has determined that exemptions to the requirements should be requested in the following four areas:

1. Redundant trains of cables needed for safe shutdown are located in the east and west penetration rooms. The wall which separates the two rooms is constructed of tube steel coated with Pyrocrete 241. This configuration has not been tested for three hour fire resistance per ASTM E-119. Duke chose to use this configuration in 1978 when the Standby Shutdown System (SSF) was conceived. We determined at that time that it was not possible to construct a masonry wall to separate the penetration rooms because the area is extremely congested. In addition, the weight of masonry material and potential seismic qualification problems precluded use of masonry blocks. Therefore, we elected to use a composite pyrocrete on tube steel wall because our judgement is that it is of equal fire resistance to a tested three hour fire barrier. In making this determination, we referenced UL Listing of Pyrocrete as protection of wide flange steel beams and determined that the (vertical) wall configuration was a more conservative arrangement than the (horizontal) beam. We were aware that there were no ordinary combustible materials adjacent to the wall surfaces which would ignite upon temperature increase of 250°F above ambient which is the heat transfer failure criterion for the ASTM E-119 test. We further considered that ASTM E-119 is a furnace environment test with temperatures in excess of 1900°F and that conditions of the penetration rooms would not result in a fire of this severity. Also a fire plume in the penetration room would mix (balance) throughout the environment resulting in appreciably lower temperature than would occur at the source of a fire or in a furnace test. We conclude that the wall arrangement which separates East and West Penetration Rooms is adequate for fire protection and optimum when considering all variables. Further, we believe this evaluation is consistent with those for which the Staff has previously approved alternatives, as described in SECY 83-269, Attachment A, Section 1.2.3. Inasmuch as this configuration has not been explicitly tested, Duke requests an exemption.

2. Electrical cable tray penetrations in the above tube steel/pyrocrete walls were tested in a 12 inch thick masonry frame. The wall (vertical) configuration is more conservative than the (horizontal) floor assembly which was used for test purposes. Although we utilize the same depth of

penetration sealant material as in masonry wall applications, the wall thickness is less than that of masonry walls. The combustible loading on either side of the wall is such that a fire environment comparable to the design basis three-hour fire test will not occur. We believe this application is consistent with those for which the Staff has previously approved alternatives, as described in SECY 83-269, Attachment A, Section 1.2.3. Inasmuch as this configuration has not been explicitly tested, Duke requests an exemption.

3. Compressed cork is installed as filler material in the seismic expansion joint between the Auxiliary and Reactor Buildings. During discussions with the Staff during 1978 in which the Standby Shutdown System concept was discussed, Duke agreed to construct a fire resistive wall between the East and West Penetration Rooms to separate redundant cable trains required for safe shutdown. When Appendix R was issued this wall (as described above) was considered sufficient to fulfill the requirement of Section III.G.2.a. The areas below the penetration room, the personnel access portal areas, will be protected with automatic sprinkler systems. It is planned to have this effort complete by May 1, 1984. Personnel routinely transit through these areas and a fire would be detected and fire fighting activities promptly initiated. Sufficient ceiling height and room volume exists to dissipate a fire generated thermal plume. Considering the above, the existing arrangement is adequate for fire protection of redundant trains of cables in the East and West Penetration Rooms. We believe the evaluation of this application is consistent with those for which the Staff has previously approved alternatives, as described in SECY 83-269, Attachment A, Section 1.2.3. Inasmuch as this configuration has not been explicitly accepted and it is not a three-hour barrier, Duke requests an exemption.

4. Inside each Reactor Building redundant trains of equipment required for safe shutdown are generally located on opposite sides of the building. By letter dated April 30, 1981, Duke Power provided an evaluation of the cable separation inside each Oconee Reactor Building. In that submittal, one instance was identified where less than 20 feet separation existed. In the Unit 1 Reactor Building, SSF pressurizer level transmitter (LT-72) is separated from the balance of plant instrument by approximately 15 feet with no intervening combustibles. In areas between redundant instruments required for safe shutdown, cable concentrations are low, generally one or two cable trays per location. Since the cable is comparable to IEEE-383 qualified cable, the plastic insulation is considered "fire retardant", Cables have metallic sheathing beneath the insulation which will prevent an internal short from propagating to adjacent cables, thereby causing a fire. Therefore, a postulated fire in the Reactor Building would have to involve transient combustibles. Administrative control of transient combustibles and Reactor Building tours at the conclusion of each outage prior to unit startup reduce the possibility of a transient fire. Areas between redundant instruments are generally open and have appreciable volume of space available for heat from a fire to dissipate. Fires involving plastic fire resistant cable insulation generally propagate slowly which would allow time for fire brigade response to control a postulated fire. Based on information as outlined above, separation of redundant cable and instruments required for safe shutdown in each Reactor Building is adequate for fire protection. However, Duke requests an exemption to Section III.G.2.d. as the horizontal distance of 20 feet cannot be maintained between safety circuits and non-safety circuits.