April 18, 1990

Docket No. 50-346

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Mr. Donald C. Shelton
Vice President - Nuclear
Toledo Edison Company
Edison Plaza - Stop 712
300 Madison Avenue
Toledo, Ohio 43652

Dear Mr. Shelton:

SUBJECT: EXEMPTION TO 10 CFR PART 50, APPENDIX R, SECTIONS III.G & III.J (TAC NO. 60995)

The Commission has issued the enclosed Exemption from certain requirements of Appendix R to 10 CFR Part 50 for the Davis-Besse Nuclear Power Station, Unit 1, in response to your letters dated January 12, 1987 and July 31, 1989. The subject regulations are related to the requirements to provide fire protection features for systems and components important to safe shutdown of the plant and to the requirement for emergency lighting units inside and outside the plant in the event of a fire.

The Exemption is enclosed. A copy of the Exemption is being filed with the Office of the Federal Register for publication.

Sincerely,

/s/

Thomas V. Wambach, Sr. Project Manager
Project Directorate III-3
Division of Reactor Projects - III,
IV, V and Special Projects
Office of Nuclear Reactor Regulation

Enclosure:
As stated

cc: See next page

DOCUMENT NAME: 60995 EX

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Date:	/90	4/16/90	4/16/90	

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

April 18, 1990

Docket No. 50-346

Mr. Donald C. Shelton
Vice President - Nuclear
Toledo Edison Company
Edison Plaza - Stop 712
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Sincerely,

Thomas V. Wambach

Thomas V. Wambach, Sr. Project Manager
Project Directorate III-3
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IV, V and Special Projects
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Enclosure:
As stated

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Public Utilities Commission
180 East Broad Street
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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
TOLEDO EDISON COMPANY	)	Docket No. 50-346
THE CLEVELAND ELECTRIC	)	
ILLUMINATING COMPANY	)	
	)	
(Davis-Besse Nuclear Power Station	)	
Unit No. 1)	)	

EXEMPTION

I.

The Toledo Edison Company and The Cleveland Electric Illuminating Company (the licensees), are the holders of Facility Operating License No. NPF-3 (the license) which authorizes operation of the Davis-Besse Nuclear Power Station, Unit No. 1. The license provides, among other things, that it is subject to all rules, regulations and Orders of the Nuclear Regulatory Commission (the Commission) now and hereafter in effect.

The facility consists of a pressurized water reactor located at the licensee's site in Ottawa County, Ohio.

II.

The Toledo Edison Company (the licensee) requested eight exemptions from the Commission's regulations in its letters dated January 12, 1987 and July 31, 1989. Seven of the exemptions are from the requirements in Section G of Appendix R to 10 CFR Part 50 which requires that certain measures be taken to protect the systems and components required to achieve and maintain a safe shutdown in the event of a fire. The eighth requested exemption is related to a requirement in Section J of Appendix R regarding emergency lighting in the event of a fire.

The licensee has previously requested a number of exemptions from the technical requirements of Appendix R in its letters dated April 29, 1982 and September 30, 1983. The staff approved those exemption requests in two letters dated November 23, 1982 and August 30, 1984. Those exemptions remain in force.

The licensee's additional request for exemptions from certain requirements of Appendix R was originally submitted in its letter dated March 6, 1986. That request was subsequently superseded by the licensee's letter dated January 12, 1987 which requested nine specific exemptions. The licensee later withdrew its request for two of these exemptions in its letters dated January 18, 1989 and March 15, 1989. Additionally, the staff found that one of these requested exemptions was not required in that Generic Letter 86-10, "Implementation of Fire Protection Requirements," provided an alternative approach for satisfying the applicable requirements of Appendix R. Accordingly, there are six proposed exemptions now pending from the licensee's letter of January 12, 1987.

The licensee later submitted in its letter dated July 31, 1989, a request for three additional exemptions from Appendix R including one of the exemption requests previously withdrawn in its letter of January 18, 1989. One of these three exemption requests was later withdrawn in the licensee's letter dated October 26, 1989. There are, therefore, a total of eight pending requests for exemptions from the requirements of Appendix R remaining from the two letters cited above. The following listing presents the current status of the twelve exemption requests submitted in the licensee's letters dated January 12, 1987 and July 31, 1989. This tabulation also

cites the applicable sections of Appendix R from which relief is being sought. The last item in this table is a resubmittal of one of the items from the licensee's letter of January 12, 1987.

ITEM	DATE OF EXEMPTION REQUEST	APPENDIX R SECTION	STATUS
1. Fire Area R	01/12/87	III.G.3	Pending
2. Fire Area EE	01/12/87	III.G.3	Pending
- Fire Area HH	01/12/87	-	Not required
- Fire Area U	01/12/87	-	Withdrawn 03/15/89
3. Fire Area AB	01/12/87	III.G.3	Pending
4. Fire Area A	01/12/87	III.G.2	Pending
5. Emergency lighting	01/12/87	III.J	Pending
- Embedded conduits	01/12/87	-	Withdrawn 01/18/89
6. Fire Area D	01/12/87	III.G.2	Pending
- Pressurizer level circuits	07/31/89	-	Withdrawn 10/26/89
7. MH 3001	07/31/89	III.G.2	Pending
8. Embedded conduits	07/31/89	III.G.2	Pending

Each of these eight pending exemption requests is discussed below, with the staff's evaluation of the licensee's presentation of the special circumstances for each specific exemption.

Fire Areas R, EE, and AB

For Items 1, 2 and 3 of the table above, the licensee has requested exemptions from the requirements of the last paragraph of Section III.G.3 of Appendix R which states in part that a fixed fire suppression system shall be installed in the area under consideration (i.e., Fire Areas R, EE and AB) in that an alternative shutdown capability and its associated circuitry is provided for each of these three areas. Specifically, Fire Area BD provides an alternative shutdown capability for the service water system in Fire Area R. Additionally, an alternative shutdown capability

and its associated circuitry is provided in Fire Area II for the control valves of the turbine driven auxiliary pumps in Fire Area R. Fire Area EE has an alternative shutdown capability in Fire Area II which is physically and electrically independent for potential fire damage to either the circuits or electrical components of the MS106 main steam inlet isolation valve for auxiliary feedwater pump turbine No. 1. Fire Area AB has an alternative shutdown capability in Room No. 115 for potential fire damage to circuits associated with the emergency core cooling system (ECCS) room cooler fans C31-1 and C31-2.

The detailed description of the configuration of the three subject areas, including the construction of the perimeter boundaries, the potential fire hazards, and the available fire protection, is contained in the licensee's letter dated January 12, 1987, in its Fire Hazards Assessment Report (FHAR) and in the Davis-Besse Appendix R Compliance Assessment Report (CAR). Part of the licensee's basis for its request for exemptions for these three fire areas is the limited fire hazard in which the equivalent fire severity would range from 4 minutes in Fire Areas R and AB to 8 minutes in Fire Area EE. These relatively low equivalent fire severity times are due to the low in-situ combustible loadings in the subject areas. The licensee also justifies its exemption request for these three fire areas based on the available fire protection.

The staff agrees with the licensee that fires of significant magnitude would not occur in the subject areas nor would they spread beyond the boundaries of these areas. As a result, the cables and/or components which provide the alternative shutdown capability for the equipment in these three

fire areas, as discussed above, would not be damaged. The staff's basis is that the principal fire hazards in the subject areas are the insulation on the electrical cables. A fire involving cable insulation is characterized initially by slow burning with a gradual rise in room temperature and significant quantities of smoke. Since the combustion products would be detected by either the existing smoke detection systems or by the plant personnel, the fire brigade would be dispatched and suppress the fire using manual fire fighting equipment. Furthermore, the walls, floors and ceilings of these three fire areas are 3-hour fire barriers which would be effective in confining the effects of a fire to the area of its origin until the arrival of the fire brigade. Additionally, Fire Area EE has a partial sprinkler system covering at least 30 percent of the area which would tend to minimize a fire in this area. Moreover, as discussed above, there is an alternative shutdown capability for each of these three fire areas which is both physically and electrically independent, thereby permitting a safe shutdown to be achieved even if the subject areas were to sustain fire damage.

On this basis, the staff finds that the licensee has demonstrated, as required by 10 CFR 50.12(a)(2)(ii), that the application of the regulation requiring a fixed fire suppression in Fire Areas R, EE and AB is not necessary to achieve the underlying purpose of the rule (i.e., achieve and maintain a safe shutdown of the plant).

Fire Area A

For Fire Area A (Item 4 of the table above), the licensee has requested an exemption from the requirement of Section III.G.2.a of Appendix R which

requires in part that cables and equipment and associated nonsafety circuits of redundant trains be separated by a fire barrier having a 3-hour rating. While there are, in general, 3-hour fire barriers in Fire Area A between redundant circuits used to achieve and maintain hot shutdown conditions, there are a number of nonrated fire walls bounding some of the rooms within this subject area. Specifically, the Train 1 safe shutdown circuits in Room Nos. 123 and 124 are not completely separated from the Train 2 circuits in Room No. 115 by a 3-hour fire barrier.

The licensee's basis for its request for an exemption for Fire Area A is that the present level of fire protection is acceptable since smoke and heat from a fire would have to travel between redundant circuits via a complicated path through locations which are partly protected by an automatic sprinkler system in order that a fire in the vicinity of one train could also damage the redundant train. This complicated path derives from the layout of Fire Area A which is a complex of a number of individual rooms encompassing more than one elevation within the plant.

On the basis of its review of the licensee's fire hazards analysis (FHA) and its on-site inspection of the subject fire area, the staff agrees with the licensee that there is presently an acceptable level of fire protection within Fire Area A.

Additionally, the licensee stated in its letter dated May 27, 1987, that if Train 1 systems were to be damaged by a fire in Room Nos. 123 and 124, the plant procedures would direct the plant operators to use the undamaged Train 2 systems in Room No. 115. Since Train 1 shutdown systems are relied upon in Fire Area A, the staff finds that these procedures

transferring reliance to Train 2 provide further assurance that the safe shutdown capability will be maintained in the event of a fire in the subject area. On the basis that the plant operators are fully trained in the transfer procedures cited above, the staff finds that these procedures are acceptable and that there will be no confusion experienced by the operators in making the safe shutdown capability transfer.

During its review of the licensee's FHA, the staff identified a concern regarding a cable chase in the subject fire area which had a significant in-situ fire load but was not protected by an automatic fire suppression system. The licensee addressed this concern in its letter dated May 27, 1987 by stating that the cable trays in this chase were protected by: the trays' solid bottoms; a cover of fire resistant material (i.e, Kaowool); a fire detection system; and manual fire fighting equipment. Additionally, the licensee stated that the high fire loading is attributable to the small floor area of the chase. The staff finds that the licensee's responses in its letter of May 27, 1987 satisfy its specific concerns identified in its review of the Davis-Besse FHA. The staff further concludes that the licensee has demonstrated, as discussed above, that it can achieve and maintain a safe shutdown even if the subject area were to sustain fire damage.

On this basis, the staff finds that the licensee has demonstrated, as required by 10 CFR 50.12(a)(2)(ii), that the application of the regulation requiring that cables and equipment of redundant trains in Fire Area A be separated by a 3-hour fire barrier is not necessary to achieve the underlying purpose of the rule (i.e., achieve and maintain a safe shutdown of the plant).

Emergency Lighting

For Item 5 of the table above, the licensee has requested an exemption from the requirement of Section III.J of Appendix R which requires that emergency lighting units with at least an 8-hour battery power supply be provided in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto. Specifically, the licensee requested approval to use existing "hard-wired" AC/DC essential lighting systems in certain portions of the auxiliary and turbine buildings and to use hand-held portable lighting units in outside plant areas in lieu of meeting the specific requirement of Section III.J cited above.

The staff initially identifed four specific concerns regarding this particular exemption request. In response to the first of these concerns, the licensee stated that the results of its own evaluation confirmed that the AC/DC lighting system in the pertinent portions of the auxiliary and turbine buildings which would be used in establishing an alternative method for achieving a safe shutdown in the event of a fire in either the control room or the cable spreading room, would not be disabled by a fire in either of these latter two locations. On the basis that there is an alternative means for achieving a safe shutdown with the existing AC/DC lighting systems in the event of a fire in either the control room or the cable spreading room, the staff finds that this concern has been resolved.

With respect to the staff's concern regarding the use of hand-held lighting units while conducting manual operations in outside plant areas, the licensee confirmed in Attachment 3 to its letter dated May 27, 1987 that no operator manual actions are required to achieve safe shutdown

which would involve the use of both hands. On this basis, the staff finds this concern resolved. With respect to the third of the staff's concerns, the licensee also confirmed in its letter dated May 27, 1987 that the travel route of the operators is free from potentially hazardous conditions for those outside plant areas where operator action is required to achieve safe shutdown. On this basis, the staff finds this particular concern resolved.

The staff also expressed its concern that the illumination level in certain areas might not be sufficient to permit the plant operators to perform actions required to achieve a safe shutdown. In response, the licensee stated in its letter dated January 12, 1987, that a plant walkdown was performed to verify that there was adequate illumination within these areas for all activities which must be performed in the first 8 hours following the onset of a fire. This is also true for the access routes to these areas of concern. Following this plant walkdown, the licensee installed additional emergency lighting units and repositioned others. These modifications were performed consistent with the guidance provided in Generic Letter 86-10, "Implementation of Fire Protection Requirements." On this basis, the staff finds that this last concern regarding emergency lighting is resolved.

The staff agrees with the licensee that there is an acceptable method for providing emergency lighting in those portions of the auxiliary and turbine buildings that the plant operators must enter to achieve a safe shutdown in the event of a fire in either the control room or the cable spreading room. The staff also agrees with the licensee that there is an

acceptable method for providing emergency lighting in outside plant areas. Finally, the staff also agrees that the modifications to the emergency lighting units cited above made in accordance with Generic Letter 86-10 are acceptable.

On the basis that the licensee has provided acceptable emergency lighting units for all areas, including the access routes, that plant operators must enter in the event of a fire, the staff finds that the licensee has demonstrated, as required by 10 CFR 50.12(a)(2)(ii), that it meets the underlying purpose of the rule regarding emergency lighting.

Fire Area D

For Fire Area D (Item 6 of the table above), the licensee has requested an exemption from the requirement of Section III.G.2.d of Appendix R which requires, for non-inerted containments, that cables and equipment and associated nonsafety circuits of redundant trains be separated by a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards. Specifically, the licensee's request is with respect to three redundant containment air cooler fans (i.e., C1-1, C1-2, and C1-3) which are about 10 feet apart. The physical configuration of this fire area, its fire hazards, and available fire protection, are provided in the licensee's letter requesting this exemption.

The staff agrees with the licensee that it has met the underlying purpose of the rule as discussed below. The licensee originally committed to protect the three circuits associated with these fans by radiant energy shields in its letter dated January 12, 1987. However, in its letter dated February 16, 1990, the licensee revised this commitment to protect only one

of these circuits with a radiant energy shield in the containment and annulus and with a 1-hour barrier and fire suppression and detection systems or with a 3-hour fire barrier in the auxiliary building. This proposal to protect only one train of a system is in compliance with the requirements of Appendix R to 10 CFR Part 50 and is acceptable. With respect to the fan coolers themselves, the small fire loading in this area would result in a relatively minor equivalent fire severity of about 4 minutes in the fire zone where the fan coolers are located (i.e., Fire Zone D-15). Further, the configuration of this area would tend to dissipate smoke and hot gases away from the subject fan coolers in the event of a fire. Additionally, the metal cabinets enclosing the fans would shield the fans themselves from the radiant energy of a fire.

On this basis, we find that the licensee has demonstrated, as required by 10 CFR 50.12(a)(2)(ii), that the application of the regulation requiring that the subject equipment be separated by more than 20 feet is not necessary to achieve the underlying purpose of the rule (i.e., achieve and maintain a safe shutdown of the plant).

Manhole MH 3001

For manhole MH 3001 (Item 7 of the table above), the licensee has requested an exemption from the requirement of Section III.G.2.b that requires in part that cables and equipment and associated nonsafety circuits located in the same fire area outside of primary containment and necessary to achieve and maintain hot shutdown conditions be separated by a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards. Specifically, the licensee's request is with respect to redundant

circuits in the subject manhole associated with the service water system, including pumps (P3-1, P3-2 and P3-3), the backup pump (P-180), valves (SW 1395 and SW 1399) and motor control centers (MCCs E12C and F12C), which are less than 6 feet from one another. This manhole has neither active nor passive fire protection features.

The staff agrees with the licensee that there is a negligible potential for a fire which could damage redundant cables in this manhole in that there are no credible external sources of fire since the manhole is constructed with a concrete raised sill whose top opening is covered with a steel cap bolted into place. As a result, the only significant fire threat to the redundant cables is from a cable-induced fire within the manhole itself. With respect to this fire potential, the licensee stated in its exemption request that the insulation on the cables in this manhole satisfies the criteria of IEEE Standard 383-1974 or its equivalent. Accordingly, this material will not sustain combustion unless an external heat source is present. Since the redundant cables are separated in accordance with the guidance in Regulatory Guide 1.75 and the cables are protected against protracted fault conditions by overcurrent devices, the staff concludes that there is a negligible potential for a fire which could damage the redundant circuits.

On this basis, the staff finds that the licensee has demonstrated, as required by 10 CFR 50.12(a)(2)(ii), that the subject redundant cables in manhole MH 3001 need not be physically separated by more than 20 feet to achieve the underlying purpose of the rule (i.e, achieve and maintain a safe shutdown) in that there is negligible potential for a fire in the subject fire area.

Embedded Conduits

For certain cables of electrical circuits which are enclosed in conduit and embedded in concrete walls, floors and ceilings (Item 8 of the table above), the licensee has requested an exemption from the requirement of Section III.G.2.a of Appendix R which requires in part that cables and equipment and associated nonsafety circuits of redundant circuits required to achieve a safe shutdown be separated by a fire barrier having a 3-hour rating. The subject cables were not evaluated by the licensee in its safe shutdown analysis for a fire. Moreover, the depth and configuration of the concrete covering these cables is insufficient in the event of a fire to meet the Appendix R requirement cited above. The licensee later submitted supplemental information regarding the subject exemption request in its letter dated September 30, 1989.

The licensee stated in the cited documents that it conducted a comprehensive effort to determine where potentially vulnerable cables were installed and to determine the depth and configuration of the concrete cover, the steel reinforcing bars and anchor bolts, all of which have an effect on the fire resistance of the reinforced concrete cover. The licensee determined in its analysis, using the standard heat input specified in ASME E-119, that if a fire were to occur in any of the subject areas, the temperature of the electrical cables would not exceed 310°F in a 30-minute period. When active fire suppression activities begin after the arrival of the fire brigade, thereby removing the heat source, the licensee stated that the cable temperatures would continue to rise to a maximum of 370°F and then diminish. The temperature-time profiles cited above were used as a reference to assess the adequacy of fire protection for the embedded cables in the subject fire areas.

The staff agrees with the licensee that 370°F is an acceptable temperature limit below which significant fire damage to the electrical cables would not occur. Furthermore, the staff finds that this acceptance criteria is conservative in that the nature and configuration of the combustibles in the subject fire areas will produce a temperature-time profile which is lower than that derived when using ASTM E-119.

The licensee's analysis of the subject fire areas was divided into three categories when comparing the fire hazards with the existing fire protection in each portion of the subject fire areas. The first of these categories was those areas which had combustibles that would result in an equivalent fire loading less than 30 minutes. The staff finds the areas in this first category acceptable on the basis that an all consuming fire less than 30 minutes would not produce sufficient heat to damage the cables; i.e., the maximum possible cable temperature of 310°F would be below the acceptance criterion of 370°F.

In the second category, there are a number of fire areas having combustibles which would yield an equivalent fire loading greater than 30 minutes but which are also protected by automatic fire suppression systems. The staff finds the areas in this second category have an acceptable level of protection on the basis that the fire suppression systems in these areas would actuate automatically during the early stages of a fire.

There are two locations (i.e., Rooms 428 and 515) which have combustibles that would produce an equivalent fire loading greater than 30 minutes but which do not have automatic fire suppression systems. Based on our evaluation of the licensee's justification for not providing automatic suppression

systems for these two rooms and on our inspection of these areas during August 1989, the staff agrees with the licensee that any potential fire in these two rooms would be suppressed by the plant fire brigade well before room temperatures reached a level high enough to cause cable damage.

Based on the validity and conservatisms in the licensee's heat transfer analyses of the protective cover over the embedded conduits in the subject areas and on the subsequent evaluation as discussed above, the staff concludes that the licensee has provided an acceptable level of fire protection for the subject fire areas. On this basis, the staff finds that the licensee has demonstrated, as required by 10 CFR 50.12(a)(2)(ii), that the subject redundant embedded cables need not have a 3-hour fire barrier to achieve the underlying purpose of the rule (i.e., achieve and maintain a safe shutdown) in that the reinforced concrete cover and other protective measures will limit the temperature rise in the embedded cables below the threshold of damage.

III.

In summary, the NRC staff finds that the licensee has demonstrated, for each of the eight exemption requests, that there are special circumstances present as required by 10 CFR 50.12(a)(2). Further, the staff also finds that, for each of these exemption requests, the fire protection provided by the licensee will not present an undue risk to the public health and safety.

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12, the eight exemptions as described in Section II are authorized by law and will not endanger life or property or the common defense and

security and are otherwise in the public interest and hereby grants the eight exemptions with respect to the requirements of 10 CFR Part 50, Appendix R, Sections III.G and III.J.

Pursuant to 10 CFR 51.21, 51.32, and 51.35, an environmental assessment and finding of no significant impact has been prepared and published in the Federal Register (55 FR 10727, March 22, 1990). Accordingly, based upon the environmental assessment, the Commission has determined that the granting of these exemptions will not have a significant effect on the quality of the human environment.

This Exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

John A. Zwolinski, Acting Director
Division of Reactor Projects - III,
IV, V and Special Projects
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland
this 18th day of April, 1990