

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

|                               |   |                   |
|-------------------------------|---|-------------------|
| In the Matter of              | ) | Docket No. 50-331 |
|                               | ) |                   |
| IOWA ELECTRIC LIGHT AND POWER | ) |                   |
| COMPANY, CENTRAL IOWA POWER   | ) |                   |
| COOPERATIVE, AND CORN BELT    | ) |                   |
| POWER COOPERATIVE             | ) |                   |
|                               | ) |                   |
| (Duane Arnold Energy Center)  | ) |                   |

EXEMPTION

I.

Iowa Electric Light and Power Company, et al. (the licensee) is the holder of Facility Operating License No. DPR-49 which authorizes the operation of the Duane Arnold Energy Center at steady state reactor power levels not in excess of 1658 megawatts thermal. The facility consists of a boiling water reactor located at the licensee's site near Palo in Linn County, Iowa. The license provides, among other things, that it is subject to all rules, regulations and Orders of the Commission now or hereafter in effect.

II.

Section 50.48 of 10 CFR Part 50 requires that licensed operating reactors be subject to the requirements of Appendix R of 10 CFR Part 50. Appendix R contains the general and some of the specific requirements for fire protection programs at licensed nuclear facilities. On February 17, 1981, the fire protection rule for nuclear power plants, 10 CFR 50.48 and Appendix R, became effective. This rule required all licensees of plants licensed prior to January 1, 1979, to submit by March 19, 1981: (1) plans and schedules for meeting the applicable requirements of Appendix R, (2) a design description of

any modifications proposed to provide alternative safe shutdown capability pursuant to Paragraph III.G.3 of Appendix R, and (3) exemption requests for which the tolling provision of Section 50.48(c)(6) was to be invoked.

The licensee responded to these requirements by a letter dated March 19, 1981, and supplemented its response by information transmitted by letters dated July 3, 1981, June 22, 1982, and January 10 and February 15, 1983.

In these submittals, the licensee requested certain exemptions from the requirements of Section III.G of Appendix R to 10 CFR Part 50, which requires that one train of cables and equipment necessary to achieve and maintain safe shutdown be maintained free of fire damage by one of the following conditions:

- 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 combustibles or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; or
- c. Enclosure of cables and equipment and associated non-safety circuits of one redundant train in a fire barrier having a one-hour rating. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area.

If these conditions are not met, Section III.G.3 requires alternative shutdown capability independent of the fire area of concern.

By a letter dated April 26, 1983, the Commission issued Exemption from certain requirements of section 50.48 and Appendix R to 10 CFR 50 for Reactor Building Torus Area, North and South Control Rod Drive (CRD) Module Areas, Reactor Building Residual Heat Removal (RHR) Valve Room, Lower Switchgear Room, Battery Rooms, and Essential Switchgear Rooms. The licensee has requested additional exemptions from Section III.G of Appendix R by letters dated June 22, 1982, January 10, 1983, and February 15, 1983. Exemptions were requested for two specific fire areas, specific fire suppression systems, specific fire area boundaries, and a vertical equipment hatch between the CRD Module Areas and the Laydown Areas. The Commission's evaluation and findings regarding the additional exemption requests follow:

1. The licensee requested an exemption from the provisions of Section III.G of Appendix R for the Reactor Building Southwest Corner (Fire Zone 1-G) to the extent that it requires automatic suppression and a one-hour fire barrier for protection of redundant cables and equipment.

The licensee justified the exemption request by stating that, due to a limited quantity of combustible material in the fire area, a fire of sufficient intensity to bridge redundant cable trays or damage the redundant cables in conduit protected by a one-hour barrier is not probable. Furthermore, the licensee will provide a one-hour barrier for the protection of all Division I cables and equipment. Because of the low combustible loading and existing early warning detection system, there is a reasonable assurance that

the proposed one-hour barrier will maintain one train free of fire damage in the time interval needed for a fire brigade to respond and manually extinguish the fire.

Our evaluation shows that the proposed modifications along with the level of safety provided in the Reactor Building Southwest Corner Room (Fire Zone 1-G) will be equivalent to the technical requirements of Section III.G of the Appendix R. The licensee's request for this exemption should therefore, be granted.

2. By letters dated June 22, 1982, and January 10, 1983 the licensee requested an exemption from Section III.G, for the Duane Arnold Energy Center Turbine Building Water Treatment Condensate Pump Area (Fire Zone 7-E) to the extent that it requires automatic suppression and one-hour rated fire barriers for the protection of redundant cables and equipment.

The licensee has justified this request for exemption from suppression capability for this zone by stating that the protection is adequate by virtue of horizontal distances involved and the extremely low combustible loading of the zone. Subsequently, by a letter dated February 15, 1983, the licensee committed to provide a one-hour fire barrier for the protection of all Division I cables in this zone, and provided further justification for not providing automatic suppression.

We have reviewed the licensee's submittals, and find that the combustibles stored in the separation areas are not located directly beneath the redundant safety-related cables. Additionally, curbing and floor drains are provided to prevent any spills from

spreading to areas close to safe shutdown cables. The licensee has committed to enclose all Division I cables in this zone in a one-hour rated fire barrier. This protection in conjunction with the configuration of the area, ceiling height, and installed early warning detection system provide reasonable assurance that one train will be maintained free of fire damage in the interval needed for the fire brigade to respond and manually extinguish the fire.

Therefore, we conclude that the existing protection in the Turbine Building Water Treatment Condensate Pump Area, combined with the proposed one-hour barriers for Division I cables, provides a level of fire protection equivalent to the technical requirements of Section III.G of Appendix R and that the licensee's request for this exemption should be granted.

3. By letter dated June 22, 1982 the licensee submitted proposed modifications to several plant areas to comply with Appendix R. By letters dated January 10 and February 15, 1983 the licensee submitted additional information and requested exemption from Section III.G for six areas protected by partial suppression systems. The licensee based this exemption request on the following bases:
  - (1) In Zone 2-A there is adequate distance of the cable trays above the floor and below the ceiling, and automatic suppression capability in the vicinity of those trays enclosed in one-hour fire barriers;
  - (2) Zone 2-B will have low combustible loadings in the vicinity of the protected cables, and automatic suppression in the vicinity of those conduits protected by one-hour fire barrier;

- (3) Zone 2-D will have low fire loading (0.01 hour), horizontal separation, automatic suppression in the vicinity of the conduits, and trays enclosed in a one-hour fire barrier;
- (4) Zone 3-A will have redundant trays horizontally separated by a minimum of eight feet, low fire loading in the area, and automatic suppression in the vicinity of the conduits and trays enclosed in one-hour fire barrier;
- (5) Zone 4-A will have low fire loading in the area, and adequate separation of redundant trays; and
- (6) Zone 16-F will have low fire loading in the area, separation of redundant trains, and automatic suppression in the vicinity of the conduits and trays enclosed in one-hour fire barriers.

We have reviewed the licensee's request for this exemption. The licensee prefers not to install a complete suppression system due to the possibility of damaging sensitive electrical equipment in adjacent areas. Our evaluation shows that, in these six areas, the amount of in-situ and anticipated combustible materials could not cause a fire of sufficient magnitude to overwhelm the system. However, if this were to occur, the one-hour fire barriers will provide additional assurance that one train will be maintained free of fire damage in the time interval required for the fire brigade to respond and manually extinguish the fire. Therefore, we conclude that the level of protection provided for the North and South CRD Module areas (2-A and 2-B), the RHR Valve Room (2-D) area, the Laydown (3-A) area, HVAC heat exchanger and Chiller (4-A) area, and the Pumphouse (16-F) area is equivalent to

the technical requirements of Section III.G of Appendix R. The requested exemption should therefore, be granted.

4. By a letter dated June 7, 1979 the licensee submitted a fire hazards analysis (FHA) which detailed the fire protection features for each fire area in the plant. We accepted the licensee's FHA as meeting our guidelines, and the divisional boundaries of less than 3-hours were accepted on the basis of combustible loading to which the barrier was exposed. The new fire protection rule, 10 CFR 50 Appendix R, was issued subsequent to FHA acceptance. The new rule requires that (1) previously approved configurations of fire protection for safe shutdown capability be verified as providing a level of safety equivalent to that envisaged in Appendix R, and (2) an exemption from Appendix R requirements be granted, if the staff's conclusion were favorable. The licensee, in January 10 and February 15, 1983 letters, indicated that 15 boundaries will be modified to meet the Appendix R requirement, and 37 penetrations between the zones comply with Section III.G of Appendix R. The licensee has requested exemptions for the following 14 remaining boundaries which will not meet the requirements of Section III.G of Appendix R. The boundary zones are listed along with their fire rating and the associated fire loading which could be expected.

| <u>Interfacing Zones</u> | <u>Fire Rating</u> | <u>Expected Fire Load (HR)</u>      |           |
|--------------------------|--------------------|-------------------------------------|-----------|
| 1C                       | 2A/2B              | 1-1/2 hr rated upper stairwell door | 0.16      |
| 1D                       | 2A/2B              | 1-1/2 hr rated lower stairwell door | 0.13      |
| 1D                       | 2A/2B              | 1-1/2 hr rated stairwell door       | 0.13      |
| 1D                       | 2A/2B              | 1-1/2 hr rated damper               | 0.13      |
| 2A/2B                    | 1C                 | 1-1/2 hr rated stairwell door       | 0.38/0.21 |
| 2A/2B                    | 1D                 | 1-1/2 hr rated lower stairwell door | 0.38/0.21 |
| 2A/2B                    | 1D                 | 1-1/2 hr rated stairwell door       | 0.38/0.21 |
| 2A/2B                    | 1D                 | 1-1/2 hr rated damper               | 0.38/0.21 |
| 2A/2B                    | 3A/3B              | 1-1/2 hr rated stairwell door       | 0.38/0.21 |
| 2A/2B                    | 3A/3B              | 2 hr rated elevator door            | 0.38/0.21 |
| 3A/3B                    | 2A/2B              | 1-1/2 hr rated stairwell door       | 0.39/0.26 |
| 3A/3B                    | 4A                 | 1-1/2 hr rated stairwell door       | 0.39/0.26 |
| 3A/3B                    | 2A/2B              | 2 hr rated elevator door            | 0.39/0.26 |
| 4A                       | 3A/3B              | 2 hr rated stairwell door           | 0.09      |

We have reviewed the licensee's request for the exemption for the above 14 boundaries. Because the combustible loading in these areas is appreciably lower than one-half the rating of the fire barriers, a fire in any of these areas would be of sufficiently short duration to assure that the existing barriers will provide adequate protection. We conclude that the existing fire protection in these fire areas provides a level of fire protection equivalent to the technical requirements of Section III.G of Appendix R to 10 CFR 50. The requested exemption should, therefore, be granted.

5. By a letter dated January 10, 1983, the licensee requested an exemption from Section III.G for a 360 square foot vertical equipment hatch opening in the floor between the CRD Module Areas (Fire Areas 2-A/2-B) and laydown areas (Fire Zones 3-A/3-B). In Zone 2-B, three Division I trays are routed horizontally below the edge of open equipment hatch, approximately 6 inches from the edge and 21-24 feet above the floors. In Zone 3-B, four Division II trays are routed

horizontally above the hatch's edge, approximately 6 feet from the edge and 16-20 feet above the zone 3-B floor.

These cables are separated from the Division I cables by the concrete floor which acts as a considerable heat sink for any fire involving the cables in Zone 2-B located below.

Subsequently, by a letter dated February 15, 1983, the licensee proposed to provide a fixed fire suppression system in the vicinity of the Division I cables routed near the equipment hatch. The proposed suppression system is designed to prevent propagation of a fire through the equipment hatch from fire Zone 2-B to cables in the vicinity of the hatch in the fire Zone 3-B. The fire loading in both the areas is low.

We have reviewed the licensee's request for this exemption from complete automatic suppression requirements of Section III.G. Based on the low combustible loading, the separation and configuration of redundant cables, and the intervening concrete floor and partial suppression system, we believe that one train of cables needed for safe shutdown will be maintained free of fire damage for the time period needed for the fire brigade to respond and manually extinguish the fire. Therefore, we conclude that such a protection is equivalent to the technical requirements of Section III.G of Appendix R, and that this exemption should be granted.

The exemptions are contingent upon the licensee's maintenance of administrative control of transient combustibles which are equivalent to those specified in Section III.K.1 through III.K.8 of Appendix R to 10 CFR 50

and any characterization of transient combustibles or design features relating thereto which are specifically discussed in our SER.

### III.

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12, an exemption is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest.

Therefore, the Commission hereby approves (to the extent indicated) the following exemptions from the requirements of Section III.G of Appendix R of 10 CFR 50:

1. Reactor Building Southwest Corner, identified as Fire Zone 1-G to the extent that it requires automatic suppression and a one-hour fire barrier for protection of redundant cables and equipment.
2. Turbine Building Water Treatment Condensate Pump Area, identified as Fire Zone 7-E-to the extent that it requires an automatic suppression system.
3. Fire Zones 2-A, 2-B, 2-D, 3-A, 4-A, and 16-F - to the extent that they require complete fire suppression systems.
4. Interfacing boundaries between the following fire zones:

| <u>Boundaries Between</u> | <u>Fire Rating</u>                  | <u>Expected Fire Load (HR)</u> |
|---------------------------|-------------------------------------|--------------------------------|
| 1C and 2A/2B              | 1-1/2 hr rated upper stairwell door | 0.16                           |
| 1D " 2A/2B                | 1-1/2 hr rated lower stairwell door | 0.13                           |
| 1D " 2A/2B                | 1-1/2 hr rated stairwell door       | 0.13                           |
| 1D " 2A/2B                | 1-1/2 hr rated damper               | 0.13                           |
| 2A/2B " 1C                | 1-1/2 hr rated stairwell door       | 0.38/0.21                      |
| 2A/2B " 1D                | 1-1/2 hr rated lower stairwell door | 0.38/0.21                      |
| 2A/2B " 1D                | 1-1/2 hr rated stairwell door       | 0.38/0.21                      |
| 2A/2B " 1D                | 1-1/2 hr rated damper               | 0.38/0.21                      |
| 2A/2B " 3A/3B             | 1-1/2 hr rated stairwell door       | 0.38/0.21                      |
| 2A/2B " 3A/3B             | 2 hr rated elevator door            | 0.38/0.21                      |
| 3A/3B " 2A/2B             | 1-1/2 hr rated stairwell door       | 0.39/0.26                      |
| 3A/3B " 4A                | 1-1/2 hr rated stairwell door       | 0.39/0.26                      |
| 3A/3B " 2A/2B             | 2 hr rated elevator door            | 0.39/0.26                      |
| 4A " 3A/3B                | 2 hr rated stairwell door           | 0.09                           |

-to the extent that they require separation by three-hour rated fire boundaries.


5. A 360 squarefoot vertical equipment hatch opening in the floor between the CRD Module Areas (Fire Areas 2-A/2-B) and Laydown Areas (Fire Zones 3-A/3-B) - to the extent that it requires a complete automatic suppression system.

The granting of these Exemptions will not result in any significant environmental impact, and pursuant to 10 CFR 51.5(d)(4) an environmental statement or negative declaration and environmental impact appraisal need not be prepared in connection with this action.

A copy of the Safety Evaluation associated with this action is available for public inspection at the Commission's Public Document Room, 1717 H Street, N. W., Washington, D. C. and at the local public document room located at the Cedar Rapids Public Library, 426 Third Avenue, S. E., Cedar Rapids, Iowa 52401. A copy may be obtained upon request when addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Licensing.

The Exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

  
Darrell G. Eisenhut, Director  
Division of Licensing  
Office of Nuclear Reactor Regulation

Dated at Bethesda, Maryland  
this 19th day of December, 1983.