



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

FIRE PROTECTION SAFETY EVALUATION BY THE
OFFICE OF NUCLEAR REACTOR REGULATION
U. S. NUCLEAR REGULATORY COMMISSION
IN THE MATTER OF
METROPOLITAN EDISON COMPANY,
JERSEY CENTRAL POWER AND LIGHT COMPANY,
AND PENNSYLVANIA ELECTRIC COMPANY
THREE MILE ISLAND NUCLEAR STATION, UNIT NO. 1
DOCKET NO. 50-289
SUPPLEMENT NO. 5

Introduction

By letters dated June 12, 1978, September 29, 1978, September 14, 1979, March 19 and May 30, 1980, Metropolitan Edison Company (Met Ed or the licensee), as required by the Fire Protection Safety Evaluation (FPSE) for Facility Operating License No. DPR-50 for the Three Mile Island Nuclear Station, Unit No. 1 (TMI-1), submitted results of their studies on open items and plant modifications. The specific items addressed in these studies are as follows:

- 3.1.3 Automatic Water Spray
- 3.1.4 Automatic Water Sprinklers
- 3.1.9 Fire Barrier Penetrations
- 3.2.2 Cable Separation
- 3.2.3 Effects of Water Spray (Protection for Redundant ES Valves Only)
- 3.2.4 Adequacy of Detection System Design
- 3.2.9 Transient Combustible Study
- 3.2.12 Emergency Lighting
- 3.2.15 Engineered Safeguards Cabinet

Our evaluation of these studies as they impact on these items is complete and is the subject of this Supplemental Safety Evaluation.

Background

On September 19, 1978, the Commission issued Amendment No. 44 to the TMI-1 operating license. This amendment added a condition to the license which requires completion of the modifications and the completion of the incomplete items identified in paragraphs 3.1.1 through 3.1.23 and paragraphs 3.2.1 through 3.2.15 respectively, of the NRC's FPSE for TMI-1. Amendment No. 44 also requires that as the items and modifications are completed, the Fire Protection Program will be addressed in regard to the completed items in supplements to the Safety Evaluation.

Upon completion of specific items identified above, the licensee submitted to the NRC by letters dated June 12, September 29, 1978, September 14, 1978, March 19 and May 30, 1980, information necessary to assure that the requirements of Amendment No. 44 are met.

Evaluation

Automatic Water Spray Systems, Section 3.1.3

In the SER, it was our concern that adequate fire suppression had not been provided in the pipe penetration area of the auxiliary building.

By letter dated May 30, 1980, the licensee provided the design details of the automatic deluge water spray system which the licensee will install in the auxiliary building pipe penetration area. The system will be hydraulically designed and installed to meet NFPA 15.

We find that the proposed automatic deluge water spray system meets Section E.3.(c) of Appendix A to BTP APCS 9.5-1 and, therefore, is acceptable.

Automatic Sprinkler Systems, Section 3.1.4

Transient Combustibles, Section 3.2.9

Cable Separation, Section 3.2.2

In the SER, it was our concern that an exposure fire could damage redundant cables which are required for safe shutdown.

By letters dated July 13 and September 14, 1979, the licensee provided the results of tests to show that the test results demonstrated that the cable separation provided by the existing Marinite board barriers was adequate. Based on our evaluation we informed the licensee that the test results did not demonstrate that the existing Marinite board barriers were adequate to preserve safe shutdown capability. We requested by letter dated February 7, 1980 that the licensee either enclose one division of cables in a 3-hour fire barrier or provide alternate shutdown capability for all fire areas containing redundant cables needed for safe shutdown. By letters dated May 19 and May 30, 1980, the licensee described the administrative controls and other procedures designed to limit quantities of transient combustibles located in safety-related areas. Also, the licensee proposed to provide an automatic sprinkler system to protect the redundant power cables in the 281' elevation of the Fuel Handling Building.

The licensee has not demonstrated that adequate protection features have been provided for cables and equipment of redundant systems important to achieving safe shutdown conditions to ensure that at least one means of achieving such conditions survives postulated fires.

You are required to meet Section III, Paragraph G of Appendix R to 10 CFR Part 50, wherein the licensee shall provide an alternate shutdown capability independent of this area. The alternate shutdown system shall meet the requirements of Section L, Paragraph III of Appendix R to 10 CFR Part 50.

Fire Barrier Penetrations, Section 3.1.9

In the SER, it was our concern that the cable and pipe penetrations, and building construction joint seals may not be sealed with seals of appropriate fire resistance.

By letters dated June 12, 1978 and March 19, 1980, the licensee provided information regarding the cable and pipe penetration seals, and building construction joint seals, which demonstrated that the seals have a three-hour fire rating.

We find that the cable and pipe penetration seals, and building construction joint seals provide a fire resistance rating of three hours which meet the guidelines in Section D.1.(j) of Appendix A to BTP APCSB 9.5-1 and, therefore, are acceptable.

Effects of Water Spray, Section 3.2.3

In the SER, it was our concern that water spray from fire protection sources could affect the redundant ES Valve Motor Control Centers and, thus, affect the ability of the plant to achieve safe shutdown.

By letter dated May 30, 1980, the licensee indicated that although lack of operator discretion in applying water from a fire hose could result in damage to redundant divisions, that hot shutdown could be achieved without this equipment.

The licensee has not demonstrated that the plant can reach a cold shutdown condition without personnel returning to make repairs to the ES Motor Control Centers. Therefore, licensee's reliance on fire hose operator discretion in applying water to prevent damage to redundant systems is unacceptable.

You are required to meet Section III, Paragraph G of Appendix R to 10 CFR Part 50, wherein the licensee shall provide an alternate shutdown capability independent of this area. The alternate shutdown system shall meet the requirements of Section L, Paragraph III of Appendix P to 10 CFR Part 50.

Adequacy of Detector Installation, Section 3.2.4

In the SER, it was our concern that proper consideration has not been given to such factors as ceiling height and configuration, ventilation air flow rate and pattern, in determining the type, number and location of fire detectors.

By letter dated May 30, 1980, the licensee verified that fire detection systems in safety-related areas are designed in conformance with NFPA 72D and 72E.

The licensee's criteria used for location and spacing of fire detectors consisted of:

1. Evaluation based on engineering judgment
2. Ceiling shapes and surfaces
3. Ceiling height
4. Configuration of contents
5. Burning characteristics of combustibles present
6. Ventilation (air flow rate)
7. Stratification

The licensee's method of locating smoke detectors utilizes current state-of-the-art techniques. The smoke detection systems comply with NFPA 72D and meet the guidelines of Section E.1.(a) of Appendix A to BTP APCS 9.5-1 and, therefore, are acceptable.

Emergency Lighting, Section 3.2.12

In the SER, it was our concern that the licensee did not provide adequate emergency lighting for shutdown operations and access/egress routes to these areas.

By letter dated May 30, 1980, the licensee verified that 20 additional 8-hour units were being provided such that all areas needed for safe shutdown and access/egress routes to safety related areas will have fixed 8-hour sealed beam emergency lighting units.

We find that the licensee's proposed emergency lighting system meets Section D.5.(a) of Appendix A to BTP APCS 9.5-1 and, therefore, is acceptable.

Engineered Safeguards Cabinets, Section 3.2.15

In the SER, it was our concern that safe shutdown could be affected in the event a fire disabled both ESAS cabinets. The ESAS cabinets are not required for safe shutdown.

By letters dated September 29, 1978, March 19, 1980 and May 30, 1980, the licensee provided additional information and described the fire protection features being provided for the ESAS cabinets. The licensee has provided a sprinkler system for the area and provided drip shields for the cabinets. The cabinets themselves are coated to obtain a U.L. approved 1/2-hour fire rating.

We find that the proposed sprinkler system, drip shields, and cabinet coating will provide adequate fire protection for the ESAS cabinets and, therefore, conclude the licensee's modifications are acceptable.

TMI-1 FIRE PROTECTION REVIEW STATUS

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>STATUS*</u>
3.1.1	Fire Detectors	C
3.1.3	Auto. Water Spray System	C
3.1.9	Fire Barrier Penetrations.	C
3.1.10	Thermal Insulation of Valves	C
3.1.11	Fire Barriers	C
3.1.13	RCP Oil Collection System	C
3.2.1	Protection of Emergency FW Pumps	C
3.2.3	Effect of Water Spray	C
3.2.4	Adequacy of Detector System Design	C
3.2.5	Fire Prot. Inside Reactor Bldg.	C
3.2.6/3.1.8	Unlabeled Fire Doors	C
3.2.7	Alarm Circuit Supervision	C
3.2.8	Remote Shutdown Station	C
3.2.10	Control Building HVAC Loss	C
3.2.11	Standpipes	C
3.2.12	Emergency Lighting	C
3.2.13	Protection of Relay Room	C
3.2.14	Fire Door Supervision	C
3.2.15	Engineered Safeguards Cabinet	C
3.1.4	Automatic Sprinkler	R
3.1.21	Alternate Shutdown	R
3.2.2	Cable Separation	R
3.2.3	Effects of Water Spray	R
3.2.9	Transient Combustible Study	R

*C - Design Criteria Found Acceptable

R - Requirement