



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

METROPOLITAN EDISON COMPANY
JERSEY CENTRAL POWER & LIGHT COMPANY
PENNSYLVANIA ELECTRIC COMPANY
GPU NUCLEAR CORPORATION

THREE MILE ISLAND NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-289

1.0 INTRODUCTION

The following safety evaluation provides documentation of the staff's acceptance of information provided by GPU Nuclear regarding various Appendix R issues at Three Mile Island Unit 1 (TMI-1) and approval to discontinue a previously-established fire watch program dealing with loss of ventilation concerns.

2.0 EVALUATION

2.1 FIRE HAZARDS ANALYSIS REPORT REVISION 9

By letter dated October 27, 1987, GPU Nuclear, the licensee, submitted Revision 9 to the Fire Hazards Analysis Report (FHAR) for Three Mile Island Nuclear Station, Unit 1. This Revision includes a number of modifications which have resulted from an extensive design verification effort by the licensee. As stated by the licensee, Revision 9 represents the "as built condition of TMI-1." Also, Revision 9 includes a number of modifications involving the addition of references to GPUN and NRC correspondence concerning the justification and subsequent acceptance of exemptions to 10 CFR Part 50 Appendix R and deviations from Appendix A to APCS 9.5-1. In addition, the FHAR has been modified to specify where certain fire barriers may not be completely rated or contain some non-rated feature but have been analyzed to provide adequate protection. This type of analysis is allowed by Generic Letter 86-10 and the non-rated features included in Revision 9 have generally been evaluated in previous NRC Safety Evaluation Reports.

The FHAR revision has been reviewed by Science Applications International Corporation (SAIC), under contract to the NRC, and has been found to be in compliance with NRC guidelines. The details of the review are discussed in Enclosure 2, which is the Technical Evaluation Report (TER) prepared by SAIC. The staff concurs with the TER findings and concludes that the changes to the fire protection program identified by the licensee in Revision 9 are acceptable.

2.2 FIRE-RELATED LOSS OF HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

In February 1987, the licensee requested approval of an exemption to the technical requirements of Section III.G. of Appendix R to 10 CFR Part 50 to the extent that HVAC may be lost during a fire in several plant areas. The staff granted this exemption by letter dated March 19, 1987. By

letter dated May 5, 1988 the licensee stated that the exemption is no longer needed on the basis that the loss of ventilation would not adversely affect safe shutdown systems. This letter included test data to support the licensee's conclusion. The staff reviewed this letter and expressed concern that the licensee's justification may not be sufficiently conservative. The licensee responded to these concerns by letters dated August 5 and 17, 1988 and during a meeting held in Rockville, Maryland on July 14, 1988.

The licensee's submittals included calculations using the TSAP code consistent with the NRC-approved NUMARC 8700 approach and actual TMI-1 test data for 18 different fire areas. Most of these areas were within the control building complex, which includes the control room. The analyses were made on an area-by-area basis and compared to the temperature limitations for the electrical or electronic equipment actually located in each area. The control room, for example, contains electronic equipment with a maximum temperature rating of 104°F whereas other areas contain only electrical switchgear (117°F rating), inverters (120°F rating) or station batteries (rated in excess of 130°F). The licensee has also made the point that exceeding these temperature ratings on a short-term basis would not be expected to cause immediate degradation or failure of the equipment contained in those areas. Finally, the licensee has in place procedures and equipment for providing temporary ventilation to areas affected by loss of HVAC although credit was not taken for these measures to demonstrate that temperature ratings would not be exceeded.

The details of the staff's review are contained in Sections 2.0 and 3.0 of the enclosed TER (Enclosure 3). The TER concludes that the provision of a roving fire watch in areas where ventilation may be lost due to a fire are no longer necessary. This conclusion is based upon the evaluations provided by the licensee that, with some manual actions, the maximum temperatures achieved in areas where ventilation may be lost will not exceed the maximum rated operating temperature of components required for safe shutdown. The staff agrees with this conclusion. Therefore, Section III.2 of the Exemption to 10 CFR Part 50, Appendix R, Section III.G.2 issued by the staff on March 19, 1987 is hereby cancelled and the fire watches required by that exemption are no longer needed.

2.3. Appendix R Exemption for Letdown Valve Circuits

By Letter dated May 21, 1988, the licensee requested approval of an exemption from the technical requirements of Section III.G. of Appendix R to the extent that it requires that redundant shutdown-related systems be separated by a distance of at least 20 feet, free of intervening combustibles in an area protected by automatic fire detection and suppression systems. The subject of this exemption request is the ability to isolate flow (and pressure) from the reactor coolant system to the low-pressure portion of the reactor coolant letdown system. Flow can be isolated by remote operation of valves MU-V-2A and MU-V-2B, MU-V-3, or MU-V-4 and MU-V-5. If all three series valves or combinations of two valves were inoperable because of fire damage in fire areas AB-FZ-4 or FH-FZ-1, overpressurization of the low-pressure letdown piping could

result. Although the separation between the wiring for these three combinations of valves is much greater than 20 feet, there is fixed intervening combustibles in the form of cables in trays.

The details of the staff's review of this request are contained in Section 4.0 of the enclosed TER (Enclosure 3). The TER concludes that the level of protection provided in Fire Zones AB-FZ-4 and FH-FZ-1 has been found to be equivalent to that called for in Section III.G.2 of Appendix R. Specifically, the intervening combustibles between redundant Letdown Isolation Valve circuits have been found not to present a level of safety less than that called for in Appendix R. The staff agrees with this conclusion and will issue a formal exemption as a separate licensing action.

2.4 Remaining Review of TMI-1 Appendix R Issues

The licensee submitted a detailed letter (Letter No. 5211-87-2028 dated February 10, 1987) in response to Generic Letter 81-12 dealing largely with revised safe shutdown methodology. SAIC, under contract to the NRC, has nearly completed the review of this submittal. During the intervening time period, revisions to the on-site fire emergency procedures and the FHAR have been made. In order to complete its review, SAIC has submitted a number of additional questions which the staff is hereby submitting to the licensee. Timely response to these questions (Enclosure 4) will enable the staff and its contractor to complete its Appendix R review for TMI-1 in a relatively short period.

3.0 Conclusions

Based on the above, the staff has made the following conclusions:

1. Revision 9 to the TMI-1 FHAR is acceptable.
2. The fire watches required by Section III.2 of the staff's March 19, 1987, Appendix R Exemption are no longer necessary.
3. The staff will issue an Appendix R exemption as requested by the licensee regarding letdown valves.
4. Additional information is necessary from the licensee in order to complete our review of the TMI-1 safe shutdown methodology and the remaining Appendix R issues.

Dated: September 7, 1988

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