



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 158 TO FACILITY OPERATING LICENSE NO. DPR-50

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

INTRODUCTION

By letter dated June 18, 1990 and October 26, 1990, GPU Nuclear Corporation (GPUN or the licensee) requested modification to the surveillance testing intervals for the Three Mile Island Unit 1 (TMI-1) hydrogen recombiner system. Specifically, GPUN requested the interval for functional testing to be changed from "at least once per 18 months" to "at least one per refueling interval."

EVALUATION

The hydrogen recombiner system removes the hydrogen and oxygen gases that accumulate in the containment atmosphere following a design-basis loss-of-coolant accident (LOCA). It is not capable of removing the highest hydrogen concentrations that could be present after a severe accident.

The present TMI-1 Technical Specifications (TS) require testing the hydrogen recombiners at least once every 92 days by performing a functional test. The Standard TS for nuclear power plants designed by Babcock & Wilcox (B&W) requires functional testing once every 6 months while in Modes 1 and 2.

The design basis for the TMI-1 hydrogen recombiner system is discussed in Section 6.5.3.1 of the Updated Final Safety Analysis Report (UFSAR Update 8, 7/89). The purpose of the system is to prevent the reactor building (containment) environment from reaching the lower flammability limit of hydrogen of 4.0 percent by volume following a LOCA. The volume of hydrogen required to reach this limit in the TMI-1 reactor building is approximately 80,000 scf. The three major sources of hydrogen following a LOCA would be metal-water reaction of the overheated Zircaloy fuel, the corrosion of aluminum and zinc electrical components by the sodium hydroxide automatically sprayed from the top of the reactor building, and radiolytic decomposition of the post-accident emergency cooling solutions. To prevent reaching this limit, the hydrogen recombiner concentration reaches approximately 3% by volume. Based upon calculations in the UFSAR, this concentration would be reached approximately 9 days following initiation of the accident.

Section 3.6.7 of the TMI-1 TS requires at least one hydrogen recombiner to be operable or to establish hot standby conditions after 7 days. TMI-1 has two hydrogen recombiners, either one of which is capable of processing the required 37 scfm of containment air once 3% hydrogen concentration is reached. The NRC staff has conducted a search of LERs to assess the reliability of hydrogen recombiners. Twelve failures of hydrogen recombiners were found over the time period from early 1980 to June 1988. In one case in which both trains were inoperable, a backup hydrogen purge system was available. In two cases, the failure was fixed within 2 hours. Since the hydrogen recombiner is manually started many hours after a LOCA occurs, the system would have been operable when called upon. On the basis of the redundancy, apparent high reliability, and the time available to fix an inoperable hydrogen recombiner before it is needed, the staff believes that the surveillance test interval could be extended to at least every refueling with no unacceptable increase in risk.

The staff, therefore, considers the proposed TMI-1 TS change to be acceptable.

ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted areas as defined in 10 CFR Part 20. We have determined that the amendment involves no significant increase in the amounts and no significant change in the types of any effluents that may be released off site, and that there is no significant increase in individual or cumulative occupational radiation exposure. The staff has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

CONCLUSION

We have concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor:

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Dated: November 26, 1990