



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

AMENDMENT NO. 59 TO FACILITY OPERATING LICENSE NO. DPR-50

METROPOLITAN EDISON COMPANY
JERSEY CENTRAL POWER AND LIGHT COMPANY
PENNSYLVANIA ELECTRIC COMPANY

THREE MILE ISLAND NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-289

Introduction

By letters dated August 30, 1978 (GQL 1309), March 31, 1980 (TLL 143) and June 9, 1980 (TLL 255), Metropolitan Edison Company (Met Ed) requested amendment of the Technical Specifications (TS) appended to Facility Operating License No. DPR-50 for Three Mile Island Nuclear Station, Unit No. 1 (TMI-1). The proposed amendment would eliminate the present temporary requirement to perform periodic special inspections of the containment ring girder and allows future inspections of the ring girder to be performed in conjunction with the normal containment structural surveillance.

Background

The ring girder is a structural member of the TMI-1 reactor containment; it is located near the top of the containment at the junction between the vertical cylindrical portion of the containment and the shallow dome roof. During construction of the ring girder in 1971, certain abnormalities were noted during the placement of the concrete. Following removal of the forms, extensive voids were found which accounted for the observed abnormalities. These defects were the subject of extensive NRC staff review. As a result of this review, means for repairing the defects were developed which were acceptable to the NRC staff. These repairs were satisfactorily implemented and the acceptability of the repairs was verified during the containment structural proof test.

As a result of this review, Met Ed also agreed to an NRC staff request to obtain strain gage readings and to perform a visual inspection of the ring girder during the prestressing operations, during the acceptance and leak tests and 6, 12, 24 and 36 months after the acceptance test. Met Ed's commitment to perform these last four inspections was formalized by inclusion of such a requirement in the Technical Specifications for TMI-1

(Section 4.4.2.2). It was (and is) noted in the specification, however, that "After the fourth (36 month) inspection, the remaining schedule of inspections, if deemed necessary, shall be determined based upon previous results of the ring girder inspection."

By letter dated August 26, 1977, Met Ed submitted the last of the four reports required by Specification 4.4.2.2. On December 29, 1977, we advised Met Ed that on the basis of our review of this submittal, we concluded that the surveillance tests had been performed in accordance with requirements and that subject to completion of certain repairs specified in the Met Ed letter of June 3, 1977, safety margins were adequate and that the containment structure would continue to perform its intended safety function.

We also noted in our letter of December 29, 1977, that inasmuch as the fourth inspection had been completed, we had evaluated the need for further inspections. We further concluded on the basis of this evaluation, that if the repairs to the ring girder, previously committed to (as mentioned above) were completed by the end of the 1978 refueling outage, the schedule and extent of the inspections of the ring girder could be modified. Specifically, we stated that the modified inspection program and inspection frequency could consist of a visual inspection of the ring girder performed in conjunction with the Inservice Tendon Surveillance Program as described in TMI-1 Specification 4.4.2.1 and Regulatory Position C.3 of Regulatory Guide 1.35, Revision 2.

By letter dated March 31, 1980 (TLL 143), Met Ed revised the initial amendment request (letter dated August 30, 1978) to reflect the requirements of the Proposed Revision 3 of Regulatory Guide 1.35.

It was the above letter of December 29, 1977 from the NRC staff that was the basis for Met Ed's present submittal.

Evaluation

In their letters of August 30, 1978 (GQL 1309) and March 31, 1980 (TLL 143), requesting the present amendment, Met Ed confirms that the repairs previously committed to have been completed in strict accordance with the specified procedure. Accordingly, our precondition for revision of the schedule and extent of ring girder surveillance has been satisfied.

Regarding the extent of inspection, a visual method has been proposed by the licensee in accordance with the guidance previously provided by the NRC staff. The method and acceptance criteria proposed are identical to those presently specified for the concrete in the vicinity of the tendon anchorage assemblies throughout the containment. Inasmuch as the principal structural function of the concrete in the ring girder is to support tendon bearing plates and because the structural integrity of the ring girder has been established by our previous reviews, we conclude that it is acceptable to apply the same inspection requirements to the concrete in the ring girder as are applied elsewhere in the containment in the vicinity of tendon anchorages.

We have reviewed the inspection requirements proposed by Met Ed and find that they are, in effect, identical with the requirements presently specified in Section 4.4.2.1.3.c for inspection of the concrete around tendon anchorages in all parts of the containment.

We have also compared Met Ed's proposed tendon surveillance program with the proposed Regulatory Guide 1.35, Revision 3, and find that the sample selection, the prestressing monitoring tests, the tendon material test and inspections and the inspection of filler grease conform with the proposed Regulatory Guide 1.35, Revision 3, and therefore we find the proposed Technical Specifications acceptable in this regard. However, we conclude that the scope of the visual inspection for the dome tendon in the ring girder is deficient and needs to be modified. Furthermore, the reexamination of abnormalities discovered in previous inspections have not been adequately addressed in the proposed Technical Specifications. These concerns, however, are resolved by the addition of Technical Specifications 4.4.2.1.4 and 4.4.2.1.5 to the surveillance program. These additions have been discussed with and agreed to by Met Ed. Our bases for concern resulting in the need for the modified visual inspection pertaining to the dome tendon in the ring girder are as follows:

1. There may be more undetected voids in the ring girder. The ring girder repair and surveillance were the results of discovering voids after the removal of the construction forms. The areas, where the repairs were performed in 1972, were identified based upon the result of a visual inspection on suspected areas. No tests were used to detect the concealed voids. Seven more voids were later discovered in 1977, during the 24-month surveillance. The use of a power wire brush to clean off the surface of bearing plates prior to painting them was attributed to breaking the covering concrete lens and exposing these voids.

2. The number of dome tendon bearing areas having cracks appear to be growing with time. This trend is observed by comparing the ring girder surveillance reports. In contrast to this, no significant cracks were observed at the vertical and hoop tendon anchoring areas.

The concrete structural adequacy of the ring girder supporting the tendon anchoring plates has been demonstrated in 1974 during the initial structural integrity test. This being the case and considering the forces in the tendon will be reduced with time due to creep in the material, the concrete in the dome tendon areas should be monitored for crack growth even though the actual concrete strength is higher than the design strength. Although not conclusive from the past inspections, small cracks have appeared in the dome tendon areas, whether they are growing is an open question. Based on the above, special attention is to be given to the dome tendon anchoring areas as part of future tendon surveillance program. We have concluded, therefore, that cracks in excess of 0.005 inch be monitored in future inspections.

As for the reexamination of previous abnormalities, this is not clearly covered in the proposed Regulatory Guide 1.35, Revision 3, nor in the proposed amendment. Met Ed considers re-examination of previous abnormalities as part of the surveillance program and to further assure that this will not be overlooked in the future Met Ed has agreed to include this as a Technical Specification.

The trend of prestress loss in the tendon should be evaluated in the program. The purpose of the tendon surveillance is to detect, in time, the possible degradation of the prestressing tendon system, thus ensuring that the safety margins in the design of the containment are not reduced under operating and environmental conditions. If the actual prestressing force losses with time compare reasonably well with the predicted forces, these comparisons would be a positive indication, thus confirming the soundness of the engineering design. However, in some cases, the time-dependent losses may not behave as predicted because of lacking or extrapolation of the laboratory testing data. Should such a condition develop and the trend of prestressing loss is greater than predicted, this may indicate an unsafe condition requiring an engineering investigation.

The proposed Regulatory Guide 1.35, Revision 3, recommends the comparison of measured prestress forces with the predicted forces of randomly selected tendons. Met Ed is committed to make this comparison under the proposed Technical Specifications. Furthermore, Met Ed is committed to report the trend for the rate of prestress loss for each completed tendon

surveillance. This commitment is reflected by the change to the Technical Specification 3.19.1.2. This change also has been discussed with and agreed to by Met Ed.

We conclude that the proposed surveillance program which eliminates the existing temporary requirements in the inspection of the ring girder will adequately indicate any possible future degradation of the containment structure with only a negligible reduction in the safety margin. Furthermore, the repaired ring girder is capable of fulfilling its design function. On this basis, therefore, we find this amendment acceptable.

Environmental Consideration

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Date: October 31, 1980