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June 9, 1980
TLL 255

Director of Nuclear Reactor Regulation
Attn: R. W. Reid, Chief
Operating Reactors Branch No. 4
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Sir:

Three Mile Island Nuclear Station, Unit I (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
Questions on Technical Specification Change Request No. 77A

On March 31, 1980 (TLL 143), Met-Ed submitted Technical Specification Change Request No. 77A which modified the Ring Girder/Tendon Surveillance requirements to the Reactor Building. On May 6, 1980, Mr. D. DiIanni of your staff forwarded questions on the change request requiring responses prior to the NRC completing their review. On May 19, 1980, our responses to the questions were reviewed and modified during a conference call with Mr. DiIanni and others. Therefore, enclosed please find our response to the questions.

The additional statement to specification 3.19.1.2 has been added to insure that trends noted during the course of the surveillance be appropriately noted in the report submitted 90 days after completion of the surveillance. An example of a trend would be if after four or five surveillances of an individual tendon it revealed that the rate of prestress loss exceeds the predicted rate for the duration of the plant life.

Sincerely,

J. G. Herbein
Vice President
TMI-I

JGH:DGM:hah

Enclosure

cc: D. DiIanni
H. Silver
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Enclosure 1
TLL 255

RESPONSES TO NRC QUESTIONS ON
THREE MILE ISLAND UNIT I TECHNICAL SPECIFICATIONS
CHANGE REQUEST NO. 77A

ITEM 1: Tech. Spec. 4.4.2.1.1.a: Provide the total number of tendons for each group (dome, vertical and hoop).

RESPONSE: The total number of tendons for each group for Three Mile Island Unit I is: 166 vertical tendons, 147 dome tendons, and 330 hoop tendons.

ITEM 2: Tech. Spec. 4.4.2.1.1.b: Provide the bases for those acceptable tendon lift-off forces for each group. Discuss the effect of the initial lock-off force on those acceptable lift-off forces.

RESPONSE: The force specified for each group is the minimum average tendon force required to meet the prestress design requirement for the containment structure. Taking the vertical tendons as an example, their design requirement is 397 kips per foot of wall circumference. For 166 vertical tendons at an average spacing of 2'-6½", the average force required per vertical tendon is 1010 kips.

The initial lock-off forces do not have any effect on the values established for the acceptable forces, since the acceptable forces are required minimum average tendon forces. Nevertheless, to make efficient use of those tendons which exhibit large friction losses due to their curvature, most tendons were stressed to 80% of the Guaranteed Ultimate Tensile Strength (GUTS) of 240 ksi and then locked off at 70% (-0, +5%) of GUTS. None of the tendons were stressed in excess of 80% of ultimate.

ITEM 3: Tech. Spec. 4.4.2.1.1.c: Provide the "specified acceptable limits" for the extent of corrosion.

RESPONSE: "Specified acceptable limits" for corrosion on tendon wires are provided in Table 3 of the Tendon Surveillance Procedure, SP-1301-9.1, copy attached. This type of criteria for rating the degree of corrosion is consistent with that currently used by the industry.

ITEM 4: Tech. Spec. 4.4.2.1.1.d: Provide the acceptable limits of the presence of voids, presence of free water, chemical and physical properties and their bases for accepting such limits.

RESPONSE: The acceptable limit for voids in sheathing filler grease is 4 gallons per tendon (total for both ends) and is specified on Data Sheet 12 of the Tendon Surveillance Procedure, SP-1301-9.1. The 4 gallon represents approximately a 5% loss of bulk filler grease, based on the total void area for each tendon. The 5% limit is suggested by Proposed Revision 3 of Regulation Guide 1.35.

The acceptable limit for free water is 5% maximum (water to dry weight of bulk filler grease) and is specified on Data Sheets 13,

14, and 15 of the above Procedure. The specified 5% maximum is a conservatively low value, recommended by the grease supplier, below which corrosion of the wires is not expected to occur as a result of moisture.

The acceptable limits for chlorides, nitrates and sulphides are 10 ppm each. These limits are specified on Data Sheets 13, 14, and 15 of the above procedure. The basis for these limits is contained in ASME Section III, Division 2, Table CC-2442-1.

The acceptable limit for physical properties of bulk filler grease is a visual comparison with fresh filler grease. Any apparent differences (color, consistency, floating solids, etc.) are to be noted in a "comments" section of Data Sheet 12 of the above procedure.

ITEM 5: Tech. Spec. 4.4.2.1.2 and 3: Discuss what provisions will be utilized to assure that "same visual inspection criteria" will be used throughout the entire plant life with potential inspection personnel changes.

RESPONSE: Re: Tech. Spec. 4.4.2.1.2--In order to insure that the "same visual inspection criteria" will be used throughout the entire plant life, Data Sheets 6, 7, and 8, "Anchorage Assembly Surveillance Inspection," are provided in the Tendon Surveillance Procedure (SP-1301-9.1) for the metal components. These Data Sheets require, for each inspected tendon, that the following be described and sketches supplied, if necessary:

a. broken, missing or damaged wires
b. shape of buttonheads
c. cracks and corrosion category for stressing washers and nuts, shims and bearing plates.

In addition, Figures 17, 18 and 19 are provided in the Procedure to illustrate acceptable and unacceptable buttonheads.

For the concrete adjacent to the tendon end anchorages, Data Sheets 9, 10 and 11 are provided in the Procedure. For each inspected tendon these Data Sheets require the following:

a. the entry of comments concerning any cracking present.
b. the documentation (location and width) and reporting for engineering evaluation of any cracks exceeding .01 inch width.

Re: Tech. Spec. 4.4.2.1.3--Documentation, on an annual basis, is required by Three Mile Island Nuclear Station, Unit I Surveillance Procedure 1301-8.1, "Reactor Building Annual Inspection".

The following examples are to be investigated:

a. Broken or distorted piping near a penetration.
b. Reactor Building Liner Plate - welds broken, liner buckled, holes inadvertently drilled, deep corrosion.
c. Obvious concrete cracks greater than .010 inch other than at construction joints.
d. Tendon bearing plate show signs of sinking into anchorage concrete. (Indication of voids in concrete)
e. Containment isolation valves - obvious damage to valve or operator which could adversely affect closure.

ITEM 6: Tech. Spec. 3.19.1.1: Reg Guide 1.35 does not provide any recommendation associated with this proposed action. Provide the basis. Also provide the estimated time requirement for performing an engineering evaluation associated with the proposed action.

RESPONSE: During the periodic tendon surveillance, the only item which indicates non-conformity of the structural integrity of the containment building to the minimum prestress requirements of the design is the criteria contained in Section 4.4.2.1.1.b, "The average of the normalized tendon lift-off forces for each group". Although the other items covered during the surveillance may be reportable to the NRC if deviations are detected, and may require replacement or repair actions, they are not indicative of a loss of structural integrity and would not require an urgent shutdown of the plant.

An engineering evaluation of the structural integrity of the containment structure would start as soon as any signs of distress were detected, and therefore would be well under way before it was determined that Section 4.4.2.1.1.b was not in compliance with minimum design requirements. As a means of controlling the time involved in this investigation, the 48 hour limitation, after determining non-compliance with Section 4.4.2.1.1.b, has been established in Section 3.19.1.1.

ITEM 7: Revise specification 3.19.1.2 to include this statement: "Furthermore, the NRC will be informed within 90 days if the surveillance program indicates that the trend for the rate of prestress loss exceeds the predicted rate for the duration of the plant life."

RESPONSE: Add to 3.19.1.2: "The report of each completed tendon surveillance will include a section dealing with trends for the rate of prestress loss as compared to the predicted rate for the duration of the plant (after an adequate number of surveillances have been completed). This report will be submitted to the NRC per specification 6.9.3.a(1)."

TABLE 3

CRITERIA AND CATEGORIES FOR RATING DEGREES OF CORROSION ON TENDON ANCHORAGE ASSEMBLIES AND SELECTED WIRES

Degrees of Corrosion

1. Bulk filler material intact and bright metal, no visible oxidation.

2. Change of color in bulk filler material and/or metal reddish brown color, no pitting. (Standard of comparison for bulk filler shall be fresh grease.)

3. Change of color in bulk filler material and/or metal having patches of red oxide, removable but ready to start pitting.

4. Change of color in bulk filler material and/or metal having patches of red oxide, not removable and/or leaving noticable pits.

5. Change of color in bulk filler material and/or metal having heavy rusting, dark red, and about to form an extremely hard crust which when removed leaves very noticable pitting.

6. Conditions more severe than category 5.

Acceptable Criteria

Anchorage assembly components in category 1, 2, or 3 are acceptable.

Wire in category 1 or 2 is acceptable.

Anchorage assembly components in category 4, 5, or 6 and wire in category 3, 4, 5, or 6 are subject to rejection and should be further evaluated by the Technical Support Engineer.

Definition

Pit - A pit is defined as an indentation visible to the naked eye.