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February 13, 1996
6710-96-2048

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Dear Sir:

Subject: Three Mile Island Nuclear Station, Unit I (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
GPU Nuclear Response to NRC Generic Letter (GL) 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-operated Gate Valves," dated August 17, 1995

NRC Generic Letter 95-07 requested that licensees (1) evaluate the operational configurations of safety-related, power-operated gate valves for their susceptibility to pressure locking or thermal binding (PLTB) and (2) perform further analyses and take any needed corrective actions, or justify longer schedules, to ensure that valves susceptible to PLTB are capable of performing their required safety functions.

This letter is in response to the GL 95-07 request that licensees provide (1) a summary description of the evaluation of operational configurations including the criteria for determining whether valves are susceptible to PLTB and (2) the results of the susceptibility evaluation and analyses to ensure that those valves susceptible to PLTB are capable of performing their intended safety function(s), including a list of the valves found to be susceptible to PLTB.

GPU Nuclear has completed a review[1] of all TMI-1 safety-related power-operated gate valves (97 valves) required to achieve and maintain hot shutdown whose safety function could be affected by PLTB. Safe shutdown for TMI-1[2] is the hot shutdown condition. The safety function of each valve was reviewed in conjunction with the system configurations derived from normal and emergency procedures and test configurations derived from the

[1] GPU Nuclear Topical Report #104, Rev. 0, "Review of the Potential for Pressure Locking and Thermal Binding of Safety-Related Power-operated Gate Valves at TMI-1."

[2] TMI-1 Updated Final Safety Analysis Report, Chapter 6B, Section 2.3.2.1.

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surveillance procedures. The criteria and assumptions used were based on the guidelines in GL 95-07 and other industry sources.

These assumptions allowed GPU Nuclear to narrow the review to those 27 valves which comprise the following groups: 1) valves that are normally closed which have an open safety function, and 2) normally open valves that would be closed as part of a surveillance test and must open from the test configuration to perform their safety function. Each of these 27 valves were evaluated for susceptibility to pressure locking and thermal binding. Consideration was given for bonnet pressurization due to: a) peak ambient temperature during normal operating and accident conditions or an increase in fluid temperature, b) upstream or downstream seat leakage, the start of a pump, or other operational changes, and c) thermal affects for solid wedge disc valves not otherwise susceptible to pressure locking. Consistent with GL 90-10, Supplement 7, valve mispositioning was not considered. No pressure threshold was assumed below which pressure locking could not occur; however, pressure locking will not occur when the valve opens against a line pressure equal to or greater than the pressure in the bonnet since the valve is designed to operate for the disc pressure differential.

It is assumed that thermal binding is not a concern for system temperatures below 221°F for flex wedge valves and below 166°F for solid wedge gate valves. Above these temperatures, the differential temperature for thermal binding concerns are 100°F for flex wedges and 50°F for solid wedge gate valves. The evaluation for thermal binding considered differences in valve disc/seat materials and wall thicknesses resulting in differential expansion, valve stem growth due to thermal expansion which could result in a high closing force, and the condition which results when a valve is closed at hot conditions and later required to open at a lower temperature.

Other assumptions considered in the evaluations are as follows:

a) If a system is declared inoperable during valve testing, i.e., inservice testing (IST), Emergency Safeguards (ES) testing or post maintenance test (PMT), PLTB concerns do not apply for the test duration since the system is inoperable and the valve function is not required. However, PLTB was still evaluated to ensure that valve damage would not occur during testing which could cause the valve to be unable to perform its safety function.

b) For the systems which are considered operational during testing (IST, ES Testing, and PMT), PLTB concerns were evaluated without considering potential accidents occurring during these tests since the probability of an accident during a short time of testing is very low.

c) When the valve is subjected to slow pressure and temperature changes, PLTB will not be a concern since thermal equilibrium between disc and seat pressure and equilibrium between bonnet and the piping will occur.

d) Normal ambient temperature changes at the valve location are slow and will not cause high temperature differentials that can create pressure locking or thermal binding.

e) No credit is taken for check valve's capability to isolate a high pressure source to eliminate consideration of the potential for PLTB.

Only two valves, the ES actuated Low Pressure Injection (LPI) control valves located outside containment (DH-V4A and DH-V4B), were found to be potentially affected by PLTB in the performance of a safety function. DH-V4A and DH-V4B were reviewed for operability and it was determined that the combination of conditions which could prevent DH-V4A and DH-V4B from opening due to pressure locking are sufficiently unlikely that a determination of operability is justified until a permanent modification can be performed. This modification will be installed as soon as practical but no later than the next refueling outage, the Cycle 12 Refueling (12R) Outage, which is scheduled to begin in September 1997.

Additionally, either DH-V4A or DH-V4B is closed prior to startup when coming out of Decay Heat System operation as part of the heatup to operating temperature. After the valve is closed, from Reactor Coolant System (RCS) temperature of approximately 250°F, it cools to ambient at approximately 80°F. Thermal binding of DH-V4A or DH-V4B has never been observed at TMI-1. However, to assure that thermal binding would not occur when these valves are called upon to perform a safety function, procedural changes will be implemented prior to startup following the 12R Outage to require that these valves be cycled prior to plant startup after they have cooled down to near ambient temperature.

Sincerely,

J. Knubel
Vice President and Director, TMI

MRK

cc: Administrator, NRC Region I
TMI Senior NRC Resident Inspector
TMI Senior NRC Project Manager

6710-96-2048
Attachment

METROPOLITAN EDISON COMPANY
JERSEY CENTRAL POWER AND LIGHT COMPANY
PENNSYLVANIA ELECTRIC COMPANY
GENERAL PUBLIC UTILITIES NUCLEAR CORPORATION

Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289

GPU Nuclear Response to NRC Generic Letter (GL) 95-07

This letter is submitted in response to NRC Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves." All statements contained in this response have been reviewed, and all such statements made and matter set forth therein are true and correct to the best of my knowledge.

J. Knubel
Vice President and Director, TMI

Signed and sworn before me this
13th day of February, 1996.

Debra S. Klick
Notary Public

Notarial Seal
Debra S. Klick, Notary Public
Londonderry Twp., Dauphin County
My Commission Expires July 4, 1998
Member, Pennsylvania Association of Notaries