UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF

DOCKET NO. 50-289
LICENSE NO. DPR-50

METROPOLITAN EDISON COMPANY

This is to certify that a copy of Technical Specification Change Request No. 36, Amendment 1 to Appendix A of the Operating License for Three Mile Island Nuclear Station Unit 1, has, on the date given below, been filed with the U. S. Nuclear Regulatory Commission and been served on the chief executives of Londonderry Township, Dauphin County, Pennsylvania and Dauphin County, Pennsylvania by deposit in the United States mail, addressed as follows:

Mr. Weldon B. Arehart
Board of Supervisors of
Londonderry Township
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Middletown, Pennsylvania 17057

Mr. Harry B. Reese, Jr.
Board of County Commissioners
of Dauphin County
Dauphin County Court House
Harrisburg, Pennsylvania 17120

METROPOLITAN EDISON COMPANY

By [signature]
Vice President

Dated: January 31, 1977

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METROPOLITAN EDISON COMPANY
JERSEY CENTRAL POWER & LIGHT COMPANY

AND

PENNSYLVANIA ELECTRIC COMPANY

THREE MILE ISLAND NUCLEAR STATION UNIT 1

Operating License No. DPR-50
Docket No. 50-289
Technical Specification Change Request No. 36
Amendment 1

This Technical Specification Change Request is submitted in support of request to change Appendix A to Operating License No. DPR-50 for Three Mile Island Nuclear Station Unit 1. As a part of this request, proposed replacement pages for Appendix A are also included.

METROPOLITAN EDISON COMPANY

By R C Arnold
Vice President

Sworn and subscribed to me this 31st day of January, 1977.

L L Sawyer
Notary Public

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Metropolitan Edison Company (Met-Ed)
Three Mile Island Nuclear Station Unit 1 (TMI-1)
Docket No. 50-289
Operating License No. DPR-50

Technical Specification Change Request No. 36, Amendment 1

The Licensee requests that the attached pages replace the corresponding existing Technical Specifications pages. This amendment implements the recommendation made in our letter of October 19, 1976. (GQL 1407)

Reasons for Proposed Change

It has been discovered that:

The fuel densification penalty was not properly incorporated into technical specifications prepared for cycle 2. Proper incorporation of this penalty would affect DNB based pressure-temperature limit curves such that they would be more restrictive.

A new rod bow penalty has been imposed as a result of Westinghouse experiments revealing a heretofore not considered phenomenon.

Babcock & Wilcox calculations confirmed that elimination of the internal vent valve bypass flow penalty, as authorized by Nuclear Regulatory Commission letter of March 10, 1976, would compensate for this error and the imposed rod bow penalty. A more detailed discussion of margins available for offsetting rod bow effects is presented in GQL 1407.

Thus, elimination of the internal vent valve flow penalty will allow continued use of present pressure temperature limits (Figure 2.3-1)

As a prerequisite for eliminating the vent valve flow penalty, the Commission required in its letter of March 10, 1976, "...testing to be conducted each refueling outage to confirm that no vent valve is stuck in an open position and that each valve continues to exhibit complete freedom of movement." This surveillance requirement was performed during the last refueling outage, and is planned for the upcoming refueling outage. This proposed change incorporates this surveillance requirement into technical specifications.

Note: The proposed technical specification 4.16 included in Technical Specification Change Request No. 13 (still under review) is no longer needed, due to equipment modification. Therefore, Technical Specification Change Request No. 13 has been retracted.

Safety Analysis Justfying Proposed Change

Elimination of the vent valve flow penalty has been authorized by the Commission.

Revised densification analysis indicates that the correct penalties are 5.93% DNBR (versus 1.88% in the Reload Report) and 3.47% power peaking relative to DNBR (versus 1.06% quoted in the Reload Report).

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The variable low pressure trip setpoint for cycle 2 operation is based on the four pump open vent valve pressure-temperature limit curve presented in figure 2.1.3 of the present Technical Specifications (Curve 1).

Curves 2 and 3 represent the corresponding limits for 3 and 2 pump operation, respectively. Each curve is based on the assumption that the reactor is operating at the maximum achievable power level for that pump operating condition. In the original cycle 2 submittal (and in the cycle one technical specifications), Curve 1 incorporated the open vent valve penalty, while curves 2 and 3 did not. That is, the four pump limit curve was based upon operation with one vent valve open while the three and two pump limit curves assumed all vent valves remained shut. In revising Figure 2.1-3 to incorporate the corrected DNBR densification penalty, the basis for the four pump limit curve was changed to eliminate the vent valve penalty. The combined effect was to move curve 1 to the right. However, in order to compensate for rod bow effects, curve 1 was left unchanged for this submittal. The revised curves 2 and 3 have incorporated the new rod bow and the increased densification penalty, therefore, the curves moved slightly to the left.

The flux/flow trip setpoint for cycle 2 (1.08) is based on the one pump coastdown analysis. When the revised densification penalty is incorporated and the vent valve penalty is eliminated, the thermal-hydraulic limiting flux/flow setpoint is greater than 1.12 (this limit must be at least 1.11 to justify the tech spec setpoint of 1.08). It can also be shown that a thermal-hydraulic limit of 1.11 on the flux/flow setpoint can be justified by taking credit for 1/2 of the vent valve penalty.

The error found in the TMI-1, Cycle 2 DNBR densification penalty calculations resulted from the use of inconsistent heat flux (flux shape) and enthalpy rise in evaluating the DNBR densification penalty. This error only affects the PT envelope and flux/flow ratio.

Based upon the above, it is determined that this change does not constitute a threat to the health and safety of the public, nor does it involve an unreviewed safety question.

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The power level trip set point produced by the power-to-flow ratio provides both high power level and low flow protection in the event the reactor power level increases or the reactor coolant flow rate decreases. The power level trip set point produced by the power to flow ratio provides overpower DNB protection for all modes of pump operation. For every flow rate there is a maximum permissible power level, and for every power level there is a minimum permissible low flow rate. Typical power level and low flow rate combinations for the pump situations of Table 2.3-1 are as follows:

1. Trip would occur when four reactor coolant pumps are operating if power is 108 percent and reactor flow rate is 100 percent, or flow rate is 92.6 percent and power level is 100 percent.

2. Trip would occur when three reactor coolant pumps are operating if power is 80.7 percent and reactor flow rate is 74.7 percent or flow rate is 69.2 percent and power level is 75 percent.

3. Trip would occur when one reactor coolant pump is operating in each loop (total of two pumps operating) if the power is 52.9 percent and reactor flow rate is 49.2 percent or flow rate is 45.4 percent and the power level is 49 percent.

The flux/flow ratios account for the maximum calibration and instrumentation errors and the maximum variation from the average value of the RC flow signal in such a manner that the reactor protective system receives a conservative indication of the RC flow.

No penalty in reactor coolant flow through the core was taken for an open core vent valve because of the core vent valve surveillance program during each refueling outage.

For safety analysis calculations the maximum calibration and instrumentation errors for the power level were used.

The power-imbalance boundaries are established in order to prevent reactor thermal limits from being exceeded. These thermal limits are either power peaking kW/ft limits or DNBR limits. The reactor power imbalance (power in the top half of core minus power in the bottom half of core) reduces the power level trip produced by the power-to-flow ratio so that the boundaries of Figure 2.3-2 are produced. The power-to-flow ratio reduces the power level trip and associated reactor power/reactor power-imbalance boundaries by 1.08 percent for a one percent flow reduction.

b. Pump monitors

The redundant pump monitors prevent the minimum core DNBR from decreasing below 1.3 by tripping the reactor due to the loss of reactor coolant pump(s). The pump monitors also restrict the power level for the number of pumps in operation.

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c. Reactor coolant system pressure

During a startup accident from low power or a slow rod withdrawal from high power, the system high pressure trip set point is reached before the nuclear overpower trip set point. The trip setting limit shown in Figure 2.3-1 for high reactor coolant system pressure (2355 psig) has been established to maintain the system pressure below the safety limit (2750 psig) for any design transient.

4.16 REACTOR INTERNALS VENT VALVES SURVEILLANCE

Applicability

Applies to Reactor Internals Vent Valves.

Objective

To verify that no reactor internals vent valve is stuck in the open position and that each valve continues to exhibit freedom of movement.

Specification

4.16.1 At intervals not exceeding the refueling interval, each reactor internals vent valve will be tested to verify that no valve is stuck in the open position and that each valve continues to exhibit freedom of movement.

Bases

Verifying vent valve freedom of movement insures that coolant flow does not bypass the core through reactor internals vent valves during operation and therefore insures the conservatism of Core Protection Safety limits as delineated in figures 2.1-1 and 2.1-3, and the flux/flow trip setpoint.

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Pages 4-60 through 4-65
DELETED

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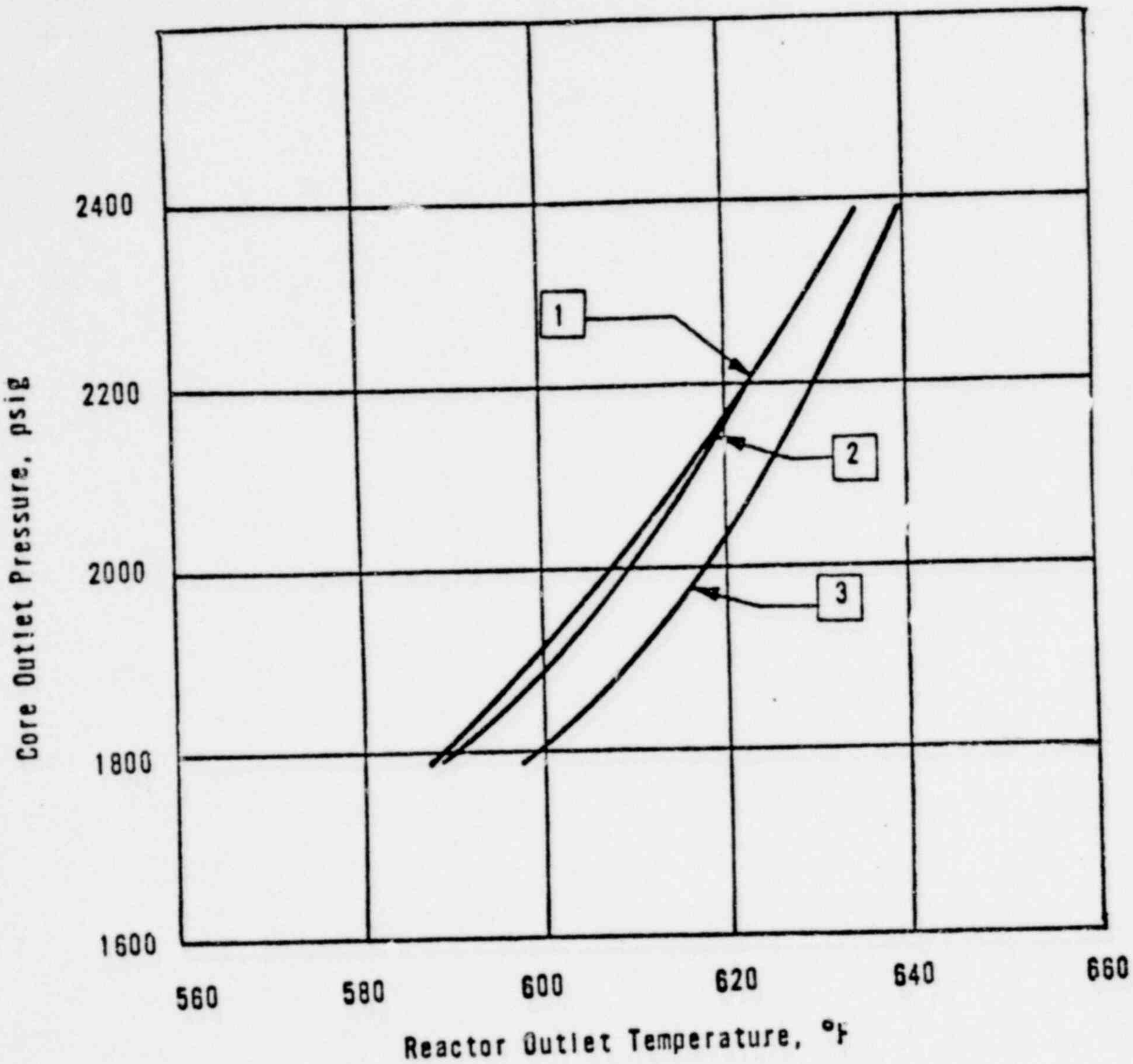

REACTOR COOLANT FLOW

CURVE	(LBS/HR)	POWER	PUMPS OPERATING (TYPE OF LIMIT)
1	139.8×10^6 (100%)*	112%	Four Pumps (DNBR Limit)
2	104.5×10^6 (74.7%)	86.7%	Three Pumps (DNBR Limit)
3	68.8×10^6 (49.2%)	59.1%	One Pump in Each Loop (Quality Limit)

*106.5% of Cycle 1 Design Flow

TMI-1, UNIT 1, CYCLE 2
CORE PROTECTION SAFETY

Figure 2.1-3

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