METROPOLITAN EDISON COMPANY
JERSEY CENTRAL POWER & LIGHT COMPANY

AND

PENNSYLVANIA ELECTRIC COMPANY

THREE MILE ISLAND NUCLEAR STATION UNIT I

Operating License No. DPR-50
Docket No. 50-289
Technical Specification Change Request No. 79

This Technical Specification Change Request is submitted in support of Licensee's 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 _____
Vice President

Sworn and subscribed to me this 10th day of May, 1978.

_____
Notary Public

GEORGE J. TROFFER
Notary Public, Reading, Berks Co.
My Commission Expires Jan. 25, 1982

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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. 79 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
R. D. #1, Geyers Church Road
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 J. G. Herbein
Vice President

Dated: May 10, 1978

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

Technical Specification Change Request No. 79

The Licensee requests that the attached changed pages replace pages 3-34, 3-34a, and 3-36 of the existing technical specifications.

Reasons for Change Request

On May 5, 1978, B&W notified the Licensee that a re-evaluation of the uncertainty associated with the incore detectors had been completed. Results of the re-evaluation indicate that the uncertainty associated with the incore detectors is greater than the uncertainty originally calculated.

The initial error analysis for quadrant tilt and imbalance values derived from incore detector system signals was performed by B&W in 1974 based upon data obtained from prototype detectors. The results of the study were used to develop a tilt and imbalance error analysis for operating limits. As a result of concern expressed about these uncertainties based upon observed operational characteristics, B&W instituted a program early in 1978 to re-evaluate the uncertainties based on operating data.

Based upon incore detector performance at B&W operating plants, particularly in terms of quadrant power tilt measurement, it was proposed that the present uncertainty allowances for tilt and imbalance might be insufficient. Thus, the individual detector uncertainty value from currently available data was used in statistical analyses to determine the uncertainties which should be applied to the limiting quadrant tilt and imbalance values.

The reinvestigation of the quadrant power tilt uncertainty found that the previous uncertainty values are too small and should be increased. The new uncertainty values are a function of both the individual incore detector signal uncertainty and the tilt limits. Table 1 gives the new tilt alarm limits corresponding to the existing actual tech. spec. limits for TMI-1. For TMI-1, the uncertainty increased from 0.39% to 0.76 for the full symmetric incore system.

The reinvestigation of uncertainties also led to increased uncertainties associated with imbalance. Table 2 gives the new imbalance alarm setpoints for TMI-1 corresponding to the approved technical specification limits for the current cycle of operation. (BOC-125 EFPD conservative set). For the full incore detector system at 100% of rated power, the imbalance uncertainty increased from 0.29% to 1.06 for TMI-1.

This change is requested to incorporate the changes necessitated by the increased uncertainty associated with the incore detectors.

Safety Evaluation Justifying Change

This change does not constitute an unreviewed safety question for the following reasons:

1. TMI-1 is not required by Technical Specifications to calculate F_Q and $F_{\Delta H}$. The plant is protected from exceeding peaking limits by Technical Specification limits placed on axial imbalance, quadrant power tilt, rod position limits, and power level cutoffs.

2. The changes in imbalance and quadrant power tilt alarm limits resulting from the increase in detector uncertainty will safely protect the plant from any peaking concerns. In addition, these limits are set up so that all of the following would need to occur before LOCA limit peaking was exceeded.

   a. The plant would need to be operating at the worst point in the cycle for peaking.

   b. The plant would need to be undergoing a xenon transient so that maximum power peaking from xenon was occurring.

   c. All instrument errors would need to be at their maximum value in the nonconservative direction.

   d. The plant would need to be operating with real quadrant power tilt at the maximum limit.

   e. The peaking calculational uncertainties would need to be at their maximum limit in the nonconservative direction.

   f. The plant would need to be operating at the worst-case imbalance limit.

   g. The regulating control rods and APSRs would have had to have been beyond their respective Technical Specification position limits.

Amendment Class (10 CFR 170)

The licensee has determined that, because this requested amendment is a similar amendment for an essentially identical unit, at the same site, this is a Class I Amendment (per 10 CFR 170.22). The appropriate remittance therefore is $400.00

TABLE 1

Quadrant Tilt Limits and Setpoints

Plant	Tech Spec Limit (Actual Tilt)	Alarm Setpoints: Full Symmetric System	Alarm Setpoints: Minimum Symmetric System	Alarm Setpoints: Out-of-Core System
TMI(1)	4.92	3.64	1.90	1.96
	30.77	26.75	15.21	22.92

(1) Changes in Technical Specification Sections 3.5.2.4 a-c and f.

TABLE 2

TMI-1 Cycle 4 From BOC To 125 EFPD (Conservative Set)

Error Adjusted LOCA Limits

Power % of 2535 MW	Imbalance Limit Tech Spec	Alarm Setpoints: Full Incore	Alarm Setpoints: Minimum Incore	Alarm Setpoints: Out-of-Core
0.	-21.59	-17.21	-12.22	-13.83
92.	-21.59	-17.21	-12.22	-13.83
102.	-23.40	-18.90	-13.39	-15.04
102.	10.25	6.16	1.83	2.44
92.	9.25	5.28	1.39	2.03
0.	9.25	5.28	1.39	2.03

f. If a control rod in the regulating or axial power shaping groups is declared inoperable per Specification 4.7.1.2., operation may continue provided the rods in the group are positioned such that the rod that was declared inoperable is maintained within allowable group average position limits of Specification 4.7.1.2.

g. If the inoperable rod in Paragraph "e" above is in groups 5, 6, 7, or 8, the other rods in the group may be trimmed to the same position. Normal operation of 100 percent of the thermal power allowable for the reactor coolant pump combination may then continue provided that the rod that was declared inoperable is maintained within allowable group average position limits in 3.5.2.5.

3.5.2.3 The worth of single inserted control rods during criticality are limited by the restrictions of Specification 3.1.3.5 and the Control Rod Position Limits defined in Specification 3.5.2.5.

3.5.2.4 Quadrant tilt:

a. Except for physics tests the quadrant tilt shall not exceed +3.64% as determined using the full incore detector system.

b. When the full incore detector system is not available and except for physics tests quadrant tilt shall not exceed +1.90% as determined using the minimum incore detector system.

c. When neither incore detector system above is available and except for physics tests quadrant tilt shall not exceed +1.96% as determined using the power range channels displayed on the console for each quadrant (out of core detector system).

d. Except for physics tests if quadrant tilt exceeds the tilt limit power shall be reduced immediately to below the power level cutoff (see Figures 3.5-2A, and 3.5-2B. Moreover, the power level cutoff value shall be reduced 2 percent for each 1 percent tilt in excess of the tilt limit. For less than four pump operation, thermal power shall be reduced 2 percent of the thermal power allowable for the reactor coolant pump combination for each 1 percent tilt in excess of the tilt limit.

e. Within a period of 4 hours, the quadrant power tilt shall be reduced to less than the tilt limit except for physics tests, or the following adjustments in setpoints and limits shall be made:

1. The protection system reactor power/imbalance envelope trip setpoints shall be reduced 2 percent in power for each 1 percent tilt.

2. The control rod group withdrawal limits (Figures 3.5-2A, 3.5-2B, 3.5-2C, 3.5-2D, and 3.5-2H, shall be reduced 2 percent in power for each 1 percent tilt in excess of the tilt limit.

3. The operational imbalance limits (Figure 3.5-2E, and 3.5-2F) shall be reduced 2 percent in power for each 1 percent tilt in excess of the tilt limit.

f. Except for physics or diagnostic testing, if quadrant tilt is in excess of +26.75% determined using the full incore detector system (FIT), or +15.21% determined using the minimum incore detector system (MIT) if the FIT is not available, or +22.92% determined using the out of core detector system (OCT) when neither the FIT nor MIT are available, the reactor will be placed in the hot shutdown condition. Diagnositc testing during power operation with a quadrant tilt is permitted provided that the thermal power allowable is restricted as stated in 3.5.2.4.d above.

g. Quadrant tilt shall be monitored on a minimum frequency of once every two hours during power operation above 15 percent of rated power.

The 25±5 percent overlap between successive control rod groups is allowed since the worth of a rod is lower at the upper and lower part of the stroke. Control rods are arranged in groups or banks defined as follows:

Group	Function
1	Safety
2	Safety
3	Safety
4	Safety
5	Regulating
6	Regulating
7	Regulating (Xenon transient override)
8	APSR (axial power shaping bank)

Control rod groups are withdrawn in sequence beginning with group 1. Groups 5, 6 and 7 are overlapped 25 percent. The normal position at power is for group 7 to be partially inserted.

The rod position limits are based on the most limiting of the following three criteria: ECCS power peaking, shutdown margin, and potential ejected rod worth. As discussed above, compliance with the ECCS power peaking criterion is ensured by the rod position limits. The minimum available rod worth, consistent with the rod position limits, provides for achieving hot shutdown by reactor trip at any time, assuming the highest worth control rod that is withdrawn remains in the full out position (1). The rod position limits also ensure that inserted rod groups will not contain single rod worths greater than: 0.65% Δk/k at rated power. These values have been shown to be safe by the safety analysis (2) of the hypothetical rod ejection accident. A maximum single inserted control rod worth of 1.0% Δk/k is allowed by the rod position limits at hot zero power. A single inserted control rod worth 1.0%Δk/k at beginning of life, hot, zero power would result in a lower transient peak thermal power and, therefore, less severe envrionmental consequences than 0.65% Δk/k ejected rod worth at rated power.

The plant computer will scan for tilt and imbalance and will satisfy the technical specification requirements. If the computer is out of service, than manual calculation for tilt above 15 percent power and imbalance above 40 percent power must be performed at least every two hours until the computer is returned to service.

The quadrant power tilt limits set forth in Specification 3.5.2.4 have been established within the thermal analysis design base using an actual core tilt of +4.92% which is equivalent to a +3.64% tilt measured with the full incore instrumentation with measurement uncertainties included.

During the physics testing program, the high flux trip setpoints are administratively set as follows to assure an additional safety margin is provided:

Test Power	Trip Setpoint
0	<5%
15	50%
40	50%
50	50%
75	85%
>75	105.5%

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