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. 80

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 /s/ J. G. Herbein
Vice President

Sworn and subscribed to me this 16th day of May, 1978.

/s/ George J. Troffer
Notary Public

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

Technical Specification Change Request No. 80

The licensee requests that the attached changed figures replace figures 2.3-2, 3.5-2E and 3.5-2H of the existing Technical Specifications.

Reasons for Change Request

The attached figures have been changed to accommodate the measured Cycle 4 power peaks, which did not meet the acceptance criteria of 7.5% on the total peak. A nuclear uncertainty of 13.5% requires new APSR Position Limits, Power Imbalance Limits and RPS Setpoints.

Safety Analysis Justifying Change

The Safety Analysis LOCA initial conditions are preserved by the alarm and trip setpoints which restrict operational flexibility. The setpoints are determined based on a calculational model. The Physics Testing Program shows real core operation and it verifies that the core is operating within the bounds of the analysis. When the physics testing indicates measured values greater than the acceptance criteria, the discrepancy is accounted for by increased uncertainties and the alarm and trip setpoints are adjusted to further restrict operational flexibility to preserve the Safety Analysis LOCA initial conditions.

The computer code used for the revised Tech. Spec. limits was the same as for the original analysis - the FLAME 3 computer code. That is, the calculated relative peaks used were the same. The differences in the revised imbalance trip setpoints (RPS) and the operational imbalance and APSR position limits (LOCA) compared to those currently approved resulted from the use of a larger calculational uncertainty factor when adjusting the calculated peaks and comparing them to the allowable thermal criteria (CFM, DNB, LOCA).

The magnitude of the calculational uncertainty factor was determined by using the larger of the measured/calculational discrepancies observed for the radial and total peaks during startup testing for Cycle 4. At 75% FP these discrepancies were 9.6 and 11.29% for the radial and total peaks, respectively. For conservatism, 6% was added to the calculational uncertainty values of 5% for the radial peak and 7.5% for the total peak, yielding 11% and 13.5%. The use of these values to adjust FLAME3 peaks is conservative, since the RPS is not DNB limited (strong dependence on radial peak) even with the 11% uncertainty applied to the radial peaks. The CFM criteria (total peak dependent) are limiting, and the 13.5% uncertainty applied is over 2% greater than the discrepancy between measured and calculated values. The same is true of the LOCA criteria which are also total peaking criteria.

With limits for full power operation derived as described above, the assurance is preserved that the FAC ECCS limits will not be exceeded and the thermal design criteria will not be violated.

Figure 2.3-2 was changed to reduce the negative reactor power imbalance from -17% to -12% at breakpoint B_2, without changing the slopes between breakpoints. This adjustment is conservative since the core was Central Fuel Melt (CFM) limited for the RPS, and the total peak which sets CFM limits, had a measured to calculated discrepancy less than 4% above the acceptance criterion.

Figure 3.5-2E was changed to reduce the negative axial power imbalance from -23.40% to -17.74% at the 102% FP breakpoint, and from -21.59% to 17.83% at the 92% FP breakpoint.

Figure 3.5-2H was changed to include power restrictions for APSR position limits between 0% and 6.1% withdrawn.

The adjustments to Figure 3.5-2E and Figure 3.5-2H are also conservative since these limits are based on LOCA KW/ft criteria and are not set from predicted total peaks.

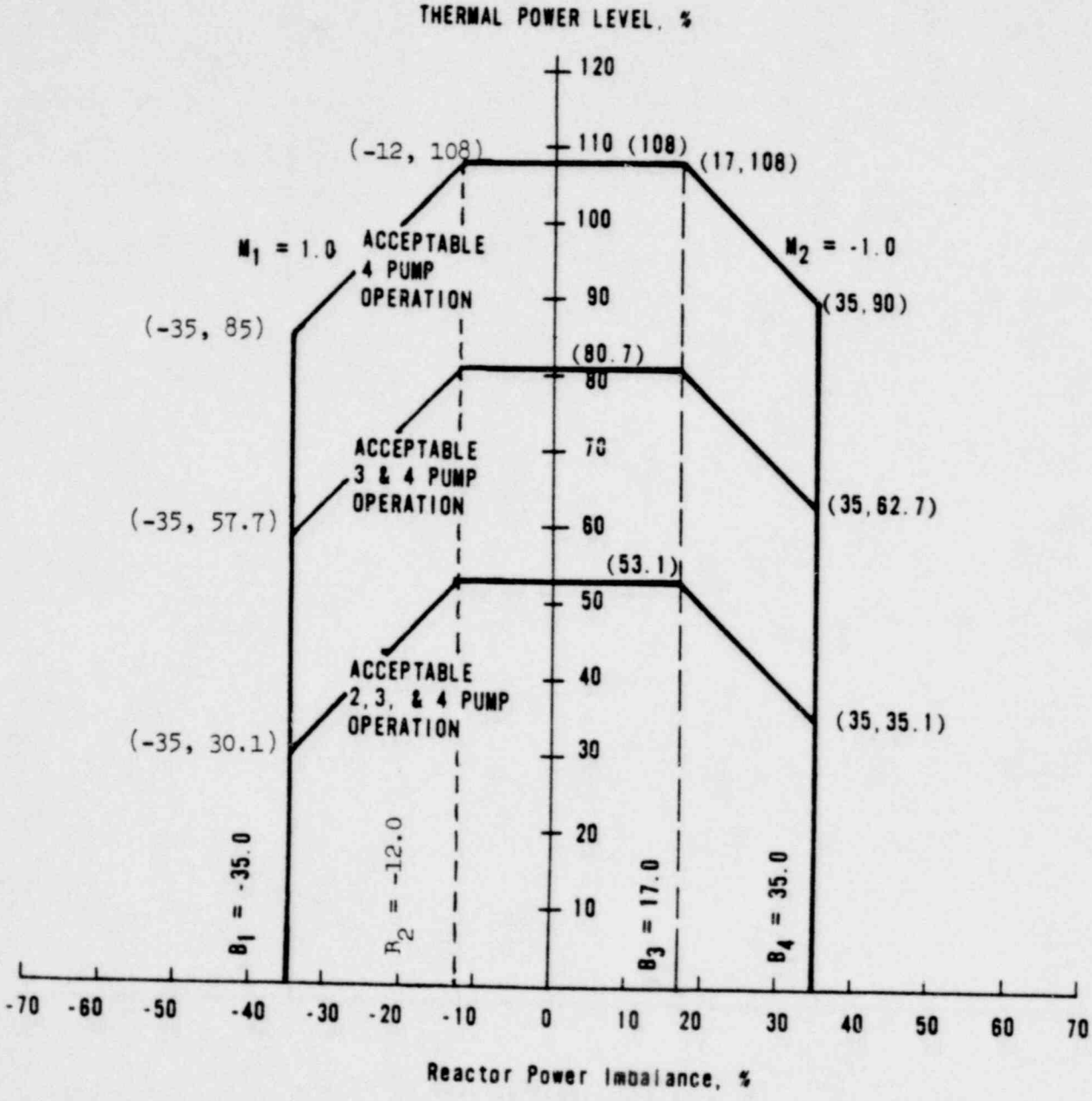
These changes to alarm and trip setpoints assure operation with complete protection with regard to DNB, CFM and LOCA criteria.

Amendment Class (10 CFR 170)

The licensee has determined that, because this requested amendment involves a single safety issue, this is a Class III Amendment (per 10 CFR 170.22). The appropriate remittance, therefore, is $4,000.00.

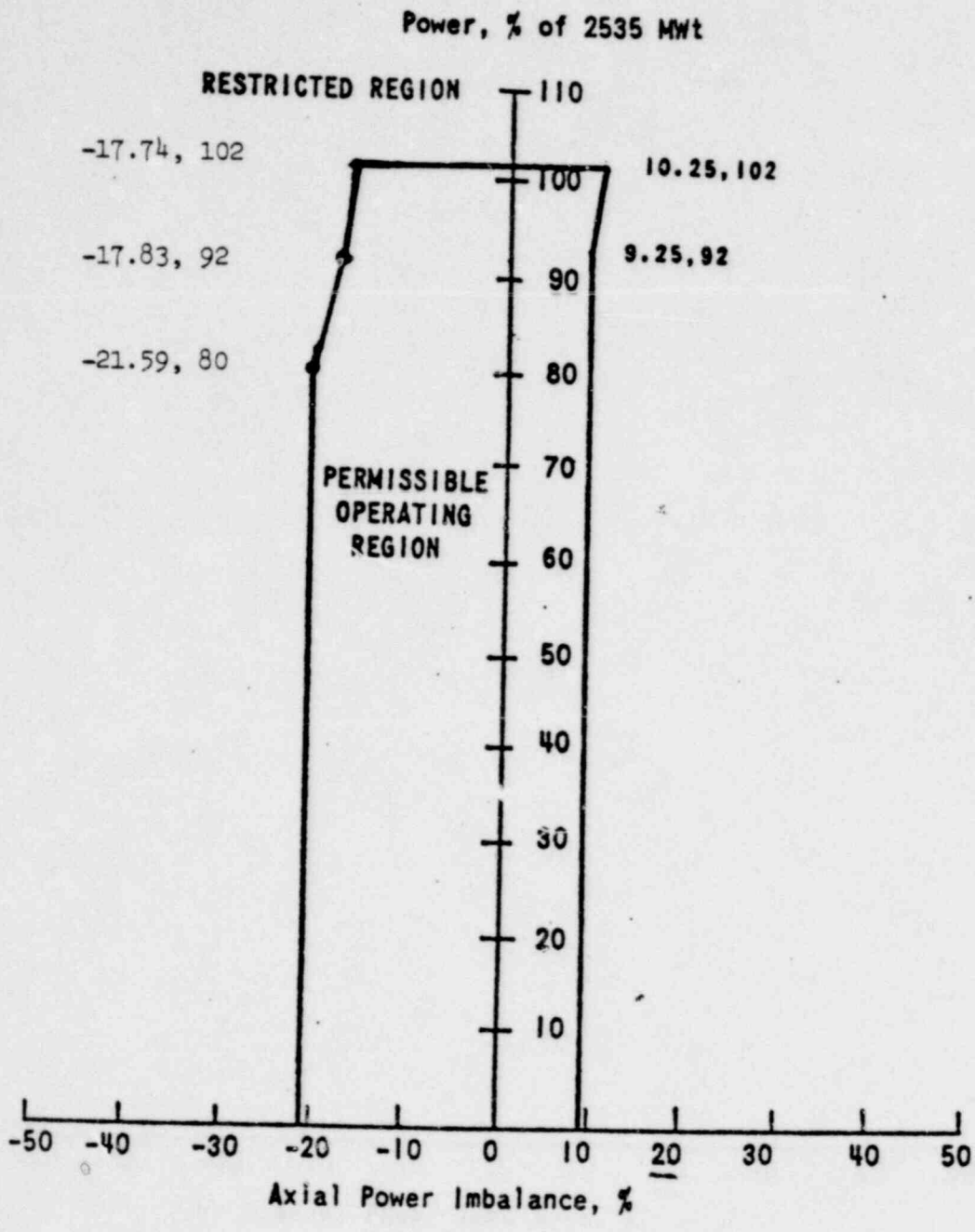
Additional Information

Per NRC verbal request of May 15, 1978, attached in support of this Technical Specification Change Request, is (a) Radial Peaking Factors, power map at 75% full power; (b) Total Peaking Factors, power map at 75% full power; and (c) summary of Zero Power Physics Testing for TMI-1, Cycle 4.



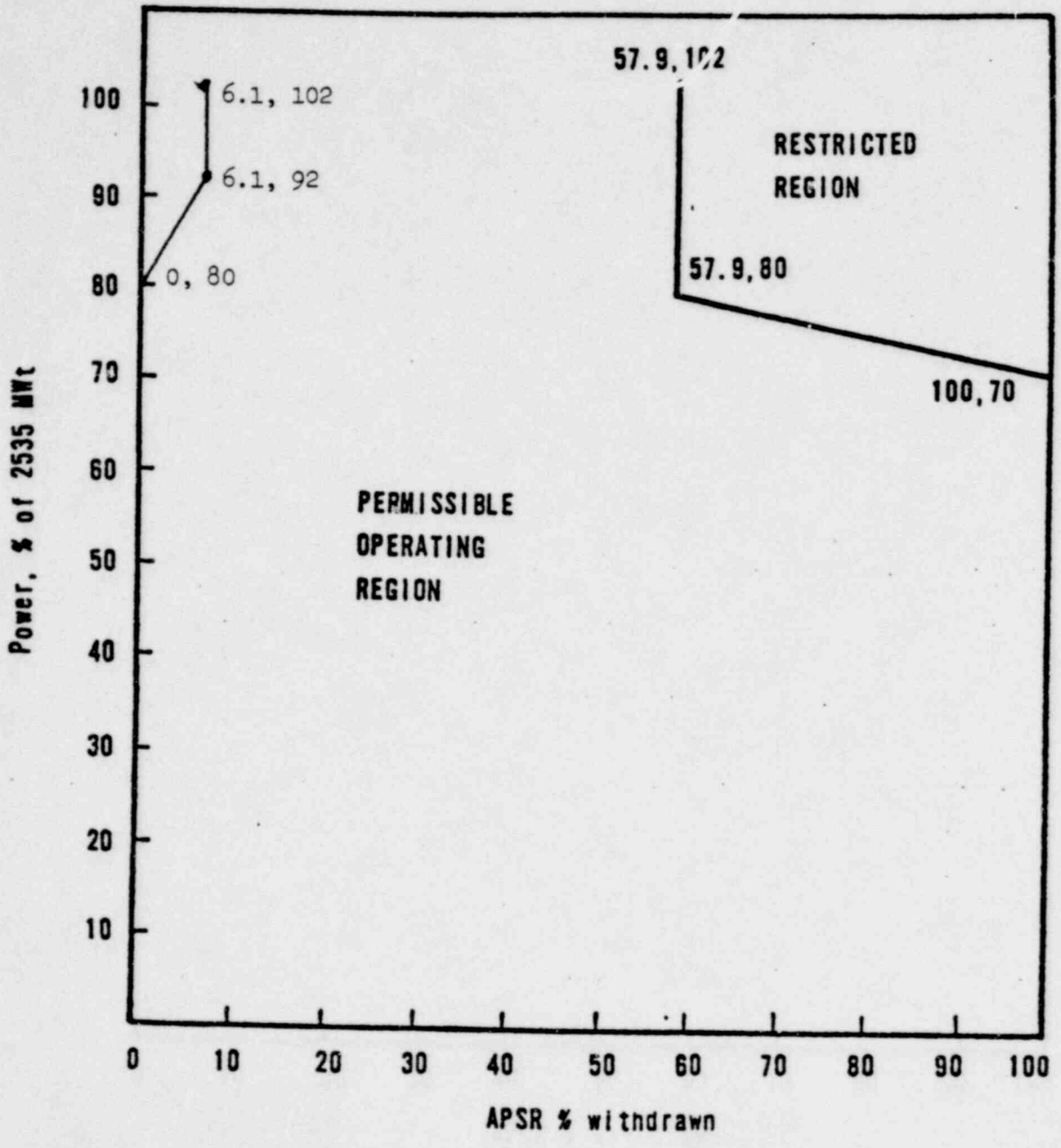
PROTECTION SYSTEM MAXIMUM ALLOWABLE SETPOINTS FOR REACTOR POWER IMBALANCE TMI-1, CYCLE 4 (FROM 0 TO 125 ± 5 EFPD)

Figure 2.3-2



POWER IMBALANCE ENVELOPE FOR OPERATION
FROM 0 TO 125 ± 5 EFPD
TMI-1, CYCLE 4

Figure 3.5-2E



APSR POSITION LIMITS FOR
OPERATION FROM 0 TO 125 ± 5 EFPD
TMI-1, CYCLE 4

Figure 3.5-2H

RADIAL PEAKING FACTORS

DATA SHEET E2D1

1550-08
Revision 2
4/17/78

	8	9	10	11	12	13	14	15
H	0.929 0.932	1.097 1.063	1.251 1.207	1.010 0.990	1.258 1.194	0.837 0.934	0.812 0.786	0.726 0.801
K		1.254 1.224	1.124 1.058	1.209 1.131	1.049 1.078	1.205 1.166	0.863 0.851	0.764 0.803
L	Maximum Peak →		1.377 1.245	1.102 1.044	1.121 1.096	0.906 0.935	1.134 1.210	0.660 0.696
M				0.925 0.986	1.243 1.149	0.967 0.946	0.906 1.002	
N					1.051 1.013	1.086 1.134	0.637 0.715	
O						0.497 0.541		

LEGEND

X.XXX	Measured Value
X.XX	Predicted Value

$$\frac{1.377 - 1.245}{1.377} \times 100 = + 9.59\%$$

	% wd.
Gp. 1-4	100
Gp. 5	100
Gp. 6	100
Gp. 7	85
Gp. 8	29

Power Level 74.6 %FP

Effective Full Power Days 2.37 EFPD

1550-08
Revision 2
04/18/78

TOTAL PEAKING FACTORS

DATA SHEET E2D2

	8	9	10	11	12	13	14	15
H	1.124 1.124	1.307 1.242	1.516 1.413	1.216 1.132	1.536 1.438	1.065 1.220	0.993 1.034	0.915 1.041
K		1.503 1.439	1.405 1.241	1.464 1.313	1.314 1.295	1.471 1.431	1.085 1.072	0.922 1.035
L			1.719 1.525	1.346 1.248	1.451 1.408	1.078 1.096	1.418 1.501	0.817 0.882
M				1.092 1.175	1.516 1.387	1.150 1.110	1.085 1.230	
N					1.333 1.232	1.307 1.380	0.778 0.881	
O						0.595 0.657		

Maximum Peak ⟶

LEGEND

X.XXX	Measured Value
X.XX	Predicted Value

$$\frac{1.719 - 1.525}{1.719} \times 100 = 11.29\%$$

	% wd.
Gp. 1-4	100
Gp. 5	100
Gp. 6	100
Gp. 7	85
Gp. 8	29

Power Level 74.6 %FP

Effective Full Power Days 2.37 EFPD

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ADDITIONAL INFORMATION

1490 301

SUMMARY OF ZERO POWER PHYSICS TESTING FOR TMI-1 CYCLE 4

	Test	Predicted Worth	Measured Worth
1.	All rods out boron concentration	1226 ± 100 ppm	1231 ppm
2.	First isothermal temperature coefficient (1215 ppmB)	-1.1×10^{-3} % $\Delta k/k/^{\circ}F$ ± 4 X 10^{-3}% $\Delta k/k/^{\circ}F$	$+2.6 \times 10^{-4}$ % $\Delta k/k/^{\circ}F$ (1234 ppmB)

Moderator temperature coefficient shall be less than + 5 X 10^{-3} % $\Delta k/k/^{\circ}F$ at zero power to assure a nonpositive temperature coefficient above 95% power.

3.	Group 7 Integral Rod Worth	1.37 ± 0.21 % $\Delta k/k$	1.48 % $\Delta k/k$
4.	Group 6 Integral Rod Worth	1.00 ± 0.15% $\Delta k/k$	1.07 % $\Delta k/k$
5.	Group 5 Integral Rod Worth	1.24 ± 0.19% $\Delta k/k$	1.42 % $\Delta k/k$
6.	Groups 5-7 Total Rod Worth	3.61 ± 0.36 % $\Delta k/k$	3.97% $\Delta k/k$
7.	Shutdown margin verification (worst rod stuck out)		>1.0% $\Delta k/k$
8.	Ejected rod	< 1.0% $\Delta k/k$	Error adjusted maximum ejected rod - 0.98% $\Delta k/k$ Control rod at D-4 using boron swap method w/Group 5, 0% withdrawn Control rod at N-12 using boron swap method - 0.83% $\Delta k/k$ Control rod at N-4 using rod swap method with Group 5 - 0.898% $\Delta k/k$ Control rod at D-12 using rod swap with Group 5 - 0.85% $\Delta k/k$