



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

METROPOLITAN EDISON COMPANY

JERSEY CENTRAL POWER AND LIGHT COMPANY

PENNSYLVANIA ELECTRIC COMPANY

DOCKET NO. 50-289

THREE MILE ISLAND NUCLEAR STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 40  
License No. DPR-50

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The applications for amendment by Metropolitan Edison Company, Jersey Central Power & Light Company, and Pennsylvania Electric Company (the licensees), dated May 10 and 16, 1978, comply with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the applications, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, Facility Operating License No. DPR-50 is hereby amended as indicated below and by changes to the Technical Specifications as indicated in the attachment to this license amendment:

A. Revise paragraph 2.c.(2) to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 40, are hereby incorporated in the license. Metropolitan Edison Company shall operate the facility in accordance with the Technical Specifications.

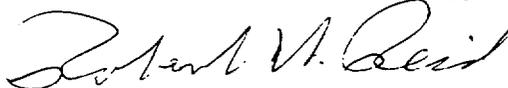
B. Add paragraph 2.c.(3) to read as follows:

(3) Power Peaking

Metropolitan Edison Company shall measure the radial and total power distribution present in the core at equilibrium xenon at or above 75% power after 25 (+20%) EFPD of exposure in Cycle 4. Metropolitan Edison Company shall compare these distributions with power distributions calculated for this power level and exposure in Cycle 4, and submit the results to the NRC within 15 days of completion of the measurements. If the difference between the measured and observed power peaks exceeds 11% for radial peaking or 13.5% for total peaking, Metropolitan Edison Company shall reduce the full power rating of the facility by one percent for each percent that the peaking exceeds these respective limits, and notify the NRC pursuant to Technical Specification 6.9.2.A.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Robert W. Reid, Chief  
Operating Reactors Branch #4  
Division of Operating Reactors

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: May 19, 1978

ATTACHMENT TO LICENSE AMENDMENT NO. 40

FACILITY OPERATING LICENSE NO. DPR-50

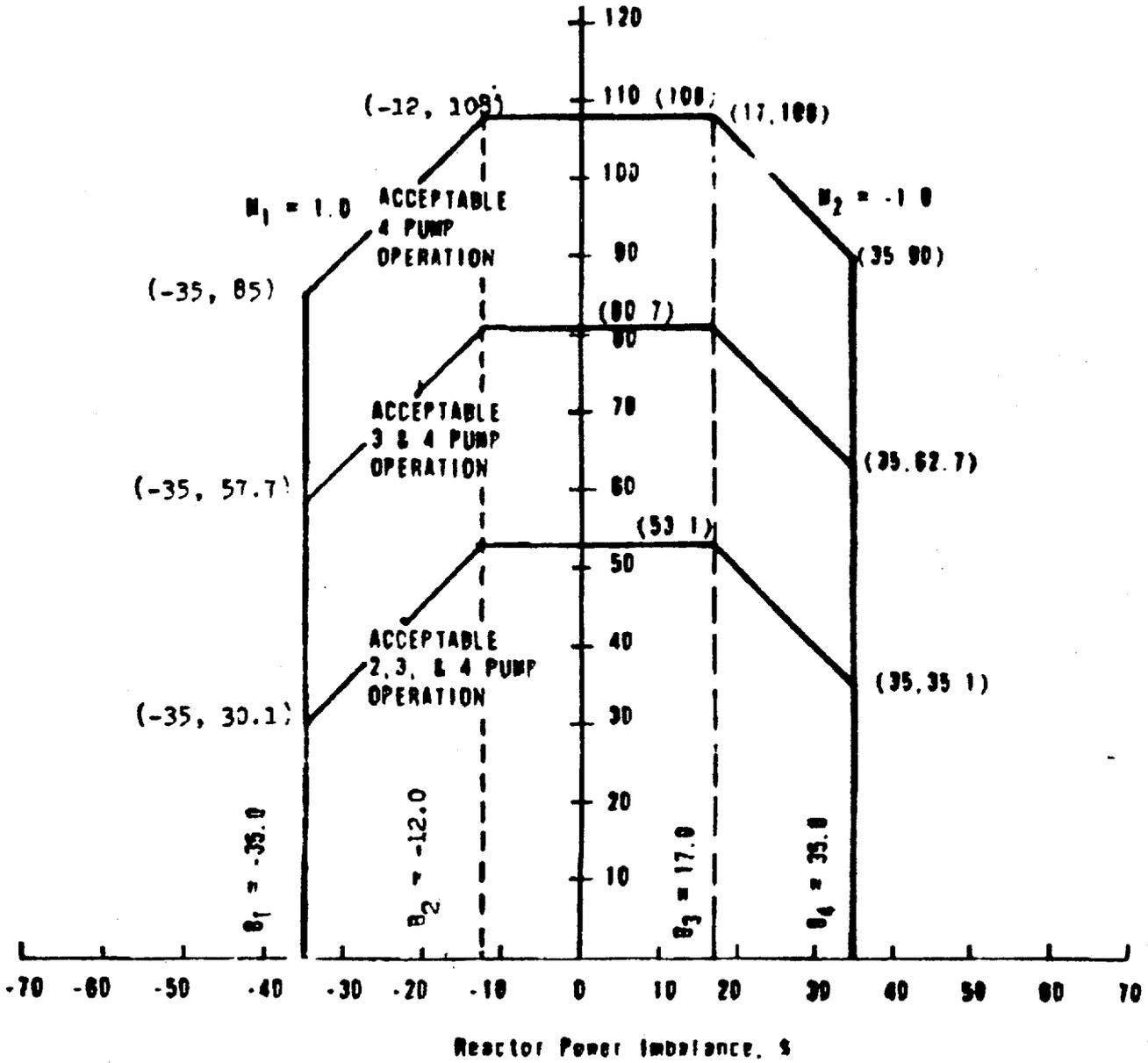
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Revise the Appendix A Technical Specifications as follows:

<u>Remove Pages</u>	<u>Insert Pages</u>
Figure 2.3-2	Figure 2.3-2
3-34 & 3-34a	3-34 & 3-34a
3-36	3-36
Figure 3.5-2E	Figure 3.5-2E
Figure 3.5-2H	Figure 3.5-2H

The changed areas on the revised pages are shown by marginal lines.

THERMAL POWER LEVEL 5



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

Figure 2.3-2

- 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. Diagnostic 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:

<u>Group</u>	<u>Function</u>
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.

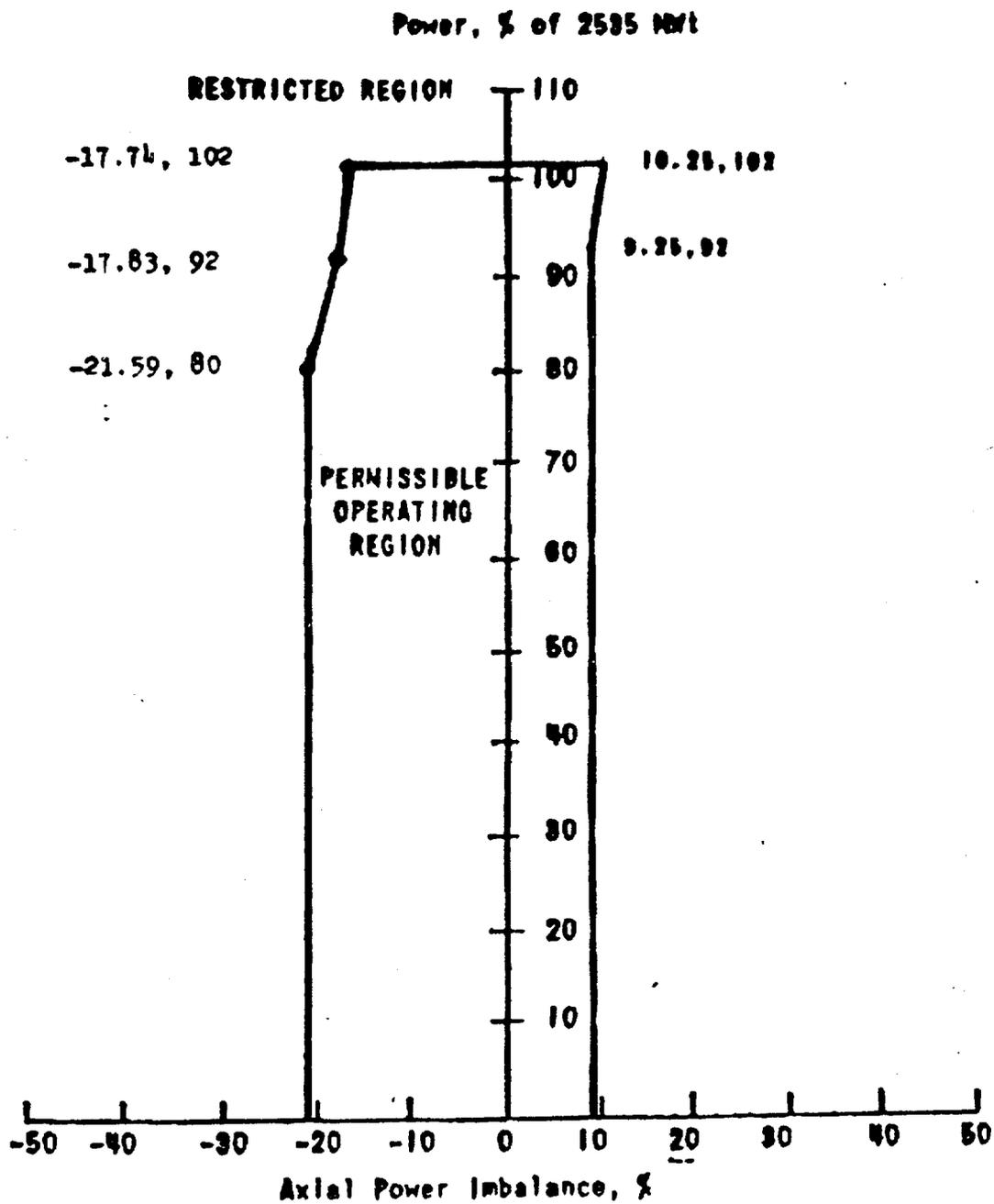
The rod position limits are based on the most limiting of the following three criteria: ECCS power peaking, shutdown margin, and potential ejected rod worth. As discussed above, compliance with the ECCS power peaking criterion is ensured by the rod position limits. The minimum available rod worth, consistent 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%  $\Delta k/k$  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%  $\Delta k/k$  is allowed by the rod position limits at hot zero power. A single inserted control rod worth 1.0%  $\Delta k/k$  at beginning of life, hot, zero power would result in a lower transient peak thermal power and, therefore, less severe environmental consequences than 0.65%  $\Delta k/k$  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.

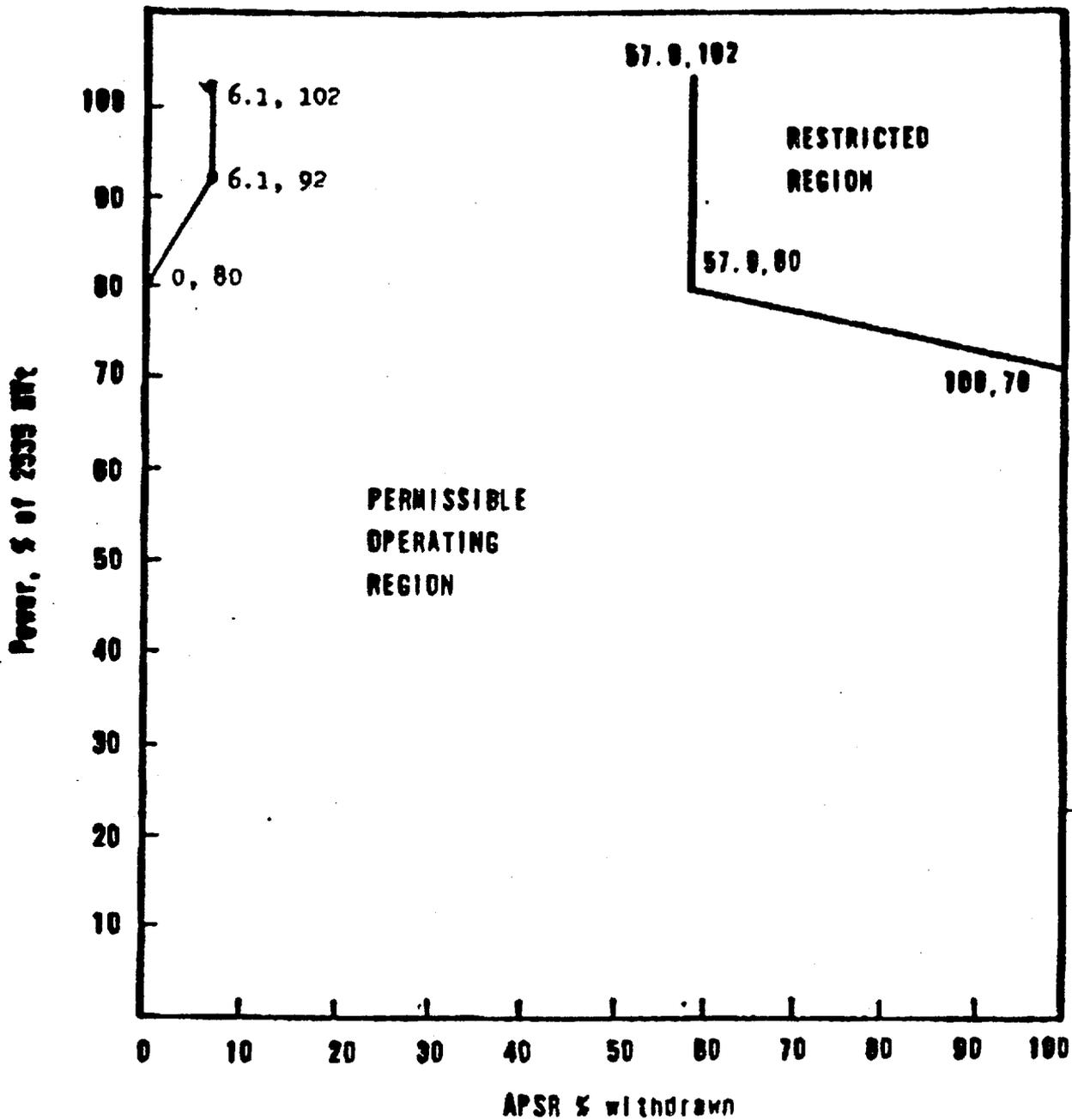
During the physics testing program, the high flux trip setpoints are administratively set as follows to assure an additional safety margin is provided:

<u>Test Power</u>	<u>Trip Setpoint</u>
0	<5%
15	50%
40	50%
50	60%
75	85%
>75	105.5%



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

Figure 3.5-2E



APSR POSITION LIMITS FOR  
 OPERATION FROM 0 TO  $125 \pm 5$  EFPD  
 TH-1, CYCLE 4

Figure 3.5-2H