



**Commonwealth Edison**  
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August 24, 1978

Mr. Harold R. Denton, Director  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

**Subject:** Dresden Station Units 2 & 3  
Quad-Cities Station Unit 2  
Proposed Amendment to Facility  
Operating License Nos. DPR-19, DPR-25,  
and DPR-29 Regarding Revised MCPR  
Operating Limits for Dresden 2 Reload  
3 Cycle 6, Quad-Cities 2 Reload 3  
Cycle 4 and Dresden 3 Reload 5 Cycle 6  
NRC Docket Nos. 50-237/249 and 50-265

- References (a):** D. K. Davis letter to R. L. Bolger  
dated December 2, 1977 transmitting  
Dresden 2 Amendment No. 33
- (b):** C. Reed letter to E. G. Case dated  
February 28, 1978 transmitting  
Quad-Cities 2 MCPR Operating Limit  
for Reload 3
- (c):** C. Reed letter to E. G. Case dated  
December 28, 1977 transmitting  
proposed license amendment for Dresden  
3 Reload No. 5

**REGULATORY DOCKET FILE COPY**

Dear Mr. Denton:

Pursuant to 10 CFR 50.59, Commonwealth Edison proposes to make amendments to Dresden Station Units 2 & 3 and Quad-Cities Station Unit 2 Technical Specifications regarding Minimum Critical Power Ratio (MCPR) operating limits. Interim  $\Delta$ CPR penalties have been applied to the MCPR Limiting Condition of Operation for the subject reactors as a result of Staff constraints on methods utilized in analyzing the Bundle Loading Error Accident.

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The most recent Staff concern has involved the sensitivity of the calculated  $\Delta$ CPR to the assumed initial conditions. In some cases, it has been necessary to apply conservative estimates when refined calculations could not be performed within licensing deadlines. For Dresden 2 Reload 3 Cycle 6, for example, a MCPR limit of 1.37 was approved for 8x8 fuel based on a best estimate of 1.36  $\pm$  0.01 (Reference (a)).

In other instances, the worst case limit has been applied to both fuel types in the absence of revised calculations (i.e. higher initial MCPR) for the less severe case. For Quad-Cities 2 Reload 3 Cycle 4, the final 8x8 limit of 1.35 was also applied to 7x7 fuel (Reference (b)). Similarly, a final 8x8 limit of 1.39 was also conservatively applied to 7x7 fuel for Dresden 3 Reload 5 Cycle 6 (Reference 3).

Refined  $\Delta$ CPR values for the Bundle Loading Error Accident have since become available from General Electric. The new operating limits which will preclude violation of the MCPR Safety Limit of 1.06 are, therefore, as follows:

Unit	Reload	Cycle	Fuel Type	MCPR Limit (Limiting Event)	
				Current	Proposed
D2	3	6	7x7	1.39 (RWE)	NC
			8x8	1.37 (BLEA)	1.36 (BLEA)
Q2	3	4	7x7	1.35 (BLEA)	1.29 (BLEA)
			8x8	1.35 (BLEA)	NC
D3	5	6	7x7	1.39 (BLEA)	1.29 (RWE)
			8x8	1.39 (BLEA)	NC

NC - No Change

RWE - Rod Withdrawal Error

BLEA - Bundle Loading Error Accident

It should be noted that the actual  $\Delta$ CPR for the loading of a fresh 2.62 8x8 into a 7x7 location for Dresden 3 is only 0.15. The proposed 7x7 limit is, therefore, based on the most severe abnormal operating transient for the 7x7 fuel, which is the Rod Withdrawal Error.

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Of the three units, Dresden 2 is in most need of a limit relaxation. Operation is frequently near the 8x8 limit during xenon deficient startups, and the new 8x8 fuel will not reach its reactivity peak until much later in the cycle. Consequently, the potential impact on capacity factor will continue to grow and the cost of continuing with an unnecessary conservatism of even 0.01  $\Delta$ CPR could be significant in the near future.

The revised Technical Specification pages are enclosed as Enclosure 1 for Dresden Unit 2, Enclosure 2 for Dresden Unit 3, and Enclosure 3 for Quad-Cities Unit 2.

Please expedite your review of these proposed MCPR limits which are now based on detailed analyses and are consistent with the Staff's interim licensing position with respect to the Bundle Loading Error Accident.

This Technical Specification change has received on-site and off-site review and approval.

Pursuant to 10 CFR 170, Commonwealth Edison has determined that this proposed amendment is a combined two (2) Class IIIs and Class I Amendment. As such, Commonwealth Edison has enclosed a fee remittance in the amount of \$8,400.00 for this proposed amendment.

Three (3) signed originals and fifty-seven (57) copies of this letter are provided for your use.

Very truly yours,

*C. Reed*

Cordell Reed  
Assistant Vice-President

Enclosures

SUBSCRIBED and SWORN to  
before me this 24th day  
of August, 1978

Nancy M. Pascerzo  
Notary Public

ENCLOSURE 1

DRESDEN STATION UNIT 2

NRC DOCKET NO. 50-237

### 3.5 LIMITING CONDITION FOR OPERATION

#### K. Minimum Critical Power Ratio (MCPR)

During steady state operation, MCPR shall be greater than or equal to -

##### Unit 2

1.39 (7 x 7 fuel)

1.36 (8 x 8 fuel)

at rated power and flow. For core flows other than rated, these nominal values of MCPR shall be increased by a factor of  $K_f$ , where  $K_f$  is as shown in Figure 3.5-2.

If at any time during steady state power operation, it is determined that the limiting value for MCPR is being exceeded, action shall be initiated within 15 minutes to restore operation to within the prescribed limits. If the steady state MCPR is not returned to within the prescribed limits within two (2) hours, the reactor shall be brought to the Cold Shutdown condition within 36 hours. Surveillance and corresponding action shall continue until reactor operation is within the prescribed limits.

### 4.5 SURVEILLANCE REQUIREMENTS

#### K. Minimum Critical Power Ratio (MCPR)

MCPR shall be determined daily during a reactor power operation at  $\geq 25\%$  rated thermal power and following any change in power level or distribution that would cause operation with a limiting control rod pattern as described in the bases for Specification 3.3.B.5.

ENCLOSURE 2

DRESDEN STATION UNIT 3

NRC DOCKET NO. 50-249

## 3.5 LIMITING CONDITION FOR OPERATION

Minimum Critical Power Ratio (MCPR)

- K. During steady state operation, MCPR shall be greater than or equal to -

Unit 3

1.29 (7 x 7 fuel)

1.39 (8 x 8 fuel)

at rated power and flow. For core flows other than rated, these nominal values of MCPR shall be increased by a factor of  $K_f$ , where  $K_f$  is as shown in Figure 3.5-2.

If at any time during steady state power operation, it is determined that the limiting value for MCPR is being exceeded, action shall be initiated within 15 minutes to restore operation to within the prescribed limits. If the steady state MCPR is not returned to within the prescribed limits within two (2) hours, the reactor shall be brought to the Cold Shutdown condition within 36 hours. Surveillance and corresponding action shall continue until reactor operation is within the prescribed limits.

## 4.5 SURVEILLANCE REQUIREMENTS

K. Minimum Critical Power Ratio (MCPR)

MCPR shall be determined daily during a reactor power operation at  $\geq 25\%$  rated thermal power and following any change in power level or distribution that would cause operation with a limiting control rod pattern as described in the bases for Specification 3.3.B.5.

ENCLOSURE 3

QUAD-CITIES STATION UNIT 2

NRC DOCKET NO. 50-265



QUAD-CITIES  
DPR-30

within the prescribed limits within 2 hours, the reactor shall be brought to the cold shutdown condition within 36 hours. Surveillance and corresponding action shall continue until reactor operation is within the prescribed limits.

$$\text{LHGR}_{\text{max}} < \text{LHGR}_d [1 - (\Delta P/P)_{\text{max}}(L/L_1)]$$

where:

$\text{LHGR}_d$  = design LHGR

= 17.5 kW/ft. 7 x 7 fuel assemblies  
= 13.4 kW/ft. 8 x 8 fuel assemblies

$(\Delta P/P)_{\text{max}}$  = maximum power spiking penalty

= .035 initial core fuel  
= .029 reload 1, 7 x 7 fuel  
= .022 reload, 8 x 8 fuel  
= .028 reload 1, mixed oxide fuel

$L_1$  = total core length

= 12 feet

$L$  = Axial distance from bottom of core

**K. Minimum Critical Power Ratio (MCPR)**

During steady-state operation MCPR shall be greater than or equal to

**1.29** (7 x 7 fuel)  
**1.35** (8 x 8 fuel)

at rated power and flow. If at any time during operation it is determined by normal surveillance that the limiting value for MCPR is being exceeded, action shall be initiated within 15 minutes to restore operation to within the prescribed limits. If the steady-state MCPR is not returned to within the prescribed limits within 2 hours, the reactor shall be brought to the cold shutdown condition within 36 hours. Surveillance and corresponding action shall continue until reactor operation is within the prescribed limits. For core flows other than rated, these nominal values of MCPR shall be increased by a factor of  $k_f$  where  $k_f$  is as shown in Figure 3.5.2.

**K. Minimum Critical Power Ratio (MCPR)**

The MCPR shall be determined daily during steady-state power operation above 25% of rated thermal power.