ENCLOSURE

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATING TO EXTENDED EXPOSURE LIMITS

COMMONWEALTH EDISON COMPANY

DRESDEN NUCLEAR POWER STATION UNITS 2 AND 3

DOCKET NOS. 50-237 AND 50-249

1.0 INTRODUCTION

By letter dated February 22, 1990, from J. A. Silady (Commonwealth Edison Company) to T. E. Murley (USNRC), the licensee submitted a request for a proposed extension of burnup limit to 36.5 GWd/MTU bundle average for ANF 8x8 fuel assembly in Dresden 2 and 3 cores. The ANF 8x8 fuel design was approved to burnup 35 GWd/MTU bundle average or 42 GWd/MTU peak planar exposure. Since then, some licensees have requested for burnup extension on a cycle-specific basis due to extended irradiation.

Currently, in Dresden Units 2 and 3, there are both ANF 8x8 and 9x9 fuel assemblies. The ANF 8x8 fuel is experiencing a higher peak-to-average exposure than was used in the approved original 8x8 fuel design report XN-NF-85-67(P)(A). Therefore, a request for ANF 8x8 fuel assembly average burnup limit extension is needed for reload applications. ANF had previously performed such an analysis for ANF 8x8 fuel for another utility, and the staff had approved such an extension. The current limits for other fuel types such as ANF 9x9 are still applicable.

On the basis of the staff approval of such burnup extension, the licensee will update these changes to the approved Core Operating Limits Report for Dresden Units 2 and 3.

2.0 EVALUATION

2.1 Steady State Linear Heat Generation Rate (SLHGR)

The SLHGR was used to analyze cladding stress and strain during steady state operation. The licensee performed stress and strain analyses using an approved methodology described in XN-NF-85-67 for extended burnup applications. The results showed that there are adequate margins to limits for stress and strain up to 50.7 GWd/MTU peak planar exposure. Inasmuch as the licensee used the approved methodology described in XN-NF-85-67 to analyze stress and strain, we conclude that SLHGR limit can be extended to burnup 50.7 GWd/MTU peak planar exposure.

2.2 Transient Linear Heat Generation Rate (TLHGR)

The TLHGR was used to analyze fuel melting during anticipated operational occurrences. The licensee performed fuel melting analysis using the approved

methodology described in XN-NF-85-67 for extended burnup applications. The results showed that the fuel melting limiting condition is at the beginning of life, not at end of life, and consequently the extended burnup applications is applicable for TLHGR limit up to 50 GWd/MTU peak planar exposure. Since the licensee used the approved methodology in analyzing fuel melting, we conclude that TLHGR limit is approved for extended burnup application to 50 GWd/MTU peak planar exposure.

2.3 Other Analyses to Support LHGR Extension

There are several other parameters that also determine the applicability for extended burnup. These parameters include: fuel rod internal pressure, cladding fatigue, cladding collapse, cladding corrosion, structural strength, and axial growth. The licensee analyzed these parameters using the approved methodology described in XN-NF-85-67 and determined that all design limits are met for extended burnup application. Based on the approved analyses, we thus conclude that these parameters are approved for extended burnup application for Dresden Units 2 and 3.

2.4 Maximum Average Planar Linear Heat Generation Rate (MAPLHGR)

The MAPLHGR was used for LOCA ECCS performance to assure that 10 CFR 50 Appendix K requirements are met. The licensee performed MAPLHGR analysis using an approved methodology for higher assembly exposure. The results showed that MAPLHGR limit can be extrapolated to 39 GWd/MTU bundle average and meets the 10 CFR 50 Appendix K requirements. Based on the acceptable results that meets the 10 CFR 50 Appendix K requirements, we conclude that the MAPLHGR curve can be extended to 36.5 GWd/MTU bundle average as requested by the licensee for Dresden Units 2 and 3.

3.0 CONCLUSION

We have reviewed the licensee submittal concerning the extended burnup application. Based on the use of the approved methodology and meeting the requirements in 10 CFR 50 Appendix K, we conclude that the licensee's submittal for extended burnup application for Dresden Units 2 and 3 is acceptable.

The staff has also concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Reviewer: S. L. Wu

Dated: