RELOAD INFORMATION AND SAFETY ANALYSIS REPORT FOR OYS‹ER CREEK CYCLE 12 RELOAD

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1.0 INTRODUCTION AND SUMMARY

This report justifies the operation of the Oyster Creek Nuclear Generating Station through the upcoming fuel reload Cycle 12. It is planned to operate the Oyster Creek reactor ', Cycle 12 beginning in December 1988 with a partial core loading of fresh P8X8R and GE8X8EB fuel bundles supplied by General Electric Company (GE).

The Cycle 12 reference loading pattern is designed to ensure compliance with Technical Specification limits and safety analysis criteria. The reload dependent analyses are performed with methodology developed by GPUN. These methods were previously submitted to the NRC for approval (References 1 through 7). The loss-of-coolant accident, rod drop accident and stability analyses were performed by the fuel vendor using previously approved methods.

The GE8X8EB fuel design will be introduced for the first time into the Oyster Creek core for Cycle 12. This fuel has been designed to accommodate higher enrichments, longer fuel cycles and will reduce or eliminate PCI related fuel failures. The Cycle 12 fuel design has an average enrichment of 3.21% and is described in Appendix B of Reference 9.

The transient and accident analyses presented in this report demonstrate that based on the Turbine Trip Without Bypass transient, the Technical Specification CPR operating limit will have to be raised from 1.45 to 1.51 for Cycle 12. The safety limit MCPR is determined using the General Electric Company Thermal Analysis Basis, GETAB[12] with the GE critical quality (X) boiling length (L) GEXL, correlation.

The second analysis uses a transient rod location that will result in a poor response of the APRM system and also has a high rod worth. The most limiting results for Cycle 12 were obtained in the highest worth control rod analysis. Figure 5.8 provides the control rod pattern used in this analysis.

The APRM response, and hence the rod block effectiveness, versus transient rod position will vary based upon the number of available LPRMs feeding the APRM. Three APRM status conditions have been defined and the APRM response to control rod withdrawal is displayed in Figure 5.9. The results of the most limiting APRM response (Status 1) are shown in Table 5.3. Since the RWE is not the limiting CPR transient for Cycle 12 all three APRM status conditions will have the same operating CPR limit (1.51). The peak MLLHGR remains well within limits.

6.0 OPERATING LIMIT MCPR

The operating limit MCPR for each transient is presented in Table 6.1 and that the limiting event is the Turbine Trip Without Bypass. The required MCPR operating limit for Cycle 12 is 1.51 based on a safety limit of 1.07, a ΔCPR of 0.37, and a statistical multiplier of 1.049.

7.0 STABILITY ANALYSIS

According to Reference 17, Oyster Creek (as a low power density BWR/2) is exempt from the current requirement to submit a cycle specific stability analysis for its reload fuel. Ample stability margins to the 1.0 decay ratio criteria, as shown in the stability analysis for Cycle 10[10], are typical for the Oyster Creek Plant.

8.0 TECHNICAL SPECIFICATIONS

Based on the Cycle 12 reference core design and safety analysis provided in this report, the following sections in the Technical Specifications will require modification.

Section 3.10.A (Average Planar LHGR): Add new limits for GE8X8EB fuel and revise limits for P8X8R fuel designs. Four and five loop operation will use same MAPLHGR figures.

Section 3.10.B (Local LHGR): Add reference for new fuel design (GE8X8EB) to include LHGR limit of ≤ 13.4 KW/ft.

Section 3.10.C (Minimum Critical Power Ratio): Change MCPR Limit from 1.45 to 1.51 for each of the three APRM status levels.

The appropriate bases sections will also require modification.

TABLE 6.1

Cycle Operating Limit MCPRs

Transient	MCPR
Fuel Loading Error (Mislocated)	1.28
Fuel Loading Error (Misorientated)	1.32
Loss of Feedwater Heating	1.20
Rod Withdrawal Error	1.45
FW Controller Failure	1.40
Turbine Trip w/o Bypass	1.51

9.0 REFERENCES

1.0 H. Fu, R. V. Furia, "Methods for the Analysis of Boiling Water Ractors Lattice Physics," TR 020-A, Rev. 0, January 1988.

2.0 Letter from J. N. Donohew, Jr. (NRC) to P. B. Fiedler (GPUN) dated November 14, 1986, "Reload Topical Report TR 020 (TAC 60339)."

3.0 R. V. Furia, "Methods for the Analysis of Boiling Water Reactors Steady State Physics," TR 021-A, Rev. 0, January 1988.

4.0 Letter from A. W. Dromerick (NRC) to P. B. Fiedler (GPUN) dated September 27, 1987, GPU Nuclear Corporation (GPUN) Topical Report TR 021, Revision 0, "Methods for the Analysis of Boiling Water Reactors Steady State Physics."

5.0 D. E. Cabrilla, et al., "Methods for the Generation of Core Kinetics Data for RETRAN-02," TR 033A, Rev. 0, May 1988.

6.0 E. R. Bujtas, et al., "Steady-State and Quasi-Steady-State Methods Used in the Analysis of Accidents and Transients," TR 040A, Rev. 0, May 1988.

7.0 M. A. Alammar, et al., "BWR-2 Transient Analysis Model Using the RETRAN Code," TR 045, Rev. 0, September 3, 1987.

8.0 Letter from H. Berkow (NRC) to J. S. Charnley (GE) dated December 3, 1985, "Acceptance for Approval of Fuel Designs Described in Licensing Topical Report NEDE-24011-P-A-6, Amendment 10 for Extended Burnup Operation."

9.0 "Oyster Creek Nuclear Generating Station SAFER/CORECOOL/GESTR-LOCA Loss-of-Coolant Accident Analysis," NEDC-31462P, August 1987.

10.0 "General Electric Reload Fuel Application for Oyster Creek," NEDO-24195, (As Amended).

11.0 "General Electric Standard Application for Reactor Fuel," NEDE-24011-P-A-8, May 1986.

12.0 "General Electric BWR Thermal Analysis Basis (GETAB): Data, Correlation and Design Application," NEDO-10958-P-A, January 1977.

13.0 "Banked Position Withdrawal Sequence," NEDO-21231, January 1977.

14.0 "Guidelines for Generating OPL-3 Inputs," NEDE-22061, Feb. 1982.

15.0 Letter from W. A. Paulson (NRC) to P. B. Fiedler (GPUN), dated August 27, 1984, "Core 10 Refueling."