UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 176

TO FACILITY OPERATING LICENSE NO. DPR-16

GPU NUCLEAR CORPORATION AND

JERSEY CENTRAL POWER & LIGHT COMPANY

OYSTER CREEK NUCLEAR GENERATING STATION

DOCKET NO. 50-219

1.0 INTRODUCTION

By letter dated October 9, 1991, as supplemented March 9, April 27, and December 15, 1994, "Technical Specification Change Request No. 191" (Ref. 1), GPU Nuclear Corporation (GPUN/the licensee) requested changes to the Oyster Creek Nuclear Generating Station (OCNGS) technical specifications (TS). These changes provide (1) additional requirements for availability of local power range monitors (LPRM) associated with average power range monitors (APRM) and (2) a lower bound for the minimum critical power ratio (MCPR) limiting condition for operation (LCO). The changes are intended to ensure a suitable APRM response to core-wide or regional thermal-hydraulic power oscillations. Accompanying the proposed changes was the GPUN Topical Report No. 068, Rev. 2, "Licensing Basis for Oyster Creek Long-Term Solution to Reactor Instability," which discusses the OCNGS long-term solution (LTS) to core instability issues. The March 9, and April 27, 1994 letters provided clarifying information that did not change the initial proposed no significant hazards consideration determination.

The NRC staff and the BWR Owners Group (BWROG) have been working since 1988 to develop LTS for instability events. The BWROG has developed several LTS design concepts which cover the range of BWR types. The LTS-II concept, in particular, was developed for the BWR-2 class, which includes the OCNGS. It takes advantage of the BWR-2 reactor core quadrant based, flow-biased, APRM protection system to provide an appropriate scram signal for either a core wide or regional power oscillation event. The BWROG generic LTSs (including Option II) are described in the topical reports of References 2 and 3, and the staff evaluation of these reports for the generic aspects of the proposed systems is given in Ref. 4. That evaluation concluded, for aspects relevant to LTS-II that (1) the methodology used to evaluate the protection provided by LTS-II is acceptable, (2) LTS-II is acceptable for BWR-2s (with plant-specific implementation analysis to show the APRM scram provides sufficient protection for out of phase oscillations to avoid exceeding core power ratio (CPR) safety limits), (3) since protection is not provided for single fuel assembly channel instability, the stability of lead use assemblies in a core reload should be

reviewed to ensure single channel instability will not occur, and (4) the recirculation drive flow channel should comply with the requirements of appropriate standards. The indicated plant specific aspects are addressed in this evaluation.

The NRC contractor, Oak Ridge National Laboratory (ORNL), assisted the staff in reviewing the stability related material submitted by GPUN. ORNL has provided a technical evaluation report (TER) that is included with this evaluation as Attachment 1. Also included as Attachment 2 is the staff review of the recirculation flow electronics upgrade proposed by GPUN to satisfy the intent of item (4) above from the staff LTS generic review.

2.0 EVALUATION

The GPUN topical report TR No. 068 describes (1) the OCNGS BWR-2 quadrant based, flow biased neutron flux scram, APRM system, (2) the APRM response to power oscillations. (3) design criteria relative to oscillation detection and response, (4) procedural actions such as avoidance of the region of potential instability on the power-flow map, and (5) supporting analyses. The supporting analyses are plant specific calculations of examples of core wide and regional oscillations, sufficient (1) to determine requirements for MCPR operating limits, in order to avoid exceeding the MCPR safety limit should oscillations occur, and (2) LPRM/APRM inoperable limits, to ensure acceptable determination of power distribution relevant to oscillation detection. These calculations provide the basis for the proposed TS changes.

This material was part of the review by ORNL discussed in the attached TER. The staff review agrees with and adopts the conclusions and basis for the conclusions presented in the TER. These conclusions are, in brief (1) LTS-II is applicable to the OCNGS and (2) the solution implementation satisfies the LTS criteria and the General Design Criteria 10 and 12. Also adopted are two reservations indicated in the TER. They are (1) that since LTS-II does not provide automatic protection for single fuel assembly channel instability, reload fuel assemblies, including lead use assemblies should be placed in the core only if it has been demonstrated by analysis, using an approved methodology, that the limiting channel stability decay ratios are equal to or better than for fuel designs, other than lead test assemblies, in industry service at the time of this review, and (2) the approval of the OCNGS submittal should not imply general approval of Figure 4.1 of TR No. 068.

In a letter of March 9, 1994 (Ref. 5) GPUN presented information on a modification to the recirculation flow monitoring electronics. This change and the submittal was provided (in part) to satisfy the intent of the conclusion by the staff in the safety evaluation for the generic LTS report (Ref. 4) concerning recirculation flow requirements as indicated in item (4) of the discussion of the generic evaluation above. This information has been reviewed by the staff and is discussed in detail in Attachment 2. The conclusions from the review, which are adopted as part of this evaluation, states that the modifications, which are part of the safety-related class 1-E plant protection system, meet staff acceptance criteria for such instrumentation, including independence and environmental and seismic qualification and are acceptable for use in connection with the OCNGS LTS-II.

As discussed above and in both of the Attachments, GPUN has proposed TS changes to ensure (1) the MCPR safety limit is not exceeded if oscillations occur and (2) there are a sufficient number and distribution of LPRMs to detect and act on oscillations. TS 3.1.B is augmented to require that power must be below the 80 percent rod line or the relevant trip system placed in a tripped condition when specified conditions for reactor power and bypassed A and B level LPRMs are exceeded. TS 3.10.C is augmented to provide a minimum operating limit MCPR of 1.47. The staff review of the analyses carried out to support these changes concludes that the analyses and the changes are acceptable.

The staff has reviewed the licensing basis submitted by GPUN for the LTS selected for OCNGS, and adopts the recommendations described in the attached reviews. GPUN has presented reactor specific information to augment the generic information in References 2 and 3, proposed changes to the TS and an upgrade of the protection system implementation, in order to adopt the BWROG LTS-II for detection and suppression of thermal-hydraulic instability power oscillations. The staff review finds the changes to the TS and protection system to be acceptable. There are two conditions to the acceptance:

(1) Fuel assemblies, including lead use assemblies, should be used in the OCNGS core only if analysis, by approved methodology, demonstrates that limiting channel stability decay ratios are equal to or better than for fuel designs, other than lead test assemblies, in industry service at the time of this review. In a letter dated December 15, 1994, the licensee committed to this condition.

(2) Approval of the GPUN submittal should not imply general approval of GPUN TR No. 068 Figure 4.1.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New Jersey State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (56 FR 57697). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

5.0 CONCLUSION

The Commission has 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) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 REFERENCES

1. Letter and attachment from J. Barton, GPUN, to U.S. NRC, dated October 9, 1991, "Oyster Creek Nuclear Generating Station, Technical Specification Change Request No. 191."

2. NEDO-31960, "BWR Owners Group, Long-Term Stability Solutions Licensing Methodology," May 1991.

3. NEDO-31960, Supplement 1, "BWR Owners Group Long-Term Stability Solutions Licensing Methodology," March 1992.

4. Letter and enclosure from A. Thadani, NRC to L. England, BWR Owners Group, dated July 12, 1993, "Acceptance for Referencing of Topical Reports NEDO-31960 and NEDO-31960 Supplement 1, "BWR Owners Group Long-Term Stability Solutions Licensing Methodology."

5. Letter and enclosure from R. Keaten, GPUN, to U.S. NRC, (Document), dated March 9, 1994, OCNGS TSCR No. 191 - Additional Information.

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Attachments: 1. TER by ORNL
2. Safety Evaluation