December 21, 2004

MEMORANDUM TO: Herbert N. Berkow, Director
Project Directorate IV
Division of Licensing Project Management

FROM: Frank Akstulewicz, Chief /***RA***/
BWR Systems and Nuclear Performance Section
Reactor Systems Branch
Division of Systems Safety and Analysis

SUBJECT: ACCEPTANCE FOR REFERENCING OF AMENDMENT 27 TO GENERAL ELECTRIC LICENSING TOPICAL REPORT NEDE-24011-P-A "GENERAL ELECTRIC STANDARD APPLICATION FOR REACTOR FUEL" (TAC NO. MC4078)

By letters dated August 6, 2003 and November 24, 2003, as supplemented by a letter dated December 8, 2004, Global Nuclear Fuel (GNF) submitted a request for review of Amendment 27 to General Electric Standard Application for Reactor Fuel (GESTAR) II as a standard amendment. The submittal letters were supported by a meeting with the staff on December 2, 2003. At that time, it was decided to separate the administrative changes, for which the staff could quickly review, from the more technical changes, for which the staff would require a more detailed review. By letter dated July 16, 2004, the staff issued an SER on the administrative changes within Amendment 27. This safety evaluation addresses the remaining technical changes in Amendment 27.

The Reactor Systems Branch (SRXB) has completed its review of this portion of Amendment 27 to GESTAR II and finds it acceptable. The attached safety evaluation input provides the basis for the staff's decision. This concludes SRXB's work on TAC No. MB4078.

Attachment: As stated

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

AMENDMENT 27 TO TOPICAL REPORT NEDE-24011-P-A, "GESTAR II"

GLOBAL NUCLEAR FUEL

## 1.0 INTRODUCTION

By letters dated August 6, 2003 (Reference 1) and November 24, 2003 (Reference 2), as supplemented by a letter dated December 8, 2004 (Reference 3), Global Nuclear Fuel (GNF) submitted a request for review of Amendment 27 to General Electric Standard Application for Reactor Fuel (GESTAR) II as a standard amendment. The submittal letters were supported by a meeting with the staff on December 2, 2003. At that time, it was decided to separate the administrative changes, for which the staff could quickly review, from the more technical changes, for which the staff would require a more detailed review. By letter dated July 16, 2004 (Reference 4), the staff issued an SER on the administrative changes within Amendment 27. This safety evaluation addresses the remaining technical changes in Amendment 27.

## 2.0 REGULATORY EVALUATION

The staff has evaluated each of the proposed changes below. Regulatory guidance for the review of fuel system designs and fuel analysis methodology adherence to applicable General Design Criteria (GDC) is provided in NUREG-0800 Standard Review Plan (SRP) Section 4.2. The latest draft of SRP-4.2 was employed in this review.

## 3.0 TECHNICAL EVALUATION

Update to Sections 1.1.7.C.vii and 1.2.7.C.vii
This change corrects the critical power correlation uncertainty equation to a standard form. The staff agrees with the correction to this equation.

Update to Section 3.2.4.3
This change reworded the paragraph to state that the Standby Liquid Control System (SLCS) is analyzed to bring the core to a shutdown condition with all rods out. This change is consistent to a previous response to an NRC question contained in Appendix B, page US.B-43 and is therefore acceptable.

Update to Section 3.4.2.2
This change reworded the paragraph to clarify evaluations to be performed on axial exposure distributions. In response to the staff's request, GNF provided further clarification on this change and the text within the change description relating to time varying axial power shape (TVAPS) methodology. GNF stated that the TVAPS description does not apply to this change nor any other in Amendment 27. The change to Section 3.4.2.2 clarifies the currently approved methodology. The staff agrees that these changes are administrative and therefore acceptable.

ATTACHMENT

Update to Section 3.4.3

This change requires that the SLCS shutdown margin be re-examined if the final loading pattern does not meet requirements. The staff agrees that the SLCS shutdown margin needs to be evaluated for this condition and therefore this change is acceptable.

Update to Section 4.2.3
This change allows the use of 1967 steam tables or later editions. The staff accepts the use of more recent international standard steam tables. Therefore, this change is acceptable.

Update to Section 4.2.4
This change clarifies the equations and variable definitions. This change does not alter the algorithm only clarifies its usage. Therefore, this change is acceptable.

Update to Section 4.3.1.2.7
This change clarifies the text for easier understanding on off-rated limits. This clarification does not alter the underlying meaning of the text and is therefore acceptable.

Update to Table A.15.0-2
This change updates Table A.15.0-2 to reflect the final resolution on Anticipated Transients Without Scram (ATWS). The ATWS criteria for new fuel designs is contained in GESTAR Section 1.1.13 and 1.2.13. NRC review and approval of each new fuel bundle design must include an evaluation against this ATWS criteria. In response to the staff's request (Reference 3), GNF has agreed to revise Table A.15.0-2. The new table will cite GESTAR Section 1.1.13 and 1.2.13 for the ATWS acceptance criteria as opposed to NEDE-31152P. This final change does not alter the current licensing basis for ATWS nor the requirement for future staff review of new fuel designs and is therefore acceptable.

Update to Section S.1.3
This change adds GDC10 requirements and stipulates the Interim Corrective Action (ICA) for the stability analysis. This change is consistent with currently approved methods and is therefore acceptable.

Update to Section S.2.2.3.2.6
MCPR, MAPLHGR, and LHGR represent the three thermal limits typically monitored by BWRs. Amendment 19 to GESTAR provided the capabilities to fold the LHGR into the MAPLHGR. Most plants discontinued specifying LHGR because it was included within MAPLHGR. This change updates the text to show that MAPLHGR need not include the LHGR limit as the LHGR limit may be specified separately. This change does not alter the previously approved thermal margin monitoring requirements and is therefore acceptable.

Update to Section S.4
This change clarifies stability solutions to those currently approved and being applied in refueling analyses. This change is consistent with currently approved positions and is therefore acceptable.

Update to Section S.4.1.2
This change adds a reference to plant-specific Option II licensing topical reports. Referencing plant-specific LTRs is acceptable. Therefore, this change is acceptable.

Update to Section S.4.2.1
This change adds text recommending that the impact of core design changes be evaluated with respect to stability ICAs. This guidance helps to ensure the continued applicability of stability ICAs and is therefore acceptable.

Update to Section S.5.1.1
This change updates the text to indicate the availability of recirculation pump trips (RPTs). This clarification does not change the RPT features nor whether it may be credited. Therefore, this change is acceptable.

Updates to Sections S.5.2, S.5.2.9, S.5.2.10, S.5.2.11, and S.5.2.12
This change adds operating flexibility options Safety/Relief Valves Out of Service, ADS Valve Out of Service, End-of-Cycle Recirculation Pump Trip Out of Service, and Main Steam Isolation Valves Out of Service. These options have already been analyzed by GNF and have been implemented on a plant-specific basis for operating BWRs. In the future, licensees planning to implement any of these options will need to (1) ensure that implementation meets the provisions under 10 CFR50.59 or (2) seek NRC approval prior to implementation. Since this change adds flexibility options already being implemented in operating plants and does not change the requirement for NRC review and approval of each option on a plant-specific basis, it is acceptable.

Update to Section S.5.2.2
At the staff's request, GNF has rescinded this change since the validation of the previous cycle LOCA analyses applies universally and not just to SAFE/REFLOOD LOCA methodology (Reference 3).

Update to Section S.5.2.3
This change corrects the Extended Load Line Limit (ELLLA) operating range. Specifically, removing the 100% power / 75% flow statepoint which is MELLLA not ELLLA. This correction does not alter the currently approved application of ELLLA and is therefore acceptable.

Update to Section S.5.2.4
This change adds text clarifying the need to evaluate increased core flow on limiting transients. This change does not change the intent or magnitude of evaluations required to support increased core flow operation and is therefore acceptable.

Update to Section S.5.2.5
This change adds text clarifying the need to evaluate reduced feedwater temperature on limiting transients. This change does not change the intent or magnitude of evaluations required to support reduced feedwater temperature operation and is therefore acceptable.

Update to Section S.5.2.6
This change adds text clarifying the need to apply reduced operating limits for low power and low flow conditions. The use of MAPLHGR and LHGR limits is currently allowed and should be adjusted to provide protection during postulated transients at off-rated conditions. This clarification is acceptable.

Update to Section S.5.2.7
This change adds text clarifying the high load line aspects of MEOD and the application of these limits to BWR 3-5 plants as MELLLA. This change does not alter the currently approved applications of MEOD or MELLLA and is therefore acceptable.

Update to Section S.5.2.8
This change adds text clarifying the response time requirements of the Turbine Bypass system. This clarification of response time does not change the intent of Section S.5.2.8 and is therefore acceptable.

Update to Section US.A.8
This change updates the operating flexibility options to be consistent with the changes noted above and is acceptable.

## 4.0 CONCLUSION

As discussed in the technical evaluation, the staff has reviewed the proposed changes and found each of them to be acceptable and appropriate for inclusion in Amendment 27 to GESTAR II, NEDE-24011-P-A.

The staff finds Amendment 27 to be acceptable for referencing in license applications and does not intent to repeat our review of the matters described in Amendment 27 when the report appears as a reference in licensing applications, except to ensure that the material presented is applicable to the specific plant involved. Our acceptance applies only to the matters described in Amendment 27.

## 5.0 CONDITIONS AND LIMITATIONS

None.

## 6.0 REFERENCES


1. Letter from M. E. Harding (GNF) to U.S. Nuclear Regulatory Commission, “Review of Amendment 27 to GESTAR II, NEDE-24011-P-A," FLN-2003-009, August 6, 2003.

2. Letter from M. E. Harding (GNF) to U.S. Nuclear Regulatory Commission, "Review of Amendment 27 to GESTAR II, NEDE-24011-P-A," FLN-2003-017, November 24, 2003.

3. Letter from M. E. Harding (GNF) to U.S. Nuclear Regulatory Commission, "Amendment 27 to GESTAR II, NEDE-24011-P-A," FLN-2004-034, December 8, 2004.

4. Letter from U.S. Nuclear Regulatory Commission to M. E. Harding (GNF), "Final Safety Evaluation for Global Nuclear Fuel (GNF) Licensing Topical Report NEDE-24011P, 'GESTAR II, Amendment 27'," July 16, 2004, ADAMS ML042010353.


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