

ENCLOSURE 1

MFN 12-112 Sup 1

Markup of GESTAR II Main and US Supplement

Non-Proprietary Information – Class I (Public)

- 2-15 *Nuclear Energy Business Group BWR Quality Assurance Program Description*, NEDO-11209-04A, March 1978.
- 2-16 Letter, J. S. Charnley (GE) to R. C. Jones, Jr. (NRC), *Fuel Channel Bow Assessment*, MFN086-89, November 15, 1989.
- 2-17 *GE11 Critical Power Test with Rod Bow to Contact*, NEDE-31829P, April 1990.
- 2-18 Robert A. Rand, *Cladding Creep Collapse Licensing Topical Report*, NEDC-33139P-A, July 2005.
- 2-19 GNF Licensing Topical Report, *The PRIME Model for Analysis of Fuel Rod Thermal – Mechanical Performance*, Technical Bases - NEDC-33256P-A, Qualification - NEDC-33257P-A, and Application Methodology - NEDC-33258P-A, September 2010.
- 2-20 Letter from AA Lingenfelter (GNF) to Document Control Desk (NRC), Subject: *Amendment 32 To NEDE-24011-P, General Electric Standard Application For Reactor Fuel (GESTAR II)*, FLN-2008-011, October 15, 2008, and Letter from TB Blount (NRC) to AA Lingenfelter (GNF), Subject: *Final Safety Evaluation for Amendment 32 to Global Nuclear Fuel Topical Report NEDE-24011-P General Electric Standard Application for Reload (TAC NO. MD9939)*, July 30, 2009.
- 2-21 *Implementation of PRIME Models and Data in Downstream Methods*, NEDO-33173 Supplement 4-A, Revision ~~01~~, ~~September~~ ~~November~~ ~~2011~~ 2012.
- 2-22 Letter from JC Kinsey (GEH) to Document Control Desk (NRC), Subject: *Response to Portion of NRC Request for Additional Information Letter No. 110 - Related to ESBWR Design Certification Application - RAI Numbers 4.2-2 Supplement 3, 4.2-4 Supplement 2 and 4.8-6 Supplement 1*, MFN 08-347, May 9, 2008.

S.5.2 Operating Flexibility Options

The following operating flexibility options have been developed for BWRs:

- (1) Single-Loop Operation.
- (2) Load Line Limit.
- (3) Extended Load Line Limit.
- (4) Increased Core Flow.
- (5) Feedwater Temperature Reduction.
- (6) ARTS Program (BWR/3-5).
- (7) Maximum Extended Operating Domain for BWR/6 and Maximum Extended Load Line Limit Analysis for BWR/3-5.
- (8) Turbine Bypass Out of Service.
- (9) Safety/Relief Valves Out of Service.
- (10) ADS Valve Out of Service.
- (11) End-of-Cycle Recirculation Pump Trip Out of Service.
- (12) Main Steam Isolation Valves Out of Service.
- (13) Maximum Extended Load Line Limit Analysis Plus.

Figure S-5 provides a general illustration of the history of power-flow domain changes.

The supplemental reload licensing report indicates if an option has been chosen.

Some plants referencing GESTAR II as the applied reload methodology may include the GE Licensing Topical Report, Applicability of GE Methods to Expanded Operating Domains (Reference S-101), as part of their licensing basis. For such a plant, the limitations, conditions, and requirements of Reference S-101 are included in the analysis and licensing basis for the reload. The applicability of Reference S-101 has been expanded to include GNF2 fuel by Reference S-108. Reference S-101 has been updated to [NEDC-33173P-A Revision 3](#) reflecting NRC approval of Supplement 2 (Reference S-109). This approval allows a reduction of the additional margin applied to the Safety Limit Minimum Critical Power Ratio (SLMCPR) in Revision 1. The limitations and conditions included in the NRC Safety Evaluation in Reference S-101 modify the SLMCPR margin to be applied to plants referencing NEDC-33173P, Applicability of GE Methods to Expanded Operating Domains (Reference S-101), as part of their licensing basis. The ~~plan for the~~ implementation of PRIME in downstream methods has been reviewed, ~~and~~ approved, [and audited](#) by the NRC (Reference S-110).

S.5.2.1 Single-Loop Operation

Technical Specifications for a plant without a Single-Loop Operation (SLO) analysis do not allow operation beyond a relatively short period of time if an idle recirculation loop cannot be

- S-97 *BWROG In-Service Pressure Relief Technical Specification Revision Licensing Topical Report*, NEDC-31753P, February 1990.
- S-98 Letter from Ashok Thadani (USNRC) to Cynthia Tully (BWROG), *Acceptance for Referencing of Licensing Topical Report NEDC-31753P 'BWROG In-Service Pressure Relief Technical Specification Revision Licensing Topical Report' (TAC No. M79265)*, March 8, 1993.
- S-99 Letter from Andrew A. Lingenfelter to Document Control Desk, *Transmittal of Updated Attachments Supporting GESTAR II Amendment 28 and Associated GESTAR II Sections* (TAC NO. MC3559), June 2, 2006.
- S-100 *Improved BPWS Control Rod Insertion Process*, NEDO-33091-A, Revision 2, July 2004.
- S-101 *Applicability of GE Methods to Expanded Operating Domains*, Licensing Topical Report, NEDC-33173P-A, Revision 34, Class III, ~~April~~ November 2012.
- S-102 GE-NE-0000-0031-6498-R0, *Plant-Specific Core-wide Mode DIVOM Procedure Guideline*, June 2, 2005.
- S-103 GE-NE-0000-0028-9714-R1, *Plant-Specific Regional Mode DIVOM Procedure Guideline*, June 2, 2005.
- S-104 *General Electric Boiling Water Reactor Detect and Suppress Solution – Confirmation Density*, NEDC-33075P-A, Rev. 6, January 2008.
- S-105 *GE to BWR Owners' Group Detect and Suppress II Committee: "Backup Stability Protection (BSP) for Inoperable Option III Solution,"* OG 02-0119-260, July 17, 2002.
- S-106 *ODYSY Application for Stability Licensing Calculations Including Option I-D and II Long Term Solutions*, NEDE-33213P-A, April 2009.
- S-107 *General Electric Boiling Water Reactor, Maximum Extended Load Line Limit Analysis Plus*, NEDC-33006P-A, Revision 3, June 2009.
- S-108 *Applicability of GE Methods to Expanded Operating Domains – Supplement for GNF2 Fuel*, NEDC-33173 Supplement 3P-A, Revision 1, July 2011.
- S-109 *Applicability of GE Methods to Expanded Operating Domains – Power Distribution Validation for Cofrentes Cycle 13*, NEDC-33173, Supplement 2, Part 1P-A, Revision 1, *Applicability of GE Methods to Expanded Operating Domains – Pin-by-Pin Gamma Scan at FitzPatrick October 2006*, NEDC-33173, Supplement 2, Part 2P-A, Revision 1, *Applicability of GE Methods to Expanded Operating Domains – Power Distribution Validation for Cofrentes Cycle 15*, NEDC-33173, Supplement 2, Part 3P-A, Revision 1, April 2012.
- S-110 *Implementation of PRIME Models and Data in Downstream Methods*, NEDO-33173 Supplement 4-A, Revision 01, ~~September 2011~~ November 2012.