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DATE OF MEETING

12/2/03

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Docket Number(s)

712

Plant/Facility Name

GNF

TAC Number(s) (if available)

MC0347

Reference Meeting Notice

MC033230586

Purpose of Meeting (copy from meeting notice)

Meeting with GNF to discuss proposed Amendment 27 to GESTAR

NAME OF PERSON WHO ISSUED MEETING NOTICE

Alan Wang

TITLE

PM

OFFICE

NRR

DIVISION

DLPM

BRANCH

PD IV

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Global Nuclear Fuel

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Review of Amendment 27 Changes to GESTAR II, NEDE-24011P-A

Presentation to NRC

December 2, 2003



- **Review of Changes**

- Administrative changes
- Changes requiring review and review effort

- **Review Schedule**

- Application for Brunswick reload and plant startup in April 2004
- Approval requested by March 15, 2004

Administrative Changes



Incorporation of NRC approved methodologies

- Updated revision numbers and dates for references
- Referenced ODYSY for stability (NEDC-32992P-A)
- Referenced approved safety limit methodology and power distribution LTRs (NEDC-32601P-A and NEDC-32694P-A)
- Referenced ODYN for non-pressurization transients (NEDC-24154P-A, Supplement 1 – Volume 4)
- Clarified options for MAPLHGR and LHGR monitoring approved in Amendment 19
- Referenced TRACG for transients (NEDE-32906P-A)
- Referenced TASC for transient and LOCA analysis (NEDC-32084P-A)
- Referenced latest SAFER improvements (NEDC-32950P), NRC letter stating that review is not required, S. A. Richards to J. F. Klapproth, "General Electric Nuclear Energy (GENE) Topical Reports GENE-32905P and GENE-32084P Acceptability Review, May 24, 2000)
- Elimination of upper bound PCT for SAFER/GESTR LOCA analysis (NEDE-23785P-A, Supplement 1, Revision1)
- Included reference to GE14 Amendment 22 compliance report (NEDE-32868P, Revision 1)
- Corrected error in nomenclature

Changes requiring review and review effort



- **Minor errors corrected**
- **Clarified SLCS analyses in response to NRC question**
- **Allow use of 1967 or later steam properties**
- **Clarifying text for easier understanding of off-rated limits**
- **Clarified requirements for ATWS analysis**
- **Expanded stability solution to include backup solutions**
- **Expanded section S.5 on operational flexibility options:**
 - Clarify analysis requirements for existing options
 - Include S/RV, ADS, EOC RPT and MSIV out of service options.

Minor Changes and clarification of current procedures

- **Minor review effort**

Review Schedule



- **Application for Brunswick reload and plant startup in April 2004**
- **Transient Analysis performed with TRACG**
- **COLR to be submitted March 15, 2004**

Approval requested by March 15, 2004

Summary of Amendment 27 Changes

Section	Description of Change	Reference	Administrative	Technical Knowledge	
				Minimum	Moderate
Throughout document	Updated revision number of GE Fuel Bundle Designs LTR, NEDE-31152-P to latest revision.		Yes		
1.1.7.C.vii, 1.2.7.C.vii	Corrected common equation to proper form: "N" replaced with "N-1."	Textbook equation placed in proper form.		Yes	
1.2.8, Stability	Changed axial and radial core power shapes to the actual operating conditions per ODYSY LTR.	Issuance and application of NRC approved <i>ODYSY Application for Stability Licensing Calculations</i> , NEDC-32992P-A, July 2001.	Yes		
1.4, References	Add reference to ODYSY LTR (NEDC-32292P-A).				
2.2	Corrected MLHGR to LHGR limit.	Correcting error made in nomenclature.	Yes		
2.4 References	Updated two LTRs to correct revision.	Updating two LTRs.	Yes		
3.2.2.2	Added three references to power distribution accuracy: References 3-16 through 3-18.	Letter from Stuart A. Richards to Glen A. Watford, "Amendment 26 to GE Licensing Topical Report NEDE-24011-P-A, "GESTAR II" - Implementing Improved GE Steady-State Methods (TAC No. MA6481)," November 10, 1999.	Yes		
3.2.3	Removed statement that Doppler and void coefficients will be reported in the FSAR or SRLR.	With the new NRC-approved ODYN code, values for these two coefficients are no longer added to either the FSAR or the SRLR.	Yes		

Summary of Amendment 27 Changes

Section	Description of Change	Reference	Adminis- trative	Technical Knowledge	
				Minimum	Moderate
3.2.4.3	Reworded paragraph to state that the standby liquid control system (SLCS) is analyzed to bring the core to a shutdown condition with all rods out. Previous wording did not state the all rods out condition.	In response to an NRC question contained in Appendix B, page US.B-53, the SLCS was analyzed in the all rods out condition.		Yes	
3.4.2.2	Reworded paragraph to clarify evaluations to be performed on axial exposure distributions.	NRC-agreed upon methodology for evaluating GE11 and later fuel uses time varying axial power shape (TVAPS) approach, thereby changing the need for assuring this check. See GENE-666-03-0393 and NRC staff agreement at meeting on April 14, 1993.	Yes		
3.4.3	Changed the standby liquid control system (SLCS) shutdown margin from not requiring a change to now be required to be re-examined.	The SLCS shutdown margin is one parameter that needs to be re-examined if the final loading plan does not meet requirements.		Yes	

Summary of Amendment 27 Changes

Section	Description of Change	Reference	Adminis- trative	Technical Knowledge	
				Minimum	Moderate
3.6 References	<p>Changed NEDO-20964 to the approved version NEDO-20964-A with the issuance date of the latter.</p> <p>Updated Reference 3-14, NEDE-24076-P to revision 1 with the corresponding issuance date.</p> <p>Added correct revision to Reference 3-15.</p> <p>Added References 3-17 and 3-18.</p>	<p>Desirable to have approved version.</p> <p>Revision 1 is latest version.</p> <p>Omitted by mistake last revision.</p> <p>Added to support Section 3.2.2.2 above.</p>	Yes		
Table 3-1	<p>Words changed to clarify the two options identified in Amendment 19 of GESTAR. Thermal-mechanical (T-M) considerations are monitored either through a composite MAPLHGR which includes the effects of both ECCS-LOCA and T-M limits or separate MAPLHGR and LHGR limits are applied where the MAPLHGR limits are used to impose ECCS-LOCA limits and the LHGR limits are used to impose T-M constraints.</p>	<p>No change in content. Clarifies two options already available to utilities. With implementation of PANAC11, it is planned that composite MAPLHGRs will not be used and instead MAPLHGR and LHGR will be monitored separately.</p>	Yes		
4.1.2, 4.1.3, 4.1.4	<p>Corrected MLHGR to LHGR limit.</p>	<p>Correcting error made in nomenclature.</p>	Yes		
4.2.3	<p>Added "or later" to steam properties table edition.</p>	<p>Use of 1967 steam tables or later editions acceptable.</p>		Yes	

Summary of Amendment 27 Changes

Section	Description of Change	Reference	Administrative	Technical Knowledge	
				Minimum	Moderate
4.2.4	Correct equations and definitions in several subsections.	Some definitions added for clarification. Units removed for consistency.		Yes	
4.3.1.2	Add TRACG as an approved transient analysis method. Clarify latest ODYN and TASC approvals. Add a brief TRACG description. Add latest approval of ODYN and TASC. Add the reference to the LTRs. Several subsections changed to incorporate these changes.	NRC approved LTRs: <i>Qualification of the One-Dimensional Core Transient Model (ODYN) for Boiling Water Reactors (Supplement 1 – Volume 4)</i> , NEDC-24154P-A, Revision 1, February 2000; <i>TRACG Application for Anticipated Operational Occurrences Transient Analyses</i> , NEDE-32906P-A, Revision 1, April 2003. <i>TASC-03A – A computer program for Transient Analysis of a Single Channel</i> , NEDC-32084P-A, Rev. 2, July 2002.	Yes		
4.3.1.2.2	Added ODYN for use in AOO slow events.	As approved by the USNRC (see above).	Yes		
4.3.1.2.7	Clarified position on off-rated limits.	Clarifying text for easier understanding on off-rated limits.		Yes	
4.3.1.2.8	Changed MLHGR limit to LHGR limit.	Error corrected.	Yes		
4.4 References	Updated several LTRs to their approved versions. Corrected date of issuance on Reference 4-4. Added NRC-approved ODYN, TRACG and TASC LTRs.	Typographical error corrected. As approved by the USNRC (see above).	Yes		

Summary of Amendment 27 Changes

Section	Description of Change	Reference	Administrative	Technical Knowledge	
				Minimum	Moderate
Table A.15.0-2	ATWS: "Special event—still under negotiation" changed to "Fuel product line dependent. See Reference A-3."	Ref. A-3 is the Fuel Bundle Design report. It has the number of failed rods for ATWS event for each fuel product line.		Yes	
A.16, References	Corrected references to the correct issued revisions and dates.	Desirable to have approved version.	Yes		
Table of Content for Tables	Deleted Tables S-6, S-7 and S-8 that were not being used.	Tables were marked as "not used." Therefore, they have simply been removed.	Yes		
S.1.3, Stability Analysis	Added GDC 10. Added Backup Stability Protection (BWROG-94078).	This topical report (NEDO-31960A) and the letter to the BWROG (Reference S-90) are being used to support how stability is handled for each reload.		Yes	
S.2.2.1.1, S.2.2.1.2, S.2.2.1.3, S.2.2.1.4, S.2.2.1.6, S.2.2.1.7.	Added ODYN for use in the inadvertent startup of the HPCI event. TRACG added.	As approved by the USNRC, ODYN in NEDC-24154P-A, Revision 1, February 2000, and TRACG in NEDE-32906P-A, Rev. 1, April 2003 is added as methods for transient analysis.	Yes		
S.2.2.3.2.4, S.2.2.3.2.4.1	Added references for latest approvals of SAFER/GESTR (NEDC-32950) and Upper Bound PCT (NEDE-23785P-A, Supp. 1, Rev. 1)	For NEDC-32950 and NEDE-23785, see Section S.6 below.	Yes		
S.2.2.3.2.4.3	Added reference for latest approvals of TASC (NEDC-32084P-A, Rev. 2)	See Section S.6 below.	Yes		

Summary of Amendment 27 Changes

Section	Description of Change	Reference	Administrative	Technical Knowledge	
				Minimum	Moderate
S.2.2.3.2.5	Added references for latest approvals of SAFER/GESTR (NEDC-32950) and Upper Bound PCT (NEDE-23785P-A, Supp. 1, Rev. 1)	For NEDC-32950 and NEDE-23785, see Section S.6 below.	Yes		
S.2.2.3.2.5.2	Added reference to SAFER/CORCL methodology (NEDC-30996P-A) for non-jet pump plants.	USNRC approved methodology per NEDC-30996P-A.	Yes		
S.2.2.3.2.6	Changed to show that MAPLHGR need not include the LHGR limit as the LHGR limit is specified separately.	MCPR, MAPLHGR and LHGR represent the three thermal limits typically monitored for BWRs. No change to content.		Yes	
S.2.2.3.5, Refueling Accident Analysis	Added reference to GE14 Amendment 22 conformance document (NEDE-32868P, Rev. 1).	NEDE-32868P, Rev. 1 contains the 10x10 lattice array and the resulting calculation for the number of rods failed for the bundle drop accident.	Yes		
S.4, Stability Analysis Methods	Clarified stability solutions to those currently being applied in refueling analysis.	With NRC approval of ODYSY LTR (NEDC-32992P-A), these stability positions must be revised.		Yes	
S.4.1.1	Added reference to ODYSY LTR (NEDC-32992P-A).	See Section S.6 below.	Yes		
S.4.1.2	Added reference to plant-specific Option II licensing topical reports.	Reference to plant-specific reports for stability Option II.		Yes	
S.4.1.3	Added reference to ODYSY LTR (NEDC-32992P-A).	See Section S.6 below.	Yes		

Summary of Amendment 27 Changes

Section	Description of Change	Reference	Adminis- trative	Technical Knowledge	
				Minimum	Moderate
S.4.2, S.4.2.1	Added section on Interim/Backup Stability Solution of BWROG-94078 LTR.	See Section S.6 below.	Yes		
S.5.1	Added TRACG.	TRACG, NEDE-32906P-A, Rev. 1, April 2003 is added as methods for transient analysis.	Yes		
S.5.1.1	Clarified statement	Previous statement was outdated.		Yes	
S.5.1.5.1, S.5.1.5.2	Added TRACG.	TRACG NEDE-32906P-A, Rev. 1, April 2003 is added as methods for transient analysis.	Yes		
S.5.2, Operating Flexibility Options	Added out of service options: SRVs OOS, ADS OOS, EOC Recirc Pump Trip OOS, and MSLIV OOS. Clarified several options.	SRVs OOS is supported by reference LTRs. Some options approved on a plant-specific bases.		Yes	
S.5.2.2	Clarify statement for SAFE/REFLOOD LOCA methodology.	Requirement that extended operating region be verified for SAFE/REFLOOD methodology.		Yes	
S.5.2.3	Clarified statements for ELLLA.	Expanded to include BWR/6 plants.		Yes	
S.5.2.4	Added clarification statement for increased core flow.	Assurance needed that increased core flow does not significantly impact analyses.		Yes	
S.5.2.5	Added clarification statement for reduced feedwater temperature.	Assurance needed that reduced feedwater temperature does not significantly impact analyses.		Yes	
S.5.2.6	Added clarification statement for low power and low flow limits.	Assurance needed that plants apply reduced operating limits for low power and low flow conditions.		Yes	

Summary of Amendment 27 Changes

Section	Description of Change	Reference	Administrative	Technical Knowledge	
				Minimum	Moderate
S.5.2.7	Add MELLLA option for BWR/3-5 plants to MEOD option for BWR/6 plants.	Clarification needed to assure that plants that have MELLLA have equally applied limits to those of MEOD.		Yes	
S.5.2.8	Added clarification statement for turbine bypass valve out of service.	Clarification needed to assure understanding of response time.		Yes	
S.5.2.9	Added a section on safety/relief valve out of service.	A viable option added for increased plant flexibility.		Yes	
S.5.2.10	Added a section on ADS valve out of service.	A viable option added for increased plant flexibility.		Yes	
S.5.2.11	Added a section on end-of-cycle recirculation pump trip out of service.	A viable option added for increased plant flexibility.		Yes	
S.5.2.12	Added a section on main steam isolation valve out of service.	A viable option added for increased plant flexibility.		Yes	
S.6, References	Added references in support for LTRs referenced above. Corrected several LTRs to the latest issue—mostly latest SAFER/GESTR analysis.	Letter from GE-NE to BWR Owners Group, "Backup Stability Protection (BSP) for Inoperable Option III Solution," OG-02-0119-260, July 17, 2002. <i>BWR Owner's Group Guidelines for Stability Interim Corrective Action</i> , BWROG-94078, June 1994. <i>Compilation of Improvements to GENE's SAFER ECCS-LOCA Evaluation Model</i> , NEDC-32950P, January 2000.	Yes		

Summary of Amendment 27 Changes

Section	Description of Change	Reference	Adminis- trative	Technical Knowledge	
				Minimum	Moderate
S.6, References (continued)	Added references in support for LTRs referenced above. Corrected several LTRs to the latest issue—mostly latest SAFER/GESTR analysis (continued).	<p><i>GESTR-LOCA and SAFER Models for Evaluation of Loss-of-Coolant Accident Volume III, Supplement 1, Additional Information for Upper Bound PCT Calculation</i>, NEDE-23785P-A, Supplement 1, Revision 1, March 2002. <i>TASC-03A - A computer program for Transient Analysis of a Single Channel</i>, NEDC-32084P-A Rev. 2, July 2002.</p> <p><i>GE14 Compliance With Amendment 22 of NEDE-24011-P-A (GESTAR II)</i>, NEDE-32868P, Revision 1, September 2000.</p> <p><i>ODYSY Application for Stability Licensing Calculations</i>, NEDC-32992P-A, July 2001.</p> <p><i>BWROG In-Service Pressure Relief Technical Specification Revision Licensing Topical Report</i>, NEDC-31753P, February 1990.</p> <p>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.</p>	Yes		
Table S-5	Correct three plant's LOCA analysis.	Consistency update.	Yes		
Figure S-2	Corrected to show CORECOOL.	USNRC approved per NEDC-30996P-A.	Yes		

Summary of Amendment 27 Changes

Section	Description of Change	Reference	Adminis- trative	Technical Knowledge	
				Minimum	Moderate
Appendix A, SRLR Format	Added several operating flexibility options to Section 8.	Added to agree with the flexibility options as specified in Section S.5.2.		Yes	
Appendix A, SRLR Format	Added TRACG to analysis methods, Section 9 footnote.	See TRACG reference in Section S.6 above. Reference to GESTAR II will need to be updated when Revision 15 is completed.	Yes		
Page US.B-36	Changed the word "lattic" to "lattice."	Typographical error corrected.	Yes		



Global Nuclear Fuel

A Joint Venture of GE, Toshiba, & Hitachi

GEXL80 Correlation for SVEA96+ Fuel

Presentation to NRC

December 2, 2003

GEXL80 Correlation for SVEA96+ Fuel



- **GEXL80 Correlation for SVEA96+ Fuel, NEDC-33107P Submitted, September 8, 2003**
 - Follows same process as previous GEXL correlations developed for ATRIUM9 (NEDC-32981P-A) and ATRIUM10 (NEDC-33106P) Fuel
 - Correlation uncertainty evaluated by comparison to SVEA96+ critical power data

- **SLMCPR submittal April 26**
- **Plant startup, November 2004**

- **Review and approval requested by March 31, 2004**