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C. R. Hutchinson

Grand Gulf Nuclear Station

May 9, 1996

U.S. Nuclear Regulatory Commission Mail Station P1-37 Washington, D.C. 20555

Attention:

Document Control Desk

Subject:

Grand Gulf Nuclear Station

Docket No. 50-416 License No. NPF-29 Cycle 9 Reload

Proposed Amendment to the Operating License (PCOL- 96/008)

GNRO-96/00053

Gentlemen:

Entergy Operations, Inc. is submitting by this letter a proposed amendment to the Grand Gulf Nuclear Station (GGNS) Operating License.

The proposed amendment requests changes to those Technical Specifications (TS) required to support Grand Gulf Nuclear Station, Unit 1 Cycle 9 (Reload 8). These changes include a change to the minimum critical power safety limit (SLMCPR) and changes to the references for the analytical methods used to determine the core operating limits. Cycle 9 will be the first cycle of operation with a mixed core of Siemens Power Corporation (SPC) 9x9-5 and General Electric (GE) GE11 reload fuel.

The proposed amendment reflects the revised SLMCPRs for two- and single-loop operation. The list of analytical methods used to determine the core operating limits is also updated to include GE's reload licensing methodologies. Additional methodology references in various TS Bases are also revised to reflect the application of GE methodologies.

Representatives from Entergy Operations and GE met with the NRC staff on December 12, 1995 to present this mixed-core licensing approach for GGNS Cycle 9. As discussed at this meeting, GGNS will maintain its current licensing basis for the misplaced bundle events. As such, the mis-oriented and mis-located bundle events will be analyzed as accidents subject to an acceptance criterion that offsite doses not exceed a small fraction (10 percent) of 10CFR100 as reported in NUREG-0800. Section 15.4.7.

The SLMCPR for Cycle 9 has been determined with GE's NRC-approved SLMCPR methodology. As discussed at the December 1995 meeting, this evaluation involved the application of GE's approved statistical methodology and uncertainties to the GGNS

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Cycle 9 core design. This analysis is consistent with the plant-specific analyses performed to resolve the deficiencies recently identified in GE's generic SLMCPR methodology. GE presented this approach to the NRC staff on April 17, 1996 as an interim resolution of this issue.

Since approximately two-thirds of the Cycle 9 core will be composed of SPC reload fuel, the Cycle 9 SLMCPR analysis considers the effects of this mixed-vendor core. Cycle conditions when the SPC fuel is limiting in terms of determining thermal limit margins are explicitly evaluated.

The SLMCPR analysis results are provided for the current Cycle 9 core design. Changes to the Cycle 9 loading pattern may be necessary to accommodate the effects of Cycle 8 operational changes or the discharge of any defective fuel that could occur before the end of Cycle 8. Any changes to the Cycle 9 core design are expected to be minor and will be evaluated to ensure the SLMCPR is not affected.

This analysis contains considerable conservatisms, especially in the uncertainty associated with the core power distribution. Preliminary GE estimates have demonstrated that the power distribution uncertainty associated with GE's 3D MONICORE core monitoring system (CMS) is substantially less than that associated with GE's original P1 system on which the approved uncertainties are based. In order to evaluate the sensitivity of the SLMCPR to this parameter, an analysis has been performed with an uncertainty value characteristic of the GE's 3D MONICORE CMS in place of the approved value. This evaluation has concluded that SLMCPRs significantly less than 1.10 are applicable to GGNS Cycle 9. Entergy Operations will be pursuing approval of this reduced uncertainty for GGNS and River Bend Station to alleviate this unnecessary penalty on operating margins. These uncertainties will be submitted separately in a GE licensing topical report for NRC review and approval. This approach for the final resolution of GE's SLMCPR issues was also presented by GE in the April 17, 1996 meeting with the NRC staff.

In accordance with the provisions of 10CFR50.4, the signed original of the requested amendment is enclosed. Attachment 2 provides the discussion and justification to support the requested amendment. This amendment request has been reviewed and accepted by the Plant Safety Review Committee and the Safety Review Committee.

Based on the guidelines in 10CFR50.92, Entergy Operations has concluded that this proposed amendment involves no significant hazards considerations. Attachment 2 details the basis for this determination.

The General Electric report provided as Attachment 4 supports the proposed TS changes. General Electric considers the information contained in this report to be proprietary. In accordance with the requirements to 10CFR2.790(b), an affidavit is enclosed to support the withholding of the information contained in this report from public disclosure (Attachment 5).

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Entergy Operations requests NRC approval and issuance of Technical Specifications changes by September 12, 1996 to allow related work activities to be implemented.

Yours truly,

CRH/ACG/mtc

attachments:

- 1. Affirmation per 10CFR50.30
- 2. GGNS PCOL-96/008
- 3. Mark-up of Affected Technical Specification Pages
- GE Cycle 9 SLMCPR Determination Report J11-02863SLMCPR, Revision 0, May 1996
- 5. GE Affidavit to Support the Withholding of the Information

CC:

Mr. J. E. Tedrow (w/a)
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Mr. N. S. Reynolds (w/a)
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General Electric Affidavit to Support Withholding Information



General Electric Company
P. O. Box 780, Wilmington, NC 28402

Affidavit

- I, Ralph J. Reda, being duly sworn, depose and state as follows:
- (1) I am Manager, Fuels and Facility Licensing, General Electric Company ("GE") and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.
- (2) The information sought to be withheld is contained in the document GGNS Cycle 9 Safety Limit MCPR Analysis, J11-02863SLMCPR, May 1996, and is indicated by "brackets" drawn in the margin of the text.
- (3) In making this application for withholding of proprietary information of which it is the owner, GE relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), 2.790(a)(4), and 2.790(d)(1) for "trade secrets and commercial or financial information obtained from a person and privileged or confidential" (Exemption 4). The material for which exemption from disclosure is here sought is all "confidential commercial information," and some portions also qualify under the narrower definition of "trade secret," within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).
- (4) Some examples of categories of information which fit into the definition of proprietary information are:
 - a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by General Electric's competitors without license from General Electric constitutes a competitive economic advantage over other companies;
 - Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;
 - Information which reveals cost or price information, production capacities, budget levels, or commercial strategies of General Electric, its customers, or its suppliers;
 - Information which reveals aspects of past, present, or future General Electric customer-funded development plans and programs, of potential commercial value to General Electric;

 Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in both paragraphs (4)a. and (4)b., above.

- (5) The information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GE, and is in fact so held. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in (6) and (7) following. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GE, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence.
- (6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within GE is limited on a "need to know" basis.
- (7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GE are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.
- (8) The information identified in paragraph (2) is classified as proprietary because it contains details of GE's Safety Limit MCPR analysis and the corresponding results which GE has applied to GGNS's actual core design with GE's GE11 fuel.
 - The development of the methods used in these analysis, along with the testing, development and approval of the supporting critical power correlation was achieved at a significant cost, on the order of several million dollars, to GE.
- (9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GE's competitive position and foreclose or reduce the availability of profit-making opportunities. The fuel design is part of GE's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical, and NRC review costs comprise a substantial investment of time and money by GE.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GE's competitive advantage will be lost if its competitors are able to use the results of the GE experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GE would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GE of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.

State of North Carolina) County of New Hanover)

Ralph J. Reda, being duly sworn, deposes and says:

That he has read the foregoing affidavit and the matters stated therein are true and correct to the best of his knowledge, information, and belief.

Executed at Wilmington, North Carolina, this 7 day of MAY, 1996

Ralph J. Reda
General Electric Company UBLIC

General Electric Subscribed and sworn before me this Tok day of MAy

Notary Public, State of North Carolina

expired 12-14.96

BEFORE THE

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-416

IN THE MATTER OF

MISSISSIPPI POWER & LIGHT COMPANY
and
SYSTEM ENERGY RESOURCES, INC.
and
SOUTH MISSISSIPPI ELECTRIC POWER ASSOCIATION
and
ENTERGY OPERATIONS, INC.

AFFIRMATION

I, C. R. Hutchinson, being duly sworn, state that I am Vice President, Operations GGNS of Entergy Operations, Inc.; that on behalf of Entergy Operations, Inc., System Energy Resources, Inc., and South Mississippi Electric Power Association I am authorized by Entergy Operations, Inc. to sign and file with the Nuclear Regulatory Commission, this application for amendment of the Operating License of the Grand Gulf Nuclear Station; that I signed this application as Vice President, Operations GGNS of Entergy Operations, Inc.; and that the statements made and the matters set forth therein are true and correct to the best of my knowledge information and belief.

R. Hutchinson

STATE OF MISSISSIPPI COUNTY OF CLAIBORNE

(SEAL)

Notary Public

Mix commission expires: MISSISSIPPI STATEWIDE NOTARY PUBLIC MY COMMISSION EXPIRES JUNE 5, 1998 BONDED THEU STEGALL NOTARY SERVICE

Attachment 2 to GNRO-96/00053

GGNS PCOL-96/008

A. AFFECTED TECHNICAL SPECIFICATIONS

- 1. The following Technical Specifications are affected by the proposed change:
 - 2.1.1 Reactor Core Safety Limits5.6.5 Core Operating Limits Report
- 2. The following Technical Specification Bases are affected by the proposed change. Since Technical Specification Bases are controlled under 10CFR50.59 Program, the markup of the Bases Sections are provided for information only:
 - B 2.1.1.1 Fuel Cladding Integrity
 - B 2.1.1.2 MCPR
 - B 2.0 References
 - B 3.2.2 Minimum Critical Power Ratio (MCPR)
 - B 3.2 References

B. DESCRIPTION OF CHANGES

- 1. <u>Technical Specification 2.1.1.2:</u> Change the Safety Limit MCPR for Two Loop Operation and Single Loop Operation to 1.10 and 1.11, respectively.
- 2. Technical Syscifications 5.6.5: Add the following:
 - NEDE-24011-P-A, General Electric Standard Application for Reactor Fuel (GESTAR-II) with exception to the misplaced fuel bundle analysis as discussed in GNRO 96-00053, letter from C. R. Hutchinson to USNRC dated May 09, 1996.
- 3. Bases 2.1.1.1: Change "ANFB" to "Fuel Vendor's Critical Power". Change 585 psig to 785 psig, >0.25 to >0.3, and Ref. 2 to Ref. 6.
- 4. <u>Bases 2.1.1.2</u>: Change "ANFB" to "Fuel Vendors", "correlation is" to "Correlations are". Change Reference 2 to Reference 6. Delete "ANFB" and change "correlation" to "correlations". Delete sentence "Still further boiling transition". Reword, as marked, line 16 of second paragraph of Section 2.1.1.2.
- 5. Bases 2.0 (References): Add References to GESTAR-II as item 6.

- 6. Bases 3.2.2: Delete last part of line 8 in the first paragraph "and the(Ref. 7)", and change Ref. 8 to Ref. 7 in the third line of the second paragraph.
- 7. Bases 3.2 References: Replace References 2 with "NEDE-24011-P-A, General Electric Standard Application for Reactor Fuel (GESTAR-II)", Reference 6 with "NEDE-30130-P-A, Steady State Nuclear Methods", and Reference 7 with "NEDO-24154, Qualification of the One-Dimensional Core Transient Model for Boiling Water Reactor".

C. BACKGROUND

The core for the current cycle (Cycle 8) at Grand Gulf Nuclear Station (GGNS) is composed entirely of Siemens Power Corporation (SPC) 9x9-5 fuel bundles. Entergy has recently contracted with General Electric Nuclear Energy (GE) to provide the next three batches of reload fuel. The next reload batch will be composed entirely of GE's GE11 9x9 design. As such, the MCPR safety limit for the mixed-vendor core and the core operating limits must be developed with General Electric's analytical methods. Representatives from Entergy Operations, Inc., and General Electric (GE) Company met with the NRC staff on December 12, 1995 to discuss the mixed-core licensing approach for Cycle 9. As presented at this meeting, a cycle-specific evaluation has been performed.

The Cycle 8 MCPR safety limit was calculated with SPC's NRC-approved safety limit methodology reported in ANF-524 (P)(A), Advanced Nuclear Fuels Corporation Critical Power Methodology for Boiling Water Reactors. With this methodology, SPC calculated a MCPR safety limit that is tailored to the GGNS plant and Cycle 8 core design. This analysis produced a MCPR safety limit of 1.06 and considered NRC-approved uncertainties for the BWR/6 feedwater flow and SPC's POWERPLEX core monitoring system.

GE's approach to the MCPR safety limit is significantly different than SPC's. As described in the NRC-approved NEDE-24011-P-A, General Electric Standard Application for Reactor Fuel (GESTAR-II), a bounding MCPR safety limit that is generic to each GE fuel type is developed.

The generic MCPR safety limit for GE11 fuel is reported as 1.07 in NEDE-31152-P, General Electric Fuel Bundle Designs. However, since approximately two-thirds of the GGNS Cycle 9 core will be composed of SPC's fuel, the MCPR safety limit analysis must consider the effects of this mixed-vendor core. As such, a cycle-specific analysis was performed considering Cycle 9 core design. This approach is consistent with that presented in our meeting with the NRC in December 1995. Any additional changes to the Cycle 9 core design are expected to be minor and will be evaluated to ensure the MCPR safety limit is unaffected.

GE GGNS Cycle-9 SLMCPR Report J11-02863SLMCPR (Attachment 4) documents the GGNS Cycle 9 MCPR safety limit analysis. This evaluation was performed with the plant uncertainty values reported in General Electric BWR Thermal Analysis Basis (GETAB). Additional uncertainties associated with the CPR prediction of the SPC fuel were included. This evaluation contains considerable conservatism, especially in the uncertainty values associated with power distribution monitoring. In order to evaluate the sensitivity of the MCPR safety limit to this parameter, an analysis was performed with an uncertainty value characteristic of the GGNS Cycle 9 core monitoring system in place of GE's original P1 core monitoring system. This evaluation concluded that significantly lower MCPR safety limit values are applicable to GGNS Cycle 9.

As discussed at the December meeting, GGNS will maintain its current licensing basis for the misplaced bundle events. As such, the mis-oriented and mis-located bundle events will be analyzed as accidents subject to an acceptance criterion of a small fraction (10%) of 10CFR100 as reported in NUREG-0800, Section 15.4.7.

D. PROPOSED TS CHANGES

The proposed changes to the Technical Specifications are to change the MCPR safety limit values for two-loop and single-loop operation to those values calculated by GE's methodology for GGNS Cycle 9. These marked-up Technical Specifications are included as Attachment 3.

The COLR methodology references will also be updated to include GE's GESTAR-II report. The GESTAR reference is added to the list of documents that have been reviewed and approved by the NRC without a revision number to maintain consistency with the other COLR methodology references and to allow reference to the upcoming revision to GESTAR which will include this cycle-specific analytical approach for the MCPR safety limit. The SPC reports currently listed in the Technical Specifications will be unaffected since SPC fuel will remain in the Cycle 9 core.

E. JUSTIFICATION

The MCPR Safety Limit is developed to assure compliance with General Design Criteria 10 of 10CFR50 Appendix A. The Bases to Technical Specification 2.1.1 states that "The MCPR SL ensures sufficient conservatism in the operating MCPR limit that, in the event of an Anticipated Operational Occurrences (AOO) from the limiting condition of operation, at least 99.9% of the fuel rods in the core would be expected to avoid boiling transition". The new MCPR SL was developed with considerable conservatism in the methodology.

GE GGNS Cycle-9 SLMCPR Report J11-02863 SLMCPR (Attachment 4) documents the GGNS Cycle 9 MCPR safety limit analysis. This evaluation was performed with the plant uncertainty values reported in GETAB. Additional uncertainties associated with the CPR prediction of the SPC fuel were included. This evaluation contains considerable conservatism, especially in the uncertainty values associated with power distribution monitoring. In order to evaluate the sensitivity of the MCPR safety limit to this parameter, an analysis was performed with an uncertainty value characteristic of the GGNS Cycle 9 core monitoring system (3D MONICORE) in place of GE's original P1 core monitoring system. This evaluation concluded that significantly lower MCPR safety limit values are applicable to GGNS Cycle 9. As discussed at the GE/NRC meeting on March 17, 1996, GE will revise GESTAR to incorporate this cycle-specific analytical approach for the MCPR safety limit.

Recent plant-specific analyses have identified that the GE11 generic MCPR safety limit may not be conservative for some plants. This GGNS analysis, however, explicitly calculates the MCPR safety limit for the GGNS Cycle 9 core design and does not credit the generic analyses. Therefore, this analysis is not affected by the current issues concerning the applicability of the generic MCPR safety limit values.

F. CONCLUSION

For two-loop operation, a Safety Limit MCPR of 1.10 was demonstrated to be adequate to ensure that 99.9 percent of the rods in the core avoid a boiling transition during the most limiting AOO. For single-loop operation, the limit is increased by 0.01 to 1.11. The MCPR fuel cladding integrity safety limits for GGNS Cycle 9 two-loop and single-loop operation were determined by applying the generic GE Safety Limit MCPR methodology to the GGNS Cycle 9 core design. The SPC fuel was explicitly considered and found to be bounded by the limiting GE11 bundles. This approach has been presented to the NRC Staff and contains considerable conservatism in the applied uncertainties. The resulting values, therefore, represent bounding measures of the GGNS Cycle 9 Safety Limit MCPRs.

G. SIGNIFICANT HAZARDS CONSIDERATION

Entergy Operations, Inc. proposes to change the current Grand Gulf Nuclear Station Technical Specifications. The specific change is to modify the Minimum Critical Power Ratio (MCPR) safety limits reported in Technical Specification 2.1.1.2, the list of references in Technical Specification 5.6.5, and associated Bases changes. The proposed change is necessary in order to switch reload fuel vendors.

The Commission has provided standards for determining whether no significant hazards considerations exists as stated in 10 CFR 50.92 (c). A proposed amendment to an

operating license involves no significant hazards if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated; (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

Entergy Operations, Inc. has evaluated the no significant hazards consideration in its request for this license amendment and determined that no significant hazards considerations result from this change. In accordance with 10 CFR 50.91(a), Entergy Operations, Inc. is providing the analysis of the proposed amendment against the three standards in 10 CFR 50.92(c). A description of the no significant hazards consideration determination follows:

I. The proposed change does not significantly increase the probability or consequences of an accident previously evaluated.

The Minimum Critical Power Ratio (MCPR) safety limit is defined in the Bases to Technical Specification 2.1.1 as that limit which "ensures that during normal operation and during Anticipated Operational Occurrences (AOOs), at least 99.9% of the fuel rods in the core do not experience transition boiling." The MCPR safety limit is re-evaluated for each reload and, for GGNS Cycle 9, the analyses have concluded that a two-loop MCPR safety limit of 1.10 based on the application of the generic GE MCPR methodology is necessary to ensure that this acceptance criterion is satisfied. For single-loop operation, a MCPR safety limit of 1.11 based on the generic GE MCPR methodology was determined to be necessary. Core MCPR operating limits are developed to support the Technical Specification 3.2 requirements and ensure these safety limits are maintained in the event of the worst-case transient. Since the MCPR safety limit will be maintained at all times, operation under the proposed changes will ensure at least 99.9% of the fuel rods in the core do not experience transition boiling. Therefore, The Minimum Critical Power Ratio (MCPR) safety limit change does not affect the probability or consequences of an accident.

The implementation of GE's GESTAR-II approved methodology has no effect on the probability or consequences of any accidents previously evaluated. One exception to GESTAR is that the mis-oriented and mis-located bundle events will continue to be analyzed as accidents subject to the acceptance criteria in the current licensing basis. The design of the GE11 fuel bundles is such that the bundles are not likely to be mis-oriented or mis-located and the normal administrative controls will be in effect for assuring proper orientation and location. Therefore, the probability of a fuel loading error is not increased. This analysis ensures that postulated dose releases will not exceed a small fraction (10 percent) of 10CFR100 limits. Therefore, the consequences of accidents previously evaluated are unchanged.

II. The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

The GE11 fuel to be used in Cycle 9 is of a design compatible with fuel present in the core and used in the previous cycle. Therefore, the GE11 fuel will not create the possibility of a new or different kind of accident. The proposed changes do not involve any new modes of operation, any changes to setpoints, or any plant modifications. They introduce revised MCPR safety limits that have been proved to be acceptable for Cycle 9 operation. Compliance with the applicable criterion for incipient boiling transition continues to be ensured. The proposed MCPR safety limits do not result in the creation of any new precursors to an accident.

Therefore, the proposed changes do not create the possibility of a new or different type of accident from any accident previously evaluated.

III. The proposed change does not involve a significant reduction in a margin of safety.

The MCPR safety limits have been evaluated to ensure that during normal operation and during AOOs, at least 99.9% of the fuel rods in the core do not experience transition boiling. Therefore, the implementation of the proposed changes in the MCPR safety limit ensure there is no reduction in the margin of safety.

As with the current SPC methodology, GGNS will implement only the NRC-approved revisions to GE's GESTAR methodology. This GE methodology is similar to those SPC reports currently listed in TS 5.6.5 and it will be applied in a similar, conservative fashion. One exception to GESTAR is that the mis-oriented and mis-located bundle events will continue to be analyzed as accidents subject to the acceptance criteria in the current licensing basis. This analysis ensures that postulated dose releases will not exceed a small fraction (10 percent) of 10CFR100 limits. On this basis, the implementation of this GE methodology does not involve a significant reduction in a margin of safety.