



**Entergy**

*Designated Original*

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Director, Nuclear Safety Assurance  
n

RBG-46863

November 20, 2008

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

SUBJECT: License Amendment Request (LAR)  
Changes to Technical Specification 5.6.5, "Core Operating Limits  
Report (COLR)"  
River Bend Station, Unit 1  
Docket No. 50-458  
License No. NPF-47

REFERENCES: 1. Letter GNRO-2007/00071 from Entergy to USNRC, "License  
Amendment Request (LAR) Changes to Technical Specification  
5.6.5, "Core Operating Limits Report (COLR)" dated December 5,  
2007 (ADAMS Accession no. ML073440113).  
2. Letter GNRO-2008/00053 from Entergy to USNRC, "Supplement to  
Amendment Request Changes to Technical Specification 5.6.5,  
"Core Operating Limits Report (COLR)" dated July 21, 2008.

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Entergy Operations, Inc. (Entergy) hereby requests a license amendment for River Bend Station, Unit 1 (RBS). A change is proposed to Technical Specification (TS) 5.6.5, "Core Operating Limits Report (COLR)" to add a reference to an analytical method that will be used to determine core operating limits. Attachment 1 contains the analysis of the proposed change and Attachment 2 contains the proposed changes to the Technical Specifications.

The proposed change is the result of a decision to insert GE14 fuel during refueling outage RF15 scheduled for fall 2009. RBS currently operates with a full core of ATRIUM-10 fuel.

The document reference, NEDC-33383P, "GEXL97 Correlation Applicable to ATRIUM-10 Fuel," will allow Entergy to use a Global Nuclear Fuel (GNF) method for the determination of fuel assembly critical power of AREVA ATRIUM-10 fuel. NEDC-33383P Rev. 1 was submitted for a similar request for Grand Gulf Nuclear Station (GGNS) under Reference 1. The GGNS amendment request and associated supplemental information was submitted by the above referenced letters. NEDC-33383P Rev. 1 is the same document submitted for review and approval for application at GGNS and was developed for use by Entergy.

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Rec'd at the  
DCD 12/19/08*

Some of the information in NEDC-33383P, "GEXL97 Correlation Applicable to ATRIUM-10 Fuel," Rev. 1 is proprietary to Global Nuclear Fuel - Americas (GNF). The proprietary information was requested to be withheld from public disclosure in accordance with 10 CFR 9.17(a)(4) and 10 CFR 2.390 (a)(4) in Reference 1. An affidavit attesting to the proprietary nature of the information was provided in the previous submittal. A non-proprietary version of the document was also included.

Attachment 4 is a report which provides information on the mixed core analysis. The report, GNF S-0000-0088-0271 Revision 0, "GE14 Thermal Hydraulic Compatibility with River Bend Legacy Fuel" contains information that is proprietary to GNF. The proprietary information is requested to be withheld from public disclosure in accordance with 10 CFR 9.17(a)(4) and 10 CFR 2.390 (a)(4). A non-proprietary version of the document is included as Attachment 5. An affidavit attesting to the proprietary nature of the information in Attachment 4 is provided in Attachment 6.

Entergy has not completed analyses to determine whether a change to the TS Minimum Critical Power Ratio (MCPR) safety limits will be required for the RBS reload. Entergy is submitting this request in advance of completed core reload analysis to provide sufficient review time. If analyses indicate that a change to the MCPR safety limit or other TS change is required, the TS change will be requested separately.

The proposed change has been evaluated in accordance with 10 CFR 50.91(a)(1) using criteria in 10 CFR 50.92(c) and it has been determined that this change involves no significant hazards consideration. The bases for these determinations are included in the attached submittal.

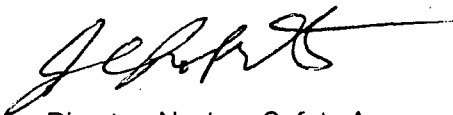
The proposed change includes three new commitments which are listed in Attachment 3.

Entergy requests approval of the proposed amendment by September 18, 2009 to support the RF15 reload. Once approved, the amendment shall be implemented prior to Cycle 16 operation. Although this request is neither exigent nor emergency, your prompt review is requested.

If you have any questions or require additional information, please contact Barry Burmeister at (225)-381-4148.

I declare under penalty of perjury that the foregoing is true and correct. Executed on November 20, 2008

Sincerely,



Director, Nuclear Safety Assurance  
River Bend Station - Unit 1

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JCR/DNL

Attachments:

1. Analysis of Proposed Technical Specification Change
2. Proposed Technical Specification Changes (mark-up)
3. List of Regulatory Commitments
4. GNF S-0000-0088-0271 Revision 0, "GE14 Thermal Hydraulic Compatibility with River Bend Legacy Fuel," Proprietary Version
5. GNF S-0000-0088-0271 Revision 0, "GE14 Thermal Hydraulic Compatibility with River Bend Legacy Fuel," Non- Proprietary Version
6. Affidavits for Requests to Withhold Information

cc: Regional Administrator  
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bcc

e-mail: Standard Distribution

LAR 2008-07  
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File Codes; G 9.5, G 9.42

**Attachment 1**

**RBG-46863**

**Analysis of Proposed Technical Specification Change**

## 1.0 DESCRIPTION

This letter is a request to amend Operating License 47 for River Bend Station, Unit 1 (RBS).

A change is proposed to Technical Specification (TS) 5.6.5, "Core Operating Limits Report (COLR)" to add a reference to an analytical method that will be used to determine core operating limits. The new reference, NEDC-33383P, "GEXL97 Correlation Applicable to ATRIUM-10 Fuel," will allow Entergy to use a Global Nuclear Fuel (GNF)<sup>1</sup> method to determine fuel assembly critical power of AREVA ATRIUM-10 fuel. RBS currently operates with a full core of ATRIUM-10 fuel. Entergy plans to use the GEXL97 correlation for RBS Operating Cycle 16.

## 2.0 PROPOSED CHANGE

TS Section 5.6.5.b lists the analytical methods previously reviewed and approved by the NRC that are used to determine the core operating limits. The proposed change will add the following new reference to TS 5.6.5.b.

25. NEDC-33383P, "GEXL97 Correlation Applicable to ATRIUM-10 Fuel," Global Nuclear Fuel.

GEXL97 has been approved for use at LaSalle County Station, Units 1 and 2 (Reference 1), but has not been approved for generic application by licensees. Entergy is proposing that the NRC approve use of this methodology for determining RBS core operating limits. A similar amendment request (Reference 2) was recently approved for use at Entergy's Grand Gulf Nuclear Station (GGNS).

## 3.0 BACKGROUND

Core operating limits are established each operating cycle in accordance with TS 3.2, "Power Distribution" and TS 5.6.5, "Core Operating Limits Report (COLR)." These operating limits ensure that the fuel design limits are not exceeded during any conditions of normal operation or in the event of any Anticipated Operational Occurrence (AOO).

The methods used to determine the operating limits are those previously found acceptable by the NRC and listed in TS section 5.6.5.b. The analytical methods currently listed support the determination of core operating limits by using those methods applicable to fuel supplied by General Electric (GE, currently known as Global Nuclear Fuel) or AREVA (formerly known as Framatome Advanced Nuclear Power (FRA-ANP), or Siemens). RBS has employed fuel supplied by GE or AREVA since it began commercial operation but is only using AREVA ATRIUM-10 fuel in the current operating cycle.

RBS has recently decided to load GE14 fuel during its upcoming refueling outage. RBS intends to use GE/GNF methodologies to determine overall core operating limits. This change will require the listing of an additional analytical method for analyzing the AREVA ATRIUM-10 fuel. The requested TS change adds the reference needed to determine fuel assembly critical power of ATRIUM-10 fuel.

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<sup>1</sup> Global Nuclear Fuel (GNF), is a joint venture of General Electric (GE), Hitachi and Toshiba

#### 4.0 TECHNICAL ANALYSIS

##### 4.1 GEXL97 Correlation for ATRIUM-10 Fuel

TS Safety Limits (SLs) ensure that specified fuel design limits are not exceeded during steady state operation, normal operational transients, and anticipated operational occurrences (AOOs). The Minimum Critical Power Ratio (MCPR) fuel cladding integrity Safety Limit (SL) ensures that during normal operation and AOOs, at least 99.9% of the fuel rods in the core do not experience transition boiling. The margin between calculated boiling transition and the MCPR SL is based on a detailed statistical procedure that considers the uncertainties in monitoring the core operating state. One specific uncertainty included in the SL is the uncertainty inherent in the critical power correlation. The fuel vendor's critical power correlations are based on data which provide a high degree of assurance that the critical power, as evaluated by the correlation, is within a small percentage of the actual critical power being estimated.

The GEXL correlation is an NRC approved GE method of accurately predicting the occurrence of boiling transition in Boiling Water Reactor (BWR) fuel. The GEXL correlation is necessary for determining the MCPR operating limits resulting from transient analysis, the MCPR safety limit analysis, and the core operating performance and design.

The RBS reactor core currently contains only AREVA ATRIUM-10 fuel. Entergy plans to insert GE14 fuel in the reactor during the upcoming refueling outage and will begin using GE/GNF's safety analysis methodologies, including GNF's critical power correlation methods. The RBS TS currently list NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel (GESTAR-II)," as a method of determining core operating limits. GESTAR-II describes the use of GEXL or GEXL-PLUS as approved methods for critical power correlations; however, it does not describe a specific approved method of performing critical power correlations for ATRIUM-10 fuel. Therefore, Entergy is proposing to add the GEXL97 reference to TS 5.6.5.b as a correlation method to be used for ATRIUM-10 fuel. In the Safety Analysis process, the GEXL97 correlation is to be applied to the ATRIUM-10 fuel in the mixed core while the appropriate approved GEXL correlation will be applied to the GNF fuel (including the determination of an acceptable MCPR safety limit for the mixed core).

Proprietary and non-proprietary versions of GEXL97 were provided in Reference 1. GEXL97 was previously approved for use at LaSalle County Station, Units 1 and 2, but has not been approved generically for other BWRs. The GEXL97 topical report approved for LaSalle was NEDC-33106P, "GEXL97 Correlation for ATRIUM-10 Fuel."

The GEXL97 topical report was rewritten as NEDC-33383P, "GEXL97 Correlation Applicable to ATRIUM-10 fuel" for more generic application. The NRC recently approved a similar amendment request for the Grand Gulf Nuclear Station (GGNS). The GGNS amendment request and associated supplemental information were submitted by References 2 and 3.

The NEDC-33383P Rev. 0 version of GEXL97 was rewritten to incorporate resolution of NRC questions raised during the review of the LaSalle amendment request. The GEXL97 correlation described in NEDC-33383P Rev. 0 was based on the same set of critical power data used in NEDC-33106P and consequently was identical to that previously approved for LaSalle, including the correlation uncertainty. NEDC-33383P was subsequently revised (i.e., Revision 1) to reflect the correction of errors in the underlying SPCB correlation and to include expanded

pressure range data and low R-factor and low inlet sub-cooling data in the overall statistics. The expanded pressure range is now consistent with GEXL14.

Entergy is proposing to use Revision 1 of GEXL97, NEDE-33383P, for the critical power correlation of ATRIUM-10 fuel at RBS.

Entergy's evaluation of the application of GEXL97 to RBS reloads considered the LaSalle precedent and specifically the following considerations:

- 1) Adequacy of the critical power database generated with the AREVA sub-channel code XCOBRA thermal hydraulic model in place of an experimental database;
- 2) Proper determination of the uncertainty in the GEXL97 correlation's predictions for the ATRIUM-10 fuel design; and,
- 3) Applicability of the proposed operating range of GEXL97 correlation to the ATRIUM-10 fuel supported by the range of the database.

Entergy has determined that the use of the GEXL97 correlation is appropriate for RBS and provides an equivalent level of protection as that currently provided.

#### Adequacy of the Critical Power Data Base and Associated Uncertainties

The GEXL correlation was developed based on boiling transition data obtained from dryout tests at a GE test facility. However, specific experimental data for AREVA's ATRIUM-10 fuel is not available to the new fuel vendor, GNF. Therefore, a critical power database was generated by using the approved SPCB correlation encoded in the AREVA thermal hydraulic model XCOBRA. This database was then used by GNF to support the development of GEXL97.

The database used in the development of the GEXL97 correlation for the ATRIUM-10 fuel is provided in Table 2-1 of the referenced GEXL97 report. This table shows the number of calculated critical power data points obtained using the AREVA SPCB critical power correlation for various axial power distributions. It also shows the fuel pin dryout location that formed the basis of the different sets of AREVA calculated critical power data. Table 2-2 of the report, provides the same information but further divides the data collected into subgroups of pressure, mass flux, and inlet sub-cooling.

The database is treated as real data in the regression analysis to generate the correlation coefficients, which introduces unavoidable uncertainties in the correlation. Since the GEXL97 correlation is fitted to this data, the uncertainty in the critical power prediction of the GEXL97 correlation for a given set of conditions will have some additional uncertainty relative to the real critical power value for those conditions; over and above the uncertainty of the correlation's fit to the database. The GEXL97 correlation appropriately determines the overall Critical Power Ratio (CPR) uncertainty by accounting for both the uncertainty in its fit to the database and for the uncertainty of the critical power values in the database itself. A statistical analysis which demonstrates the ability of the final GEXL97 correlation to predict the ATRIUM-10 simulated critical power data is provided in the referenced GEXL97 report.

#### Generation of the GEXL97 Correlation and the Range of Applicability

In developing the GEXL97 correlation, GNF took certain steps to optimize the GEXL97 critical power predictions for the ATRIUM-10 fuel design and to minimize the prediction uncertainty.



This process is identical to that used by GNF when developing GEXL correlation coefficients for GNF/GE fuel designs using raw experimental test data and has been used in past development of GEXL correlations applicable to other co-resident fuel.

The RBS TS safety limit requires the core thermal power to be  $< 23.8\%$  of rated when reactor steam dome pressure is  $< 785$  psig ( $\sim 800$  psia) or core flow is  $< 10\%$  of rated. This safety limit is intended to provide fuel cladding integrity protection during start-up conditions since the GEXL correlation was not approved at the time as a licensing model for pressures below 785 psig. Entergy is aware that GE provided a 10 CFR Part 21 Notification, SC05-03 dated March 29, 2005, which reports that the GEXL correlation lower end of the pressure range (i.e., 800 psia) could temporarily be exceeded during a reactor depressurization transient caused by a Pressure Regulator Failure -Maximum Demand Open (PRFO). To address this issue for GE14 fuel, GNF requested and received NRC approval of a change to the GEXL14 correlation model for pressures down to 700 psia. The GEXL97 Rev. 1 application range for ATRIUM 10 fuel is provided in section 4.2 of the referenced report. The pressure range was extended in Rev. 1 to be consistent with the range for GEXL14 which ensures that such reactor depressurization transients are adequately evaluated. This application range covers the range of expected operation of the ATRIUM-10 fuel during normal steady state and transient conditions in the RBS reload cores for pressures down to 700 psia. Entergy and GNF do not intend to use GEXL97 beyond the approval data base of both the GEXL14 and the SPCB NRC-approved ranges of applicability.

Entergy is following the industry effort to resolve the TS issues associated with the GE Part 21 and will request appropriate TS changes after a generic resolution is reached by the industry and NRC staff. Since the depressurization event does not threaten fuel cladding integrity, and has been adequately evaluated for the lower pressure range, Entergy believes that final resolution of the Part 21 issue is not necessary prior to the use of GEXL97.

#### 4.2 Fuel Compatibility of the Mixed Core

NEDC-33383-P does not provide a detailed mixed core analysis for the RBS transition cores. During the NRC review of the GGNS request for use of GEXL97, the NRC determined that such information was needed to complete its review. GGNS provided similar information in Reference 3. A similar mixed core thermal hydraulic analysis for RBS is provided by Attachment 4, GNF S-0000-0088-0271 Revision 0, "GE14 Thermal Hydraulic Compatibility with River Bend Legacy Fuel." This report provides evaluations performed to demonstrate acceptable thermal hydraulic compatibility of the GE14 fuel assembly with the RBS legacy fuel assemblies. Analyses cover the transition from a core loaded completely with ATRIUM - 10 fuel to one loaded completely with GE14 fuel. The results of these evaluations support the conclusion that GE14 fuel and the legacy fuel can be safely and acceptably operated together at RBS.

Some of the information in GNF S-0000-0088-0271 Revision 0, is proprietary to Global Nuclear Fuel - Americas (GNF-A). The proprietary information is requested to be withheld from public disclosure in accordance with 10 CFR 9.17(a)(4) and 10 CFR 2.390 (a)(4). An affidavit attesting to the proprietary nature of the information is provided in Attachment 6. Attachment 5 provides a non-proprietary version of the report.

#### 4.3 Impact of the Fuel Transition on the Safety Analyses

During the NRC review of the GGNS request for use of GEXL97, the NRC requested additional information regarding the impact of the fuel transition on the plant's safety analyses. Specifically, the NRC requested information on the impact to the loss-of-coolant accident (LOCA), anticipated transient without scram (ATWS), abnormal operation occurrence (AOO), American Society of Mechanical Engineers (ASME) Code overpressure, and stability analyses. As discussed with the NRC and in the GGNS response letter (Reference 3), this type of information is not available until late in the process. Entergy will provide this information to the NRC in a supplemental letter. The expected date for submittal of this information is August 12, 2009.

#### 4.4 Applicability of Existing TS 5.6.5 Analytical Methods

RBS TS 5.6.5.b requires the analytical methods used to determine the core operating limits to be those previously reviewed and approved by the NRC and listed in TS 5.6.5.b. The documents provided in Technical Specification 5.6.5 b include the NRC approved methodologies for both GNF and AREVA. Although GNF is the fuel vendor for Cycle 16, the Cycle 16 core will contain fuel from both fuel vendors. Several of the AREVA documents explicitly support generation of thermal limits for Cycle 16 while some do not. However, the use of the methods not supporting Cycle 16 thermal limits could be necessary at some point in the future and maintaining these documents in the RBS Technical Specification would preclude the need for a Technical Specification change in the event the documents were needed. The principle of GL 88-16 and the Standard TS NUREGs is to reduce unnecessary burden on both licensee and NRC staff by minimizing the need for TS amendments involving cycle specific information. Since some of the AREVA documents will continue to apply to the upcoming cycle and others may be used in the future, leaving the AREVA references in the TS is consistent with this principle.

The current documents listed in TS 5.6.5.b are all fuel vendor generic Topical Reports (TRs) that have been approved by the NRC. NEDC-33383P, "GEXL97 Correlation Applicable to ATRIUM-10 Fuel," will be the first document listed in TS 5.6.5.b approved by the NRC for RBS on a plant-specific basis. The RBS Core Operating Limits Report (COLR) provides the complete identification of all of the analytical documents, including the revision number. Entergy procedure EN-LI-100, "Process Applicability Determination," identifies the COLR as a licensing basis document for which changes must be reviewed in accordance with the 50.59 process. Thus, any changes to NEDC-33383P must be reviewed in accordance with the criteria of 10 CFR 50.59.

#### 5.0 Applicable Regulatory Requirements/Criteria

The proposed changes have been evaluated to determine whether applicable regulations and requirements continue to be met.

Entergy has determined that the proposed changes do not require any exemptions or relief from regulatory requirements, other than the TS, and do not affect conformance with any General Design Criterion (GDC) differently than described in the Updated Final Safety Analysis Report (UFSAR).

10 CFR 50.36, paragraph d(5), states that the TS will include administrative controls that address the provisions relating to organization and management, procedures, record keeping, review and audit, and reporting necessary to assure operation of the facility in a safe manner. The COLR is required as a part of the reporting requirements specified in the RBS TS Administrative Controls section. The TS requires the core operating limits to be established prior to each reload cycle, or prior to any remaining portion of a reload cycle, and to be documented in the COLR. In addition, it requires the analytical methods used to determine the core operating limits to be approved by the NRC and described in the Administrative Controls section of the TS. The proposed TS changes ensure that these requirements are met.

10 CFR 50.34, "Contents of Applications; Technical Information," requires that Safety Analysis Reports be submitted that analyze the design and performance of structures, systems, and components provided for the prevention of accidents and the mitigation of the consequences of accidents. As part of the core reload design process, reload safety evaluations are performed to ensure that the safety analyses remain bounding for the design cycle. To confirm that the analyses remain bounding, key inputs to the safety analyses such as the Critical Power Ratio (CPR) are confirmed to be conservative with respect to the current design cycle. If key safety analysis parameters are not bounded, a re-analysis or re-evaluation of the affected transients or accidents is performed to ensure that the applicable acceptance criteria are satisfied. The proposed TS change is needed to perform reload safety analysis for the next cycle core reload consisting of fuels from two different fuel vendors.

#### 5.1 No Significant Hazards Consideration

Entergy proposes to use a Global Nuclear Fuels (GNF) analysis method to determine core operating limits for River Bend Station (RBS) beginning with operating Cycle 16. The GNF method of analysis, NEDC-33383P, "GEXL97 Correlation Applicable to ATRIUM-10 Fuel," will be used to determine fuel assembly critical power of AREVA ATRIUM-10 fuel. TS section 5.6.5.b must be revised to include a reference to the GEXL97 topical report prior to the method being used to establish the core operating limits.

Entergy Operations, Inc. has evaluated whether or not a significant hazards consideration is involved with the proposed amendment(s) by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

Core operating limits are established each operating cycle in accordance with TS 3.2, "Power Distribution" and TS 5.6.5, "Core Operating Limits Report (COLR)". These core operating limits ensure that the fuel design limits are not exceeded during any conditions of normal operation or in the event of any Anticipated Operational Occurrence (AOO). The methods used to determine the operating limits are those previously found acceptable by the NRC and listed in TS section 5.6.5.b.

A change to TS 5.6.5.b is requested to include an additional reference to the list of analytical methods. RBS currently operates with a full core of AREVA ATRIUM-10 fuel but is scheduled to load GE14 fuel during the next refueling outage. RBS plans to use

the analysis methods of the new fuel vendor, GNF, for the analysis of the mixed core. The GEXL97 correlation accurately models predicted core behavior and appropriately determines the overall critical power uncertainty of this method. In addition, the GEXL97 application range covers the range of expected operation of the ATRIUM-10 fuel during normal steady state and transient conditions in the RBS reload cores.

The requested TS changes concern the use of analytical methods and do not involve any plant modifications or operational changes that could affect any postulated accident precursors or accident mitigation systems and do not introduce any new accident initiation mechanisms. The proposed changes have no effect on the type or amount of radiation released and has no effect on predicted offsite doses in the event of an accident. Thus, the proposed change does not affect the probability of an accident previously evaluated nor does it increase the radiological consequences of any accident previously evaluated.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed TS changes will not change the design function, reliability, performance, or operation of any plant systems, components, or structures. It does not create the possibility of a new failure mechanism, malfunction, or accident initiators not considered in the design and licensing bases. Plant operation will continue to be within the core operating limits that are established using NRC approved methods that are applicable to the RBS design and the RBS fuel.

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

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No.

The proposed change adds GEXL97 to the list of analytical methods in TS 5.6.5.b that can be used to determine core operating limits. Use of the GEXL97 correlation analytical method provides an equivalent level of protection as that currently provided. The change does not alter any method of analysis as described in the NRC approved versions of GESTAR-II. The proposed change does not modify the safety limits or setpoints at which protective actions are initiated, and do not change the requirements governing operation or availability of safety equipment assumed to operate to preserve the margin of safety.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, Entergy concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92.

## 5.2 Environmental Considerations

The proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22 (9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

## 6.0 PRECEDENCE

The NRC previously approved use of GEXL97 for LaSalle County Stations, Units 1 and 2. The LaSalle application requested that two methods be added to TS 5.6.5.b. One of the methods, GEXL96 is for ATRIUM-9B fuel which RBS does not use. The other method was for ATRIUM-10 fuel and was listed as NEDC-33106P, "GEXL97 Correlation for ATRIUM-10 Fuel." The version of GEXL97 that will be referenced in the RBS TS is NEDC-33383P, "GEXL97 Correlation Applicable to ATRIUM-10 Fuel." NEDC-33383P is an updated version of NEDC-33106P which incorporates resolution of NRC questions that arose during the review of the LaSalle amendment request and makes the correlation more generically applicable to ATRIUM-10 fuel. The GEXL97 correlation described in NEDC-33383P Rev. 0 was based on the same set of critical power data used in NEDC-33106P and consequently was identical to that previously approved for LaSalle, including the correlation uncertainty. NEDC-33383P was subsequently revised (i.e., Revision 1) to reflect the correction of errors in the underlying SPCB correlation and to include expanded pressure range data, low R-factor, and low inlet sub-cooling data in the overall statistics.

The NRC staff has approved a similar request for use of NEDC-33383P, Rev. 1 at GGNS. During the review of the GGNS amendment request, the NRC asked Entergy to provide additional information regarding NEDC-33383P and the impact of the fuel transition on safety analyses. Specifically the NRC requested that the following items be addressed. The questions have been addressed for RBS as described below.

1. *It appears that NEDC-33383-P does not provide a detailed mixed core analysis for the transition cores. Provide this mixed core analysis.*

This subject is addressed in section 4.2 of this attachment.

2. *Discuss if the licensee/GNF intends to use GEXL97 beyond the approval data base of both the GEXL14 and the SPCB NRC-approved ranges of applicability.*

As stated in section 4.1 of this attachment, Entergy and GNF do not intend to use GEXL97 beyond the approval data base of both the GEXL14 and the SPCB NRC-approved ranges of applicability.

3. *Figure 4-1, "GEXL97 R-Factor Trends, in NEDC-33383P provides predicted critical power versus R-factor behavior for a range of R-factors. Yet the R-factor range depicted in the table above the figure shows a longer range of R-factors than that given in the figure.*
  - a) *Is there R-factor raw data beyond the highest R-factor in the figure?*
  - a) *Also, the data provided is for only one pressure. Do the GEXL97 trends behave differently at different pressures? If so, explain.*

Figure 4-1 was revised in NEDC-33383-P Rev. 1 to show the longer R-factor range. The observed R-factor trends extend over the entire pressure application range.

4. *The NRC-approved documents listed in TS 5.6.5.b are the only documents to be used to determine the core operating limits listed in TS 5.6.5.a prior to each reload. Discuss if there are documents listed in TS 5.6.5.b, other than the changes in documents submitted in the December 5, 2007, application, that would not be used to calculate the operating limits in TS 5.6.5.a for the next reload.*

This subject is addressed in section 4.4 of this attachment.

5. *Discuss if there are any plant-specific documents listed in TS 5.6.5.b that have been revised since the NRC staff approved their use and what is the requirement that the document revisions are reviewed in accordance with the change criteria in 10 CFR 50.59.*

This subject is addressed in section 4.4 of this attachment.

6. *In the application letter dated December 5, 2007, on the top of page 2, there are the following two statements: (1) AREVA identified an error in its SPCB critical power correlation affecting the ATRIUM-10 fuel and is currently evaluating the impact of the error, and Entergy will provide a supplement to this LAR describing the impact of this error; and (2) Entergy has not completed analyses to determine whether a change to the minimum critical power ratio (MPCR) safety limits in the Technical Specifications (TSs) will be required. Address these two statements and provide the current status of (1) the AREVA evaluation of the error in the SPCB correlation including an explanation the impact of the error on the GEXL97 topical report that was submitted with the application and (2) the analyses to determine whether a change in the TS MPCR safety limits is needed.*

- (1) *As discussed in section 4.1 of this attachment, Revision 1 of NEDC-33383P reflects correction of the SPCB errors.*
- (2) *As discussed in the cover letter, Entergy has not completed analyses to determine whether a change to the TS Minimum Critical Power Ratio (MCPR) safety limits will be required for the RBS reload. If analyses indicate that a change to the MCPR safety limit or other TS change is required, the TS change will be requested separately.*

7. The application describes a transition from the current core with a full loading of ATRIUM-10 to a full loading of GE14 fuel. This transition will start with the upcoming refueling outage and continue over several refueling outages. Once the NRC staff approves the inclusion of the GEXL97 correlation into the TS, the licensee calculates the core operating limits listed in TS 5.6.5a and performs the plant accident analyses without further review by the NRC staff. Therefore, the staff requests that the licensee provide additional information to allow the staff to review the impact of the transition on the safety analyses.

*Specifically, for loss-of-coolant accident (LOCA), anticipated transient without scram (ATWS), abnormal operation occurrence (AOO), American Society of Mechanical Engineers (ASME) Code overpressure, and stability analyses performed for the initial transition core:*

- a state the approved methodology and/or the computer codes used and the reference (e.g. topical report) documenting the methodology/computer codes,*
- b state if the analysis is in compliance with all applicable restrictions in the staff safety evaluation(s) approving the methodology, and*
- c provide the quantitative results of the figure(s) of merit (FOM) compared against the acceptance criteria.*

This subject is addressed in section 4.3 of the report. As discussed with the NRC and in the GGNS response letter, this type of information is not available until late in the reload core design process. Entergy will provide this information to the NRC in a supplemental letter.

## 7.0 REFERENCES

1. Letter from USNRC to Exelon Nuclear, "LaSalle County Station Units 1 and 2, Issuance of Amendments RE: Core Operating Limits Report (TAC NOS. MB9888 AND MB9889)," dated July 9, 2004 (ADAMS Accession No. ML033430391)
2. Letter GNRO-2007/00071 from Entergy to USNRC, "License Amendment Request (LAR) Changes to Technical Specification 5.6.5, "Core Operating Limits Report (COLR)" dated December 5, 2007 (ADAMS Accession no. ML073440113).
3. Letter GNRO-2008/00053 from Entergy to USNRC, "Supplement to Amendment Request Changes to Technical Specification 5.6.5, "Core Operating Limits Report (COLR)" dated July 21, 2008.
4. Letter from Mr. Jason S. Post of General Electric Company, "10CFR21 Reportable Condition Notification: Potential to Exceed Low Pressure Technical Specification Safety Limit," dated March 29, 2005 (ADAMS Accession No. ML050950428)

**Attachment 2**

**RBG-46863**

**Proposed Technical Specification Changes (mark-up)**



-3-

- (3) EOI, pursuant to the Act and 10 CFR Part 70, to receive, possess and to use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Final Safety Analysis Report, as supplemented and amended;
- (4) EOI, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
- (5) EOI, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
- (6) EOI, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

EOI is authorized to operate the facility at reactor core power levels not in excess of 3091 megawatts thermal (100% rated power) in accordance with the conditions specified herein. The items identified in Attachment 1 to this license shall be completed as specified. Attachment 1 is hereby incorporated into this license.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 160 and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. EOI shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

Insert new  
amendment No.

Amendment No. 160

Reporting Requirements  
5.6

5.6 Reporting Requirements

5.6.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

24) NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel (GESTAR-II)".

- c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.
- d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

{ 25) NEDC-33383P, "GEXL97 Correlation  
APPLICABLE TO ATRIUM-10 FUEL,"  
Global Nuclear Fuel.

**Attachment 3**

**RBG-46863**

**List of Regulatory Commitments**

### List of Regulatory Commitments

The following table identifies those actions committed to by Entergy in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE (If Required)
	ONE- TIME ACTION	CONTINUING COMPLIANCE	
Entergy has not completed analyses to determine whether a change to the TS Minimum Critical Power Ratio (MCPR) safety limits will be required for the RBS reload. If analyses indicate that a change to the MCPR safety limit is required, the TS change will be requested separately.	X		4/2/2009
Entergy is following the industry effort to resolve the TS issues associated with the GE Part 21 and will request appropriate TS changes after a generic resolution is reached by the industry and NRC staff.	X		After industry resolution of GE part 21 report, SC05-03
Entergy will provide information regarding the impact of the fuel transition on the plant's safety analyses in a supplemental letter.	X		8/12/2009