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RBG-45951

May 14, 2002

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

SUBJECT: River Bend Station, Unit 1
Docket No. 50-458
Appendix K Measurement Uncertainty Recovery – Power Uprate Request
License Amendment Request (LAR) 2002-15

Dear Sir or Madam:

Pursuant to 10CFR50.90, Entergy Operations, Inc. (Entergy) requests approval of changes to the River Bend Station, Unit 1 (RBS) Operating License and Technical Specifications associated with an increase in the licensed power level. The changes involve a proposed increase in the power level from 3,039 MWt to 3091 MWt. These changes result from increased feedwater flow measurement accuracy to be achieved by utilizing high accuracy ultrasonic flow measurement instrumentation. The instrumentation is to be installed during the upcoming refueling outage (March 2003). The proposed changes are described in Attachment 1.

Entergy has proposed only those license and Technical Specification (TS) changes that are required in order to implement the increased power level.

The proposed change has been evaluated in accordance with 10CFR50.91(a)(1) using criteria in 10CFR50.92(c) and it has been determined that this change involves no significant hazards considerations. The bases for these determinations are included in the attached submittal.

Entergy requests that the effective date for this TS change be within 60 days of startup from RBS Refueling Outage 11. Although this request is neither exigent nor emergency, your prompt review and approval prior to February 14, 2003 is requested. Entergy would like to implement the new power level shortly after returning to power from the refueling outage.

Entergy notes that various General Electric and Framatome topical reports that are a part of the RBS licensing basis (e.g., NEDE-20566-P – GE's Analytical Model for Appendix K LOCA Analysis) may have included explicit references to the use of "102% of licensed core power levels." Entergy does not consider that these topical reports require revision to reflect this requested power uprate. Rather, it will be understood that those statements refer to the Appendix K margin and the original licensed power level.

Note that the report in Attachment 2, General Electric Report NEDC-33051P, is proprietary. An affidavit signed by an officer of General Electric is provided in Attachment 5 and is also included in the front of the document. It is requested that this proprietary information be withheld from

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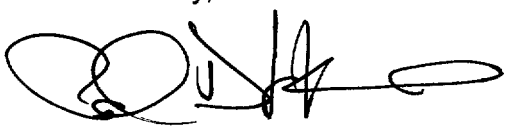
public disclosure. This request is made pursuant to 10CFR2.790. The address of General Electric is provided in the cover page of the report included in Attachment 2. Note that a non-proprietary version is planned and will be submitted by early July.

A summary of the commitments associated with the implementation of this request is provided in Attachment 4. Should you have any questions or comments concerning this request, please contact Jerry Burford at (601) 368-5755.

I declare under penalty of perjury that the foregoing is true and correct. Executed on May 14, 2002.

Sincerely,



Paul D. Hinnenkamp
Vice President, Operations
River Bend Station, Unit 1

PDH/FGB

Attachments:
1. Analysis of Proposed Technical Specification Change
2. General Electric Topical Safety Analysis Report, NEDC-33051P
3. Proposed Technical Specification Changes (mark-up)
4. List of Regulatory Commitments
5. GE Affidavit for Proprietary Information

cc: U. S. Nuclear Regulatory Commission
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NRC Senior Resident Inspector
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Mr. David J Wrona
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Attachment 1

RBG-45951

Analysis of Proposed Technical Specification Change

1.0 DESCRIPTION

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

Entergy Operations, Inc. (Entergy) is proposing that the RBS Operating License be amended to reflect an increase in the licensed reactor power level from 3,039 MWt to 3,091 MWt (an approximate 1.7% increase). These changes result from increased feedwater flow measurement accuracy to be achieved by utilizing high accuracy ultrasonic flow measurement instrumentation.

2.0 PROPOSED CHANGE

The proposed license amendment would revise the RBS Operating License and Technical Specifications to increase licensed power level to 3091 MWt, or 1.7% greater than the current level of 3039 MWt. The proposed changes are indicated on the marked up pages in Attachment 3 and are described below:

1. Paragraph 2.C.(1) in Facility Operating License NPF-47 is revised to authorize operation at a steady state reactor core power level not in excess of 3091 megawatts thermal (100 % rated power).

2. The definition of RATED THERMAL POWER (RTP) in Technical Specification (TS) 1.1 is revised to reflect the increase from 3039 MWt to 3091 MWt.

3. The statement of the Limiting Condition for Operation 3.4.1.B.1, Condition B and Required Action B.1 of Technical Specification 3.4.1 are revised to adjust the maximum thermal power for single loop operation from 79% to 77.6% RTP.

Entergy has conducted a review to identify if other Operating License or Technical Specification changes are needed. The conclusion of that review is that there are no additional changes to accommodate the change in the definition of RATED THERMAL POWER. In summary, the proposed changes recognize the increased accuracy of the plant instrumentation and will satisfy 10CFR50 Appendix K. Based on a rule change during the year 2000, this increased accuracy may be used to support a measurement uncertainty recovery power uprate.

3.0 BACKGROUND

On June 1, 2000, a revision to 10CFR50, Appendix K was issued to be effective on July 31, 2000. The stated objective of this rulemaking was to reduce an unnecessarily burdensome regulatory requirement. Appendix K was originally issued to ensure an adequate performance margin of the Emergency Core Cooling System (ECCS) in the event a design-basis Loss of Coolant Accident (LOCA) was to occur. The margin is provided by conservative features and requirements of the evaluation models and by the ECCS performance criteria. The original regulation did not require the power measurement uncertainty be demonstrated, but rather mandated a 2% margin. The new rule allows licensees to justify a smaller margin for power measurement uncertainty. Because there continues to be substantial conservatism in other

Appendix K requirements, sufficient margin to ECCS performance in the event of a LOCA is preserved.

However, the final rule, by itself, did not allow increases in licensed power levels. Because the licensed power level for a plant is a technical specification limit, proposals to raise the licensed power level must be reviewed and approved under the license amendment process. The license amendment request includes a justification of the reduced power measurement uncertainty and the basis for the modified ECCS analysis. These items are addressed in Attachment 2.

RBS is currently licensed to operate at a maximum power level of 3039 MWt, which includes a 2% margin in the ECCS evaluation model to allow for uncertainties in core thermal power measurement as was previously required by 10CFR50, Appendix K. Appendix K has since been revised to permit licensees to use an assumed power level less than 1.02 times the licensed power level, provided the new power level is demonstrated to account for uncertainties due to power level instrument error.

RBS plans to install a Caldon LEFM CheckPlus™ (√+™) System for feedwater flow measurement. Use of the LEFM √+™ System will reduce the calorimetric core power measurement uncertainty to $\leq$ 0.3%. Based on this, Entergy is proposing to reduce the power measurement uncertainty required by 10CFR50, Appendix K to permit an increase of 1.7% in the licensed power level. The reduction in power measurement uncertainty does not constitute a significant change to the emergency core cooling system (ECCS) evaluation model as defined in 10CFR50.46(a)(3)(i).

Uncertainty in feedwater flow measurement is the most significant contributor to core power measurement uncertainty. Use of the LEFM √+™ System provides a more accurate measurement of feedwater flow than the instrumentation originally installed at RBS. Caldon Topical Report ER-80P, as supplemented by Caldon Engineering Report ER-157P, documents the theory, design and operating features of the system and its ability to achieve increased accuracy of flow measurement. In a Safety Evaluation dated March 1999, the NRC approved ER-80P for referencing in license applications for power uprate. ER-157P, which supplements ER-80P, was provided for NRC review on July 6, 2001 by Entergy (letter number CNRO-2001-00029). The NRC has issued a Safety Evaluation dated 12/20/01 approving ER-157P. Additional details regarding the LEFM √+™ System and its application at RBS are provided in the following discussion.

4.0 TECHNICAL ANALYSIS

The River Bend Station is presently licensed for a full core power rating of 3039 MWt. Based on the use of more accurate feedwater flow measurement equipment, approval is sought to increase licensed core power level by 1.7% to 3091 MWt. Entergy Operations, Incorporated (EOI) has evaluated the impact of the proposed core power uprate on nuclear steam supply system (NSSS) systems and components, balance of plant (BOP) systems, and safety analyses. The results of the EOI evaluation are summarized in Attachment 2 of this submittal and provide justification for the proposed change to the Operating License and the definition of Rated Thermal Power. The other technical specification change described in Section 2 of this attachment, is proposed in order to adjust the maximum power level at which single loop

operation is permitted to maintain it at effectively the same power absolute power level as before the uprate. This new value, 77.6% of the new RTP (i.e., 2399 Mw), is roughly equivalent to 79% of the original RTP (about 2400 Mw). The results of all analyses and evaluations performed demonstrate that all acceptance criteria continue to be met.

4.1 GENERAL LICENSING APPROACH FOR PLANT ANALYSES USING PLANT POWER LEVEL

Rated thermal power is used as an input to most plant safety, component, and system analyses. Analyses for which a 2% increase was applied to the initial power level to account solely for the power measurement uncertainty do not need to be re-performed for the 1.7% uprate conditions. This is based on the fact the sum of increased core power level (1.7%) and the decreased power measurement uncertainty ($\leq$ 0.3%) fall within the previously analyzed conditions.

The power calorimetric uncertainty calculation described in section 4.2.5 below indicates that with the LEFM CheckPlus™ (√+™) system installed, the power measurement uncertainty (based on a 95-percent probability at a 95-percent confidence interval) is $\leq$0.3%. Thus, these analyses only need to reflect a 0.3% power measurement uncertainty. Accordingly, the existing 2% uncertainty can be allocated such that 1.7% is applied to provide sufficient margin to address the uprate to 3091 MWt, and 0.3% is retained in the analysis to still account for the power measurement uncertainty.

Various core and fuel performance analyses described in Attachment 2 are reanalyzed or reevaluated on a cycle-specific basis. Other analyses performed at a nominal power level have either been evaluated or re-performed for the 1.7% increased power level. The results demonstrate that the applicable analysis acceptance criteria continue to be met at the 1.7% uprate conditions.

Some analyses already employ a core power level greater than the proposed 3091 MWt. For these analyses, some of this available margin has been used to offset the 1.7% uprate, and the analyses have been evaluated to confirm that sufficient analysis margin exists to envelop the 1.7% uprate.

4.2 LEFM ULTRASONIC FLOW MEASUREMENT

The LEFM √+™ System is based upon ultrasonic transit time principles to determine fluid velocity. This flow measurement method yields highly accurate flow readings and has been approved by the NRC for power uprate applications as documented in Caldon Topical Report ER-80P, Rev. 0 and ER-157P, Rev. 5.

This instrumentation is non-safety related. It is, however, designed and manufactured in accordance with the Caldon 10CFR50 Appendix B Quality Assurance Program. The system software is developed under the Caldon Verification and Validation (V&V) Program, which meets the criteria of ANSI/IEEE-ANS standard 7-4.3.2, "Standard Criteria for Digital Computers in Safety Systems of Nuclear Power Generating Stations" and ASME NQA-2a-1990, Quality Assurance Requirements for Nuclear Facility Applications." The V&V program is also consistent with the guidance of EPRI TR-103291s, "Handbook for Verification and Validation of Digital Systems." Specific

examples of quality measures undertaken in the design, manufacture, and testing of the LEFM √+™ System are provided in Topical Report ER-80P.

4.2.1 Use of LEFM To Determine Calorimetric Power

The LEFM √+™ System measures transit times of pulses of ultrasonic energy traveling multiple acoustic paths, both with the flow and against it, which form two orthogonal measurement planes. From these measurements, the system forms multiple path length fluid velocity products, which are numerically integrated to determine volumetric flow. The system also measures sound velocity along the acoustic paths which, along with feedwater pressure inputs, are used to determine fluid temperature and density. The LEFM CheckPlus™ system then calculates mass flow, and transmits the signals to the Plant Computer for use in thermal power calculations. This power determination will be used directly to calibrate the plant's nuclear power instruments in accordance with Technical Specification Surveillance Requirements.

The Caldon LEFM Check™ System has eight transducers mounted at both ends of four measurement paths arranged at different chord lengths across a single plane. The allowance of 0.6% in total power measurement uncertainty when using the Caldon LEFM √™ System was derived by Caldon in ER-80P, and received NRC approval in March 1999 to support a 1.0% power uprate. Supplement ER-160P was later issued to support a power uprate of 1.4% when using the Caldon LEFM √™ System. ER-160P has been previously reviewed and approved by the NRC in connection with a similar license amendment request submitted for the Watts Bar Nuclear plant. The NRC staff approved the report in its January 19, 2001 Safety Evaluation (SE) for Watts Bar (ADAMS accession number ML010260074).

The Caldon LEFM √+™ System is similar to the LEFM √™ System, except that it has 16 transducers on eight acoustic measurement paths grouped into two orthogonal planes with four measurement paths in each plane. The LEFM √+™ System is essentially two LEFM √™ Systems combined. In order to ensure independence, each measurement plane employs its own timing clock in the LEFM √+™ System. As a result, the LEFM √+™ System provides feedwater flow measurement that is more accurate than that provided by a LEFM √™ System. It will support a power uprate of up to 1.7%. Superiority in measurement accuracy arises from two distinct advantages in the LEFM √+™ System, both of which are described in Caldon Report ER-157P. The NRC staff approved the report in its December 20, 2001 Safety Evaluation (SE) (ADAMS accession number ML013540256). These advantages are:

- Because of the orthogonal geometry of the two measurement planes, any transverse components of the fluid velocity will be cancelled out when the two companion measurements in each plane are averaged. The average of two numerical integrations of four pairs of axial velocity measurements in orthogonal planes is inherently more accurate than the integration of four measurements in a single plane.
- Because there are twice as many measurements being taken, the total statistical error due to uncertainties in both transit time measurements and path length geometry is reduced. This advantage arises due to the statistical treatment of the uncertainties, the mathematics of which is supported by ANSI/ASME Power Test Code PTC 19.1-1985.

The individual contributions to mass flow measurement uncertainty by the two Caldon systems are tabulated for comparison in Table 1 of ER-157P. This table identifies the differences between the uncertainties associated with the two LEFM systems and provides an association with the two advantages of the LEFM √+™ System listed above. This table shows that the accuracy of the LEFM √+™ System exceeds the accuracy of the LEFM √™ System.

The LEFM √+™ System at RBS consists of flow elements to be installed in each feedwater flow loop and an electronics cabinet. The installation of each flow element will conform to the requirements in Caldon Topical Reports ER-80P and ER-157P. It is to be used for continuous calorimetric power determination by direct serial link with the plant computer and incorporates self-verification features. These features ensure that hydraulic profile and signal processing requirements are met within the design basis uncertainty analysis.

Caldon calibrates the LEFM √+™ spool pieces using a site-specific model test at Alden Research Laboratories with calibration standards traceable to National Standards. A copy of the Alden Labs certified calibration report is included in the Caldon Design Basis Uncertainty Analysis for the system. The LEFM √+™ System will be installed and commissioned according to Caldon procedures (in conformance with ER-80 and ER-157) including verification of ultrasonic signal quality and hydraulic velocity profiles as compared to those tested during site-specific model testing.

4.2.2 LEFM Failure

The redundancy inherent in the two measurement planes of an LEFM √+™ makes the system resistant to component failures. Continued operation at the uprate power level is justified with an LEFM √+™ system for any single component failure. The system features automatic self-checking. A continuously operating on-line test is provided to verify that the digital circuits are operating correctly and within the specified accuracy envelope. The on-line monitoring and diagnostics tests include the acoustic processing unit transmitters, timing circuits, signal quality, path sound velocity, hydraulic profile as represented by path velocities, and active computation as reported by watchdog timers. The system provides display and storage of verification test results. Failure messages are generated if system failure events are detected.

The LEFM √+™ feedwater mass flow and temperature inputs will also be used to adjust or 'calibrate' the inputs from the feedwater venturis and temperature elements. If the LEFM √+™ system becomes inoperable, control room operators are promptly alerted by control room computer indications. The reactor thermal power will then be administratively controlled, following an acceptable allowed outage time, at a power level to be determined consistent with the RBS uncertainty analysis until such time as the LEFM √+™ system is returned to an operable status. The uncertainties of the venturi and temperature element based inputs are expected to increase over time due to drift and ambient temperature uncertainty effects, and must be compensated for in the administrative controls. The administrative controls will be added to the RBS Technical Requirements Manual.

The RBS calorimetric power measurement uncertainties using the LEFM √+™system are described in Attachment 2, Section 1.4.

4.2.3 Maintenance and Calibration

Calibration and maintenance of the LEFM system will be performed using site procedures developed from the Caldon LEFM √+™ System technical manuals. All work is performed in accordance with site work control procedures. Verification of system operation is provided by the previously discussed self-checking system. In addition, the RBS I&C personnel performing initial maintenance on the LEFM will be trained by Caldon.

4.2.4 Training

Procedures governing normal operation, emergency operation, and off-normal operation that may be affected by the power uprate will be identified in the design change process revised prior to implementation of the uprated power. Appropriate personnel will receive training on the Caldon LEFM √+™ System as well as on the affected procedures. This training is to consist of briefings, required reading, classroom sessions, and a simulator demonstration. This training will also be conducted prior to operation at the uprated power.

4.2.5 Uncertainty Determination Methodology

Caldon has completed the RBS LEFM √+™ System uncertainty calculation indicating a mass flow inaccuracy of $\leq$ 0.3% of rated flow for the site-specific installation. The calculations are consistent with the methodology described in Topical Report ER-80P, as supplemented by Engineering Report ER-157P. The uncertainty calculation supports an overall uncertainty in the reactor power measurement of 0.3%. The uncertainty is at a 95% probability and 95% confidence level. Section 1.4 of Attachment 2 provides a discussion for uncertainty in the RBS heat balance using the LEFM √+™ system.

LEFM √+™ System operating procedures will ensure that the assumptions and requirements of the uncertainty calculation remain valid.

4.2.6 Monitoring, Verification and Error Reporting

Although use of the LEFM √+™ System for this application is non-safety related, the system is designed and manufactured under the vendor's standard quality control program, which provides for configuration control, deficiency reporting and correction, and maintenance. However, system software and laboratory calibration tests are required to meet the requirements of 10CFR50, Appendix B. The software also meets the requirements of Entergy software control procedure IT-104 for Class B software.

4.2.7 Hydraulic Modeling

The LEFM √+™ spool pieces will be calibrated at Alden Research Laboratory (ARL). This testing includes a full-scale model of the RBS hydraulic geometry and tests in straight pipe. The calibration factor for the RBS spool pieces will be based on these tests and documented in a Caldon Engineering Report. A review of the observed profiles for the various pipe models at ARL and the observed profiles at RBS will be conducted as part of the final commissioning by Caldon, Inc. Final acceptance of the

RBS uncertainty analysis will occur after the completion of the commissioning process, which verifies bounding calibration test data. This step provides for the final positive confirmation that actual performance in the field meets the uncertainty assumptions for the instrumentation and is consistent with the assumptions of topical reports ER-80P and ER-157P.

4.2.8 RIS 2002-03, Item I and ER-157P Criteria

Regulatory Information Summary 2002-03 and the NRC SER for Caldon Topical Report ER-157P requested information regarding the device to be used as the basis for measurement uncertainty recovery power uprate requests. This information is either addressed below or references are provided to other sections of this submittal.

RIS items I.A, I.B – references to the topical reports and to their NRC approvals are provided in Section 4.2.1.

RIS item I.C – As described in Section 4.2.1, the LEFM will be installed at RBS in conformance with the requirements of the above topical reports.

RIS item I.D – The NRC identified four criteria in their Safety Evaluation of ER-157P to be addressed by licensees applying for a power uprate using the LEFM √+™ System:

Criterion 1 – Discuss maintenance and calibration procedures, including processes and contingencies for inoperable LEFM instrumentation and the effect on thermal power measurements and plant operation. Response: As noted in Section 4.2.3 above, work will be controlled by procedures developed in accordance with Caldon recommendations. The incorporation of, and adherence to, these requirements will assure that the LEFM system is properly maintained and calibrated. Contingency plans for operation of the plant with an LEFM out-of-service are described in response to RIS items I.G and I.H below.

Criterion 2 – For plants that currently have the LEFM installed, provide an evaluation of the operational and maintenance history. Response: This criterion is not applicable to RBS. RBS currently uses venturis to obtain the feedwater flow input to the plant calorimetric heat balance measurements. The LEFM √+™ System is to be installed during the upcoming refueling outage (RF11).

Criterion 3 – Confirm that the methodology used to calculate the uncertainty of the LEFM in comparison to the current feedwater instrumentation is based on accepted plant setpoint methodology. Response: This information will be provided once the RBS uncertainty analysis has been verified.

Criterion 4 – For plants where the ultrasonic meter was not installed and flow elements calibrated to a site-specific piping configuration, additional justification should be provided for its use. Response: This criterion is not applicable to RBS. As described in Section 4.2.7, the calibration factor for the RBS spool pieces will be established by test at Alden Research Laboratory.

RIS item I.E – This information will be provided once the RBS uncertainty analysis has been verified.

RIS Item I.F.i – As described in Section 4.2.7 above, calibration and maintenance of the instruments that provide input to the plant calorimetric power calculation is performed using site procedures developed based on vendor recommendations.

RIS Item I.F.ii – As discussed in Section 4.2 above, the LEFM √+™ System is designed and manufactured in accordance with the Caldon 10CFR50 Appendix B Quality Assurance Program.

RIS Item I.F.iii – RBS uses the Entergy Corrective Action Program. Corrective actions are controlled in accordance with that program.

RIS Item I.F.iv – All conditions adverse to quality are handled in accordance with the Entergy Corrective Action Program. The LEFM √+™ System software will be controlled under the RBS software quality assurance program. This program provides for appropriate vendor notification and error reporting.

RIS Item I.F.v – Caldon has noted that the software is also subject to the Caldon V&V program and that it includes requirements for user notification of important deficiencies.

RIS Item I.G – The allowable outage time for the LEFM √+™ System will be provided once the RBS uncertainty analysis has been verified.

RIS Item I.H – The contingent actions when an LEFM is out of service will be provided once the RBS uncertainty analysis is verified.

5.0 REGULATORY ANALYSIS

5.1 Applicable Regulatory Requirements/Criteria

The proposed changes have been evaluated to determine whether applicable regulations and requirements continue to be met. As described in Section 3.0 above, a change to 10CFR50 Appendix K to recognize that the uncertainty of the plant instrumentation was conservatively bounded by the 2% required to be assumed in the original Appendix K. With the proposed power uprate, RBS continues to satisfy the requirements of 10CFR50.46 and 10CFR50 Appendix K. The spectrum of hypothetical accidents and transients has been investigated and were shown to meet the plant's currently licensed regulatory criteria. ECCS performance was evaluated and was shown to still meet the criteria of 10CFR50.46 and 10CFR50 Appendix K. Challenges to the containment under postulated accident conditions have been evaluated, and the containment and its associated cooling systems continue to meet 10CFR50 Appendix A, Criterion 38, Long Term Cooling, and Criterion 50, Containment.

Entergy has determined that the proposed changes do not require any exemptions or relief from any regulatory requirements, other than the TS (see Attachment 3), and do not affect conformance with any GDC as currently described in the SAR.

5.2 No Significant Hazards Consideration

Entergy Operations, Inc. (Entergy) is proposing that the River Bend Station Operating License be amended to reflect an increase in the licensed reactor power level from 3,039 MWt to 3,091 MWt. These changes result from increased accuracy of the feedwater flow and temperature measurements to be achieved by utilizing high accuracy ultrasonic flow measurement instrumentation. The basis for this change is consistent with the revision to 10CFR50 Appendix K issued in June 2000.

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.

   The comprehensive analytical efforts performed to support the proposed change included a review of the Nuclear Steam Supply System (NSSS) systems and components that could be affected by this change. All systems and components will function as designed, and the applicable performance requirements have been evaluated and found to be acceptable.

   The comprehensive analytical efforts performed to support the proposed uprate conditions included a review and evaluation of all components and systems that could be affected by this change. Evaluation of accident analyses confirmed the effects of the proposed uprate are bounded by the current dose analyses. All systems will function as designed, and all performance requirements for these systems have been evaluated for the uprate conditions and found acceptable. Because the integrity of the plant will not be affected by operation at the new power level conditions, it is concluded that all structures, systems, and components required to mitigate a transient remain capable of fulfilling their intended functions. The reduced uncertainty in the flow input to the power calorimetric measurement allows the current safety analyses to be used, with small changes to the core operating limits, to support operation at a core power of 3,091 megawatts thermal (MWt). As such, all Final Safety Analysis Report (FSAR) Chapter 15 accident analyses continue to demonstrate compliance with the relevant event acceptance criteria. Those analyses performed to assess the effects of mass and energy releases remain valid. The source terms used to assess radiological consequences have been reviewed and determined to either bound operation at the new power level condition, or new analyses were performed to verify all acceptance criteria continue to be met.

   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.

   No new accident scenarios, failure mechanisms, or limiting single failures are introduced as a result of the proposed changes. All systems, structures, and components previously required for the mitigation of a transient remain capable of fulfilling their intended design functions. The proposed changes have no adverse effects on any safety-related system or component and do not challenge the performance or integrity of any safety related system.

   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.

   Operation at the uprated power condition does not involve a significant reduction in a margin of safety. Analyses of the primary fission product barriers have concluded that all relevant design criteria remain satisfied, both from the standpoint of the integrity of the primary fission product barrier and from the standpoint of compliance with the required acceptance criteria. The calculated loads on all affected structures, systems and components have been shown to remain within design criteria for all design basis event categories. No NRC acceptance criterion is exceeded.

   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(s) present no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

5.3 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 10CFR51.22(c)(9). Therefore, pursuant to 10CFR51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 PRECEDENCE

Similar amendment requests have been approved for:

Facility	Amendment(s)	Approval Date	Accession #
San Onofre 2 & 3	180, 171	July 6, 2001	ML011870421
Watts Bar	31	January 19, 2001	ML010260074
Waterford 3	183	March 29, 2002	ML020910734

In addition, a similar request for another Entergy facility, Grand Gulf Nuclear Station, is currently under NRC review (see accession # ML020370273).

Attachment 3

RBG-45951

Proposed Technical Specification Changes (mark-up)

(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 1 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 ~~3039~~ 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. ~~70~~ 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.

1.1 Definitions (continued)

MAXIMUM FRACTION OF LIMITING POWER DENSITY (MFLPD)	The MFLPD shall be the largest value of the fraction of limiting power density in the core. The fraction of limiting power density shall be the LHGR existing at a given location divided by the specified LHGR limit for that bundle type.
MINIMUM CRITICAL POWER RATIO (MCPR)	The MCPR shall be the smallest critical power ratio (CPR) that exists in the core for each class of fuel. The CPR is that power in the assembly that is calculated by application of the appropriate correlation(s) to cause some point in the assembly to experience boiling transition, divided by the actual assembly operating power.
MODE	A MODE shall correspond to any one inclusive combination of mode switch position, average reactor coolant temperature, and reactor vessel head closure bolt tensioning specified in Table 1.1-1 with fuel in the reactor vessel.
OPERABLE - OPERABILITY	A system, subsystem, division, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, division, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).
RATED THERMAL POWER (RTP)	RTP shall be a total reactor core heat transfer rate to the reactor coolant of ~~2939 MWt~~ 3091.
REACTOR PROTECTION SYSTEM (RPS) RESPONSE TIME	The RPS RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its RPS trip setpoint at the channel sensor until de-energization of the scram pilot valve solenoids. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured.

(continued)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.1 Recirculation Loops Operating

LCO 3.4.1

A. Two recirculation loops shall be in operation with matched flows.

OR

B. One recirculation loop shall be in operation with:

1. THERMAL POWER ≤ ~~79~~ 77.6 % RTP;
2. Total core flow within limits;
3. LCO 3.2.1,"AVERAGE PLANAR LINEAR HEAT GENERATION RATE (APLHGR)," single loop operation limits specified in the COLR;
4. LCO 3.2.2,"MINIMUM CRITICAL POWER RATIO (MCPR)," single loop operation limits specified in the COLR; and
5. LCO 3.3.1.1, "Reactor Protection System (RPS) Instrumentation," Function 2.b (Average Power Range Monitors Flow Biased Simulated Thermal Power - High), Allowable Value for single loop operation as specified in the COLR.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Recirculation loop jet pump flow mismatch not within limits.	A.1 Shutdown one recirculation loop.	2 hours
B. THERMAL POWER > ~~79~~ 77.6 % RTP during single loop operation.	B.1 Reduce THERMAL POWER to ≤ ~~79~~ 77.6 % RTP.	1 hour

(continued)

Attachment 4

RBG-45951

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	
This operational aspect of the TPO uprate (steam flow margin available at the turbine inlet) will be demonstrated by performing controller testing equivalent to the testing performed during the original startup of the plant. (TSAR 1.2.1)	X		**upon implementation**
The values used in the measurement uncertainty calculation will be confirmed by the initial calibration test results of the LEFM CheckPlus system. (TSAR 1.4)	X		**upon implementation**
PCS tests will be performed during the power ascension phase. (TSAR 5.2.1, 10.4)	X		**upon implementation**
The performance of the FW/level control systems will be recorded at 95% and 100% of CLTP and confirmed at the TPO RTP during power ascension. These checks will demonstrate acceptable operational capability and will utilize the methods and criteria described in the original startup testing of these systems. (TSAR 5.2.2)	X		**upon implementation**
The reload analyses performed prior to TPO implementation will be based on the reactor power bypass AL for the TSV closure scram, TCV fast closure scram, and RPT remaining constant in percent of RTP. (TSAR 5.3.2)	X		**RF11**
The measurements [of reactor and system pressure and flows] will be taken along the same rod pattern line used for the increase to TPO RTP. Core power from the APRMs is re-scaled to the TPO RTP before exceeding the CLTP and any necessary adjustments will be made to the APRM alarm and trip settings. (TSAR 10.4)	X		**upon implementation**

Demonstration of acceptable fuel thermal margin will be performed prior to and during power ascension to the TPO RTP at each steady-state heat balance point defined above. Fuel thermal margin will be projected to the TPO RTP point after the measurements taken at 100% of CLTP to show the estimated margin. The thermal margin will be confirmed by the measurements taken at full TPO RTP conditions. The demonstration of core and fuel conditions will be performed with the methods currently used at the plant. (TSAR 10.4)	X		**upon implementation**
Minor changes to the power/flow map, Technical Specifications, and the like, will be communicated through normal operator training. Simulator changes and validation for the TPO uprate will be performed in accordance with ANSI/ANS 3.5-1985. (TSAR 10.5)	X		**upon implementation**
The Emergency Operating Procedures (EOP) action thresholds are plant unique and will be addressed using standard procedure updating processes. (TSAR 10.8)	X		**upon implementation**
A non-proprietary version [of NEDC-33051] is planned and will be submitted by early July. (letter)	X		**7/15/02**
The installation of each flow element will conform to the requirements in Caldon Topical Reports ER-80P and ER-157P. (att 1, 4.2.1)	X		**4/15/03**
The administrative controls [for LEFM OOS] will be added to the RBS Technical Requirements Manual. (att 1, 4.2.2)	X		**upon implementation**
Calibration and maintenance of the LEFM system will be performed using site procedures developed from the Caldon LEFM √+™ System technical manuals. (att 1, 4.2.3)	X		**upon implementation**
RBS I&C personnel performing initial maintenance on the LEFM will be trained by Caldon. (att 1, 4.2.3)	X		**upon implementation**

Procedures governing normal operation, emergency operation, and off-normal operation that may be affected by the power uprate will be identified in the design change process and revised prior to implementation of the uprated power. Appropriate personnel will receive training on the LEFM √+™ System as well as on the affected procedures. This training is to consist of briefings, required reading, classroom sessions, and a simulator demonstration. (att1, 4.2.4)	**X**		**upon implementation**
LEFM System operating procedures will ensure that the assumptions and requirements of the uncertainty calculation remain valid. (att 1, 4.2.5)	**X**		**upon implementation**
The LEFM spool pieces will be calibrated at Alden Research Laboratory (ARL). Profiles comparisons will be made between ARL and plant commissioning. Differences will be considered in the final overall plant calorimetric uncertainty analysis to ensure consistency with ER-80P and ER-157P. (att 1, 4.2.7)	**X**		**3/14/03**
This information [description of RBS uncertainty analysis and AOT basis] will be provided once the RBS uncertainty analysis has been verified. (att 1, 4.2.8, cr 3 & it I.E & I.G)	**X**		**6/30/02**
The contingent actions when an LEFM is out of service will be provided once the RBS uncertainty analysis is verified. (att 1, 4.2.8, it I.H; see also 4.2.2)	**X**		**6/30/02**

Attachment 5

RBG-45951

GE Affidavit for Proprietary Information

May 9, 2002	**Action Requested by:**	N/A
GE-ENTERGY-TPO-193	**Response to:**	N/A
DRF 0000-0000-0017	**Project Deliverable:**	N/A

cc: K. Cole
H. Hoang
M. Ball
J. Burford (EOI)

To: Charles Richardson (EOI)

From: Michael Dick

Author: Michael Dick

Subject: GE Proprietary Information Affidavit for RBS TPO License Amendment Request

Reference:
1. Entergy Operations, Inc. Contract Order No. NHC00530 (Riverbend)
2. Entergy Operations, Inc., RiverBend Station, Thermal Power Optimization Program, GE Proposal No. 208-JX4BS-LD1, Rev. 5, dated May 31, 2001.
3. GE-ENTERGY-TPO-193, dated May 7, 2002

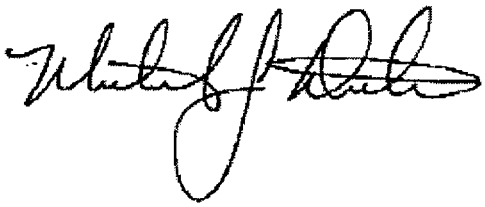
Reference 3 transmitted the RBS TPO TSAR Revision 0, NEDC-33051P, that will be submitted to the USNRC as part of the Licensing Amendment Request for the TPO Uprate. NEDC-33051P contains GE-NE proprietary information which is provided under the Entergy Operations, Inc./GE-NE proprietary information agreement. GE-NE customarily maintains this information in confidence and withholds it from public disclosure.

The attached affidavit identifies that NEDC-33051P has been handled and classified as proprietary to GE-NE. Along with the affidavit, NEDC-33051P is suitable for review by the NRC. GE-NE hereby requests that NEDC-33051P be withheld from public disclosure in accordance with the provisions of 10 CFR 2.790 and 9.17.

A copy of this letter is included in DRF 0000-0000-0017.

If you have any questions in this matter, please contact me.

GE-Entergy TPO-193 Revision 0
May 9, 2002



MJD
Attachment: Proprietary Information Affidavit

General Electric Company

AFFIDAVIT

I, George B. Stramback, state as follows:

(1) I am Project Manager, Regulatory Services, 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 GE proprietary report NEDC-33051P, *Safety Analysis Report for River Bend Station Thermal Power Optimization,* Class III (GE Proprietary Information), dated May 2002. This document, taken as a whole, constitutes a proprietary compilation of information, some of it also independently proprietary, prepared by the General Electric Company. The independently proprietary elements are delineated by bars marked in the margin adjacent to the specific material.

(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;

b. 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;

c. Information which reveals cost or price information, production capacities, budget levels, or commercial strategies of General Electric, its customers, or its suppliers;

d. Information which reveals aspects of past, present, or future General Electric customer-funded development plans and programs, of potential commercial value to General Electric;

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

Both the compilation as a whole and the marked independently proprietary elements incorporated in that compilation are considered proprietary for the reason described in items (4)a. and (4)b., above.

(5) The information sought to be withheld is being submitted to NRC in confidence. That information (both the entire body of information in the form compiled in this document, and the marked individual proprietary elements) is of a sort customarily held in confidence by GE, and has, to the best of my knowledge, consistently been held in confidence by GE, has not been publicly disclosed, and 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. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.

(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 by bars in the margin is classified as proprietary because it contains detailed results and conclusions from these evaluations, utilizing analytical models and methods, including computer codes, which GE has developed, obtained NRC approval of, and applied to perform evaluations of transient and accident events in the GE Boiling Water Reactor ("BWR"). The development and approval of these system, component, and thermal hydraulic models and computer codes was achieved at a significant cost to GE, on the order of several million dollars.

The remainder of the information identified in paragraph (2), above, is classified as proprietary because it constitutes a confidential compilation of information, including detailed results of analytical models, methods, and processes, including computer codes, and conclusions from these applications, which represent, as a whole, an integrated process or approach which GE has developed, obtained NRC approval of, and applied to perform evaluations of the safety-significant changes necessary to demonstrate the regulatory acceptability of a given increase in licensed power output for a GE BWR. The development and approval of this overall approach was achieved at a significant additional cost to GE, in excess of a million dollars, over and above the very large cost of developing the underlying individual proprietary analyses.

To effect a change to the licensing basis of a plant requires a thorough evaluation of the impact of the change on all postulated accident and transient events, and all other regulatory requirements and commitments included in the plant's FSAR. The analytical process to perform and document these evaluations for a proposed power uprate was developed at a substantial investment in GE resources and expertise. The results from these evaluations identify those BWR systems and components, and those postulated events, which are impacted by the changes required to accommodate operation at increased power levels, and, just as importantly, those which are not so impacted, and the technical justification for not considering the latter in changing the licensing basis. The scope thus determined forms the basis for GE's offerings to support utilities in both performing analyses and providing licensing consulting services. Clearly, the scope and magnitude of effort of any attempt by a competitor to effect a similar licensing change can be narrowed considerably based upon these results. Having invested in the initial evaluations and developed the solution strategy and process described in the subject document GE derives an important competitive advantage in selling and performing these services. However, the mere knowledge of the impact on each system and component reveals the process, and provides a guide to the solution strategy.

(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 information is part of GE's comprehensive BWR 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, including justifications for not including certain analyses in applications to change the licensing basis.

GE's competitive advantage will be lost if its competitors are able to use the results of the GE experience to avoid fruitless avenues, or to normalize or verify their own process, or to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions. In particular, the specific areas addressed by any document and submittal to support a change in the safety or licensing bases of the plant will clearly reveal those areas where detailed evaluations must be performed and specific analyses revised, and also, by omission, reveal those areas not so affected.

While some of the underlying analyses, and some of the gross structure of the process, may at various times have been publicly revealed, enough of both the analyses and the detailed structural framework of the process have been held in confidence that this information, in this compiled form, continues to have great competitive value to GE. This value would be lost if the information as a whole, in the context and level of detail provided in the subject GE document, were to be disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources, including that required to determine the areas that are not affected by a power uprate and are therefore blind alleys, 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 its analytical process.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.

Executed on this the 7th day of May 2002.

George B. Stramback
General Electric Company