FPL Energy
Seabrook Station

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MAY 26 2004

Docket No. 50-443
NYN-04047

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Reference: FPL Energy Seabrook, LLC letter NYN-04016, "License Amendment Request 04-03, Application for Stretch Power Uprate," dated March 17, 2004

Seabrook Station
Response to Request for Additional Information Regarding
License Amendment Request 04-03, Application for Stretch Power Uprate

By letter dated March 17, 2004, FPL Energy Seabrook, LLC (FPL Energy Seabrook) requested an amendment to facility operating license NPF-86 and the plant technical specifications for Seabrook Station. This license amendment request (LAR) is an application for a stretch power uprate which will increase the Seabrook Station licensed reactor core power by 5.2% from 3411 megawatts thermal (MWt) to 3587 MWt.

During a telephone conversation on April 27, 2004 and a public meeting on May 20, 2004, the Nuclear Regulatory Commission (NRC) identified additional information that is required prior to completion of the license amendment acceptance review. The information requested and the FPL Energy Seabrook responses are provided in Enclosure 1 to this letter. The specific information request from the NRC is provided in Enclosure 2.

This information clarifies the extent to which systems, components, and analyses are affected by the SPU conditions. The areas where FPL Energy Seabrook specifically requests NRC approval are the Technical Specification changes set forth in Attachment 2 to the referenced letter.

A001

Also enclosed is a reformatted no significant hazards consideration analysis. The reformatted document consolidates information and eliminates reference to other LAR sections and other docketed information.

In addition, FPL Energy Seabrook concurs with the February 28, 2005 date proposed by the NRC for issuance of the license amendment.

There are no commitments being made in this submittal. Should you have any questions concerning this information, please contact Mr. Stephen T. Hale, Power Uprate Project Manager, at (603) 773-7561.

Very truly yours,

FPL Energy Seabrook, LLC

Gene St. Pierre

for Mark E. Warner
Site Vice President

cc. H. J. Miller, NRC Region I Administrator
V. Nerses, NRC Project Manager, Project Directorate I-2
G. T. Dentel, NRC Resident Inspector

Mr. Bruce Cheney, Director
New Hampshire Bureau of Emergency Management
State Office Park South
107 Pleasant Street
Concord, NH 03301

OATH AND AFFIRMATION

I, Gene F. St.Pierre, Station Director of FPL Energy Seabrook, LLC hereby affirm that the information and statements contained in this submittal to support license amendment request 04-03 are based on facts and circumstances which are true and accurate to the best of my knowledge and belief.

Sworn and Subscribed
Before me this

26 day of May, 2004

Notary Public

Gene St.Pierre
Station Director

MICHAEL D. O'KEEFE
MY COMMISSION EXPIRES FEB. 5, 2008
NOTARY PUBLIC
NEW HAMPSHIRE

Enclosure 1 to NYN-04047

Response to Request for Additional Information for LAR 04-03, Application for Stretch Power Uprate

REQUEST FOR ADDITIONAL INFORMATION RELATED TO POWER UPRATE LICENSE AMENDMENT REQUEST SEABROOK STATION DOCKET NO. 50-443

By letter dated March 17, 2004, FPL Energy Seabrook, LLC (Seabrook or the licensee) submitted an amendment request. The proposed amendment would increase the maximum authorized reactor core power level for Seabrook from 3411 megawatt thermal (MWt) to 3587 MWt. This represents a nominal increase of 5.16% rated thermal power.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the information the licensee provided that supports the proposed amendment and requests the following additional information to clarify the submittal:

Based on our review of the licensee's submittal dated March 17, 2004, regarding a request for NRC to approve a stretch power uprate (SPU) for Seabrook, it has been determined that the licensee's submittal needs to be supplemented and documented with the following additional information in order to complete our acceptance review:

Bullet 1:

The submittal should identify those BOP areas (Matrix 5 of RS-001) that are potentially impacted from a safety perspective (including consideration of licensing basis criteria and commitments that have been made) as a result of the proposed SPU, and those that are not impacted (provide explanation for the "no safety impact determination," such as the original design-basis analysis is bounding). This will help to focus NRC review effort and expedite the completion of the review.

\+ The SPU evaluation of BOP systems (Matrix 5 of RS-001) should include consideration of all design and licensing basis criteria that apply, including any commitments that have been made. Any instances where the plant licensing basis or commitments are not being satisfied as a result of the SPU should be specifically identified and justified in accordance with 10 CFR 50.59 requirements and the licensee's commitment tracking and control program.

FPL Energy Seabrook Response:

To address Bullets 1, 2, and 3, Table 1, "Seabrook Station Affected / Unaffected Matrix," (below) was prepared to better identify the extent to which systems, components, and analyses are affected by the SPU conditions. The system evaluation process utilized by FPL Energy Seabrook for the SPU required consideration of all design and licensing basis criteria, including any specific commitments. Additionally, the process included interviews with system engineers and a review of system operating and maintenance history. Based on the analyses and evaluations performed for the SPU, the Seabrook Station licensing bases, as revised by the LAR accident analyses (Attachment 1, Section 6.0) and Technical Specification changes (Attachment 2), and applicable commitments are satisfied.

TABLE 1
SEABROOK STATION
AFFECTED / UNAFFECTED MATRIX

LAR Section	System / Component / Evaluation / Analysis	Affected / Unaffected[1]	Method Of SPU Reconciliation	Change To Current Licensing Basis
Section 3.0 – Design Transients				
3.1	NSSS Design Transients	Affected	Analysis	No
3.2	Auxiliary Equipment Design Transients	Unaffected	Evaluation	No
Section 4.0 – Nuclear Steam Supply Systems				
4.1.4.1 / 4.1.5.1	Reactor Coolant System	Affected	Analysis and Evaluation	No
4.1.4.2 / 4.1.5.2	Chemical and Volume Control System	Unaffected	Evaluation	No
4.1.4.3 / 4.1.5.3	Residual Heat Removal System	Affected	Analysis and Evaluation	No[2]
4.1.4.4 / 4.1.5.4	Safety Injection System	Unaffected	Evaluation	No
4.2.3.1 / 4.2.4.1	Main Steam System-NSSS/BOP Interface (Main Steam Safety Valves, Atmospheric Steam Dump Valves, Main Steam Isolation Valves)	Unaffected	Analysis and Evaluation	No
4.2.3.2 / 4.2.4.2	Steam Dump System-NSSS/BOP Interface (Steam Dump Valves)	Unaffected	Analysis and Evaluation	No
4.2.3.3 / 4.2.4.3	Condensate and Feedwater System-NSSS/BOP Interface (Feedwater Isolation Valves, Feedwater Control Valves, Condensate and Feedwater Pump Flow)	Affected	Analysis and Evaluation	No
4.2.3.4 / 4.2.4.4	Emergency Feedwater System-NSSS/BOP Interface (Emergency Feedwater Pump Flow, Condensate Storage Tank Inventory)	Unaffected	Analysis and Evaluation	No

TABLE 1 (continued)
SEABROOK STATION
AFFECTED / UNAFFECTED MATRIX

LAR Section	System / Component / Evaluation / Analysis	Affected / Unaffected[1]	Method Of SPU Reconciliation	Change To Current Licensing Basis
Section 4.0 – Nuclear Steam Supply Systems (continued)				
4.2.3.5 / 4.2.4.5	Steam Generator Blowdown System-NSSS/BOP Interface (Steam Generator Blowdown Flow)	Unaffected	Evaluation	No
4.3.1 / 4.3.2	Reactor Protection System / Engineered Safety Features Actuation System	Affected	Analysis	Yes
4.3.3.1	Pressure Control Component Sizing	Unaffected	Analysis	No
4.3.3.2	Margin To Trip Analysis	Affected	Analysis	Yes
4.3.4	Cold Overpressure Mitigation System	Unaffected	Evaluation	No
Section 5.0 – Nuclear Steam Supply System Components				
5.1.1	Reactor Pressure Vessel Structural Evaluation	Affected	Analysis and Evaluation	No
5.1.2	Reactor Pressure Vessel Neutron Fluence Evaluation	Affected	Analysis	No
5.1.3	Reactor Pressure Vessel Integrity – Neutron Irradiation	Affected	Analysis	No
5.2.5	Thermal-Hydraulic Evaluations of Reactor Internals	Affected	Analysis	No
5.2.6	Mechanical Systems Evaluations of Reactor Internals	Affected	Analysis	No
5.2.7	Structural Evaluation of Reactor Internal Components	Affected	Analysis and Evaluation	No
5.2.8	Reactor Pressure Vessel Internals Heat Generation Rates	Affected	Analysis	No
5.3	Fuel Assembly Structural Analysis	Affected	Analysis	No
5.4	Control Rod Drive Mechanisms	Affected	Analysis and Evaluation	No
5.5	Reactor Coolant Loop Piping and Supports	Affected	Analysis	No
5.6	Pressurizer	Affected	Analysis	No
5.7.1	Steam Generator Thermal-Hydraulic Evaluation	Affected	Analysis	No
5.7.2	Steam Generator Structural	Affected	Analysis	No

TABLE 1 (continued)
SEABROOK STATION
AFFECTED / UNAFFECTED MATRIX

LAR Section	System / Component / Evaluation / Analysis	Affected / Unaffected[1]	Method Of SPU Reconciliation	Change To Current Licensing Basis
Section 5.0 – Nuclear Steam Supply System Components (continued)				
5.7.3	Steam Generator Design Pressure	Unaffected	Analysis	No
5.7.4	Steam Generator Hardware Evaluation	Affected	Analysis	No
5.7.5	Tube Vibration and Wear	Affected	Analysis	No
5.7.6	Tube Repair Limits (Regulatory Guide 1.121 Analysis)	Affected	Analysis and Evaluation	No
5.7.7	Steam Generator Tube Integrity Considerations	Affected	Analysis and Evaluation	No
5.8.1	Reactor Coolant Pumps (Structural)	Affected	Analysis	No
5.8.2	Reactor Coolant Pump Motors	Affected	Analysis	No
5.9.3.1	Auxiliary System Tanks (Chemical and Volume Control, Residual Heat Removal, and Emergency Core Cooling Systems)	Unaffected	Evaluation	No
5.9.3.2	Auxiliary System Heat Exchangers	Unaffected	Analysis and Evaluation	No
5.9.3.3	Auxiliary System Pumps	Unaffected	Evaluation	No
5.9.3.4	Auxiliary System Valves	Unaffected	Evaluation	No
5.10	Bottom Mounted Instrumentation	Affected	Analysis	No
5.11	Materials	Unaffected	Evaluation	No[3]
5.12	Application of Leak-Before-Break Methodology	Unaffected	Analysis	No
Section 6.0 – Accident Analysis				
6.1.1	Best-Estimate Large Break LOCA	Affected	Analysis and Evaluation	Yes
6.1.2	Small Break LOCA	Affected	Analysis	No
6.1.3	Post-LOCA Subcriticality and Long Term Core Cooling	Affected	Analysis	Yes

TABLE 1 (continued)
SEABROOK STATION
AFFECTED / UNAFFECTED MATRIX

LAR Section	System / Component / Evaluation / Analysis	Affected / Unaffected[1]	Method Of SPU Reconciliation	Change To Current Licensing Basis
Section 6.0 – Accident Analysis (continued)				
6.1.4	Containment Sump pH Control	Affected	Analysis	No
6.1.5	Hot Leg Switchover	Affected	Analysis	Yes
6.1.6	Post-LOCA Hydrogen Generation	Affected	Analysis	No
6.1.7	LOCA Hydraulic Forces	Affected	Analysis	No
6.2	Steam Generator Tube Rupture	Affected	Analysis	Yes
6.3.2.1	Excessive Heat Removal Due to Feedwater System Malfunctions	Affected	Analysis	Yes
6.3.2.2	Excessive Increase in Secondary Steam Flow	Affected	Evaluation	Yes
6.3.2.3	Inadvertent Opening of a Steam Generator Dump, Relief, or Safety Valve	Unaffected	Evaluation	No
6.3.2.4	Steam System Piping Failure	Affected	Analysis	Yes
6.3.3.1	Loss of External Load / Turbine Trip	Affected	Analysis	Yes
6.3.3.2	Loss of Normal Feedwater	Affected	Analysis	Yes
6.3.3.3	Loss of Nonemergency AC Power to the Plant Auxiliaries	Affected	Analysis	Yes
6.3.3.4	Feedwater System Pipe Break	Affected	Analysis	Yes
6.3.4.1.2	Complete Loss of Forced Reactor Coolant Flow	Affected	Analysis	Yes
6.3.4.1.1	Partial Loss of Reactor Coolant Flow	Affected	Analysis	Yes
6.3.4.2	Reactor Coolant Pump Locked Rotor / Shaft Break	Affected	Analysis	Yes
6.3.5.1	Uncontrolled Rod Control Cluster Assembly Bank Withdrawal From a Subcritical Condition	Affected	Analysis and Evaluation	Yes

TABLE 1 (continued)
SEABROOK STATION
AFFECTED / UNAFFECTED MATRIX

LAR Section	System / Component / Evaluation / Analysis	Affected / Unaffected[1]	Method Of SPU Reconciliation	Change To Current Licensing Basis
Section 6.0 – Accident Analysis (continued)				
6.3.5.2	Uncontrolled Rod Control Cluster Assembly Bank Withdrawal at Power	Affected	Analysis	Yes
6.3.5.3	Rod Control Cluster Assembly Misoperation	Affected	Evaluation	Yes
6.3.5.4	Startup of an Inactive Reactor Coolant Pump	Unaffected	Evaluation	No
6.3.5.5	Chemical and Volume Control System Malfunction that Results in a Decrease in Boron Concentration in the Reactor Coolant	Affected	Analysis	Yes
6.3.5.6	Inadvertent Loading and Operation of a Fuel Assembly in an Improper Location	Unaffected	Evaluation	No
6.3.5.7	Spectrum of Rod Control Cluster Assembly Ejection Accidents	Affected	Analysis	Yes
6.3.6.1	Inadvertent Operation of Emergency Core Cooling System During Power Operation	Affected	Analysis	Yes
6.3.6.2	Chemical and Volume Control System Malfunction that Increases Reactor Coolant Inventory	Affected	Analysis	Yes
6.3.7.1	Inadvertent Opening of a Pressurizer Safety or Relief Valve	Affected	Analysis	Yes
6.3.8	Anticipated Transient Without Scram	Affected	Analysis and Evaluation	No
6.3.9	Station Blackout	Unaffected	Evaluation	No
6.4.1.1	Long-Term LOCA Mass and Energy Releases	Unaffected	Analysis	No[4,5]
6.4.1.2	Short-Term LOCA Mass and Energy Releases	Unaffected	Analysis and Evaluation	No[4,5]
6.4.2	Sub-Compartment Analysis	Unaffected	Evaluation	No[4,5]
6.4.3	Long Term Containment Response	Unaffected	Analysis	No[4,5]
6.4.4	Main Steam Line Break Mass and Energy Releases Inside Containment	Affected	Analysis	No[5]

TABLE 1 (continued)
SEABROOK STATION
AFFECTED / UNAFFECTED MATRIX

LAR Section	System / Component / Evaluation / Analysis	Affected / Unaffected[1]	Method Of SPU Reconciliation	Change To Current Licensing Basis
Section 6.0 – Accident Analysis (continued)				
6.4.5	Steamline Break Containment Response	Unaffected	Analysis	No[5]
6.5	Streamline Break Outside Containment	Affected	Analysis	Yes
6.6	Radiological Consequences	Affected	Analysis	Note 6
Section 7.0 – Nuclear Fuel				
7.1	Thermal-Hydraulic Design	Affected	Analysis	Yes[7]
7.2	Core Design	Affected	Analysis	No[8]
7.3	Fuel Rod Design and Performance	Affected	Analysis	No
Section 8.0 – Balance of Plant[9]				
8.2	Heat Balances	Affected	Analysis	No[10]
8.3	Turbine Generator and Turbine Auxiliary Systems	Affected	Analysis and Evaluation[11]	No
8.4.1	Main Steam	Affected	Analysis and Evaluation	No
8.4.2	Extraction Steam	Affected	Analysis and Evaluation	No
8.4.3	Condensate and Feedwater	Affected	Analysis and Evaluation	No
8.4.4	Emergency Feedwater	Unaffected	Analysis and Evaluation	No
8.4.5	Steam Generator Blowdown	Unaffected	Evaluation	No
8.4.6	Main Condenser Evacuation System	Affected	Analysis and Evaluation	No
8.4.7	Main Condenser and Circulating Water	Affected	Analysis and Evaluation	No
8.4.8	Heater Drains	Affected	Analysis and Evaluation	No
8.4.9	Spent Fuel Pool Cooling	Affected	Analysis and Evaluation	No[12]
8.4.10	Containment Building Spray	Unaffected	Analysis and Evaluation	No[5]

TABLE 1 (continued)
SEABROOK STATION
AFFECTED / UNAFFECTED MATRIX

LAR Section	System / Component / Evaluation / Analysis	Affected / Unaffected[1]	Method Of SPU Reconciliation	Change To Current Licensing Basis
Section 8.0 – Balance of Plant[9] (continued)				
8.4.11	Ultimate Heat Sink	Unaffected	Evaluation	No[2]
8.4.12	Service Water	Unaffected	Evaluation	No[2]
8.4.13.1	Primary Component Cooling Water	Unaffected	Analysis and Evaluation	No[2]
8.4.13.2	Secondary Component Cooling Water	Unaffected	Evaluation	No
8.4.14	Heating, Ventilation, and Air Conditioning	Affected	Analysis and Evaluation	No
8.4.15.1	Rad Waste Systems	Unaffected	Evaluation	No
8.4.15.2.1	Normal Operation Annual Rad Waste Effluent Releases	Affected	Analysis and Evaluation	Yes[13]
8.4.15.2.2	Post Accident Access to Vital Areas	Affected	Analysis and Evaluation	Yes[13]
8.4.15.2.3	Normal Operation Dose Rates and Shielding	Affected	Analysis and Evaluation	Yes[13]
8.4.15.2.4	Post Accident Environmental Levels	Affected	Analysis and Evaluation	Yes[13]
8.4.15.2.5	Radiation Monitor Setpoints	Unaffected	Evaluation	No[14]
8.4.16.1	AC Distribution System	Affected	Analysis and Evaluation	No
8.4.16.2	Power Block Electrical Equipment	Affected	Analysis and Evaluation	No
8.4.16.3	DC System	Unaffected	Evaluation	No
8.4.16.4	Emergency Diesel Generator Fuel Oil and Lube Oil Systems	Unaffected	Evaluation	No
8.4.16.5	Emergency Diesel Generators and Auxiliaries	Unaffected	Evaluation	No
8.4.16.6	Switchyard	Unaffected	Analysis and Evaluation	No
8.4.16.7	Grid Stability	Affected	Analysis[15]	No
8.4.17	BOP Instrumentation	Affected	Analysis and Evaluation	No[16]
8.5.1	BOP Piping and Supports	Affected	Analysis and Evaluation	No

TABLE 1 (continued)
SEABROOK STATION
AFFECTED / UNAFFECTED MATRIX

LAR Section	System / Component / Evaluation / Analysis	Affected / Unaffected[1]	Method Of SPU Reconciliation	Change To Current Licensing Basis
Section 8.0 – Balance of Plant[9] (continued)				
8.5.2	NSSS Piping and Supports	Affected	Analysis and Evaluation	No
8.6.1	Containment Structure	Unaffected	Evaluation	No[5]
8.6.2	Containment Sub-Compartments	Unaffected	Evaluation	No[5]
8.6.3	High Energy Line Break Outside Containment	Unaffected	Analysis and Evaluation	No
8.6.4	Pipe Support Reactions	Unaffected	Analysis and Evaluation	No
Section 9.0 – Programs				
9.1.1	Fire Protection Program	Unaffected	Evaluation	No
9.1.2	Valve Programs	Unaffected	Evaluation	No
9.1.3	Flow Accelerated Corrosion Program	Affected	Analysis and Evaluation	No
9.2	Equipment Qualification Program	Affected	Evaluation	No
Section 10.0 – Miscellaneous Topics				
10.1	Mid-Loop Operation	Affected	Evaluation	No
10.2	Natural Circulation Cooldown	Affected	Analysis	No
10.3	Internal Flooding	Unaffected	Evaluation	No
10.4	High Energy Line Break / Jet Impingement	Unaffected	Evaluation	No
10.5	Probabilistic Safety Assessment	Unaffected	Evaluation	No
Section 11.0 – Impact on Operations				
11.0	Impact on Operations	Affected	Analysis and Evaluation	No
Section 13.0 – Environmental Evaluation				
13.0	Environmental Evaluation	Unaffected	Analysis and Evaluation	No

TABLE 1 (continued)
SEABROOK STATION
AFFECTED / UNAFFECTED MATRIX

LAR Section	System / Component / Evaluation / Analysis	Affected / Unaffected[1]	Method Of SPU Reconciliation	Change To Current Licensing Basis

NOTES:

1. According to the NRC Guidance for Margin Uncertainty Recapture Power Uprates in RIS 2002-03:
   - Unaffected – Unaffected systems, components, or safety analyses are those having current design and licensing bases analyses and calculations that bound the potential effects of the SPU.
   - Affected – Affected systems, components, or safety analyses are those having current design and licensing bases analyses and calculations that do not bound the potential effects of the SPU.
2. The total heat loads for normal operation and normal cooldown at SPU conditions are bounded by current design values. Although the SPU heat loads for extended cooldown and LOCA (LOCA heat loads were maximized for conservatism) are greater than original values, the heat loads are still within the design capability of the heat removal systems without a change in flow rates, equipment, or system operation.
3. Materials requirements and evaluations continue to be applicable.
4. The SPU mass and energy releases for LOCA inside Containment are less than those in the current Seabrook Station analyses of record.
5. The current licensing basis Containment peak pressure and peak temperature envelopes remain bounding for the SPU.
6. The accident radiological consequences at the analyzed SPU core power level of 3659 MWt were submitted to the NRC in FPL Energy Seabrook letter NYN-03061 in License Amendment Request 03-02 to adopt the Alternate Source Term methodology for Seabrook Station.
7. Change in methodology only.
8. Core designs are checked for each reload cycle to ensure that design bases conditions are bounded.
9. The safety related functions (e.g., containment isolation, temperature control) were considered for the SPU and remain unchanged. The original licensing basis acceptance criteria for the remainder of BOP system and component functions were not detailed. The criteria required that the systems function to produce power and provide reliable operation with minimal transients or trips. For the SPU, these systems were compared to industry codes, standards, and criteria to determine acceptability.
10. There are no acceptance criteria for the heat balance per se. The heat balance results are the inputs used for BOP systems and components evaluations and analyses.
11. Includes confirmation that the existing Turbine Missile Analysis remains valid.
12. Although the temperature acceptance criterion of 140°F (200°F, and no boiling in the spent fuel pool) are not changed, the time for the spent fuel pool capability to match decay heat at SPU conditions has changed (e.g., 118 hours to 134 hours).

TABLE 1 (continued)
SEABROOK STATION
AFFECTED / UNAFFECTED MATRIX

LAR Section	System / Component / Evaluation / Analysis	Affected / Unaffected[1]	Method Of SPU Reconciliation	Change To Current Licensing Basis

NOTES: (continued)

13. Reflects changes in core and Reactor Coolant System isotopic inventories.
14. The radiation monitor setpoint bases remain valid for the SPU. The actual setpoints of the monitors may change slightly to correspond to an increase in radiation level (background or process) as a result of the SPU.
15. The Grid Stability Analysis was performed by ISO New England.
16. Evaluation was based on revised heat balance parameters and applicable system analysis compared to instrument ranges. Changes required include banding (external coloring) for the feedwater and main steam flow indicators in the Control Room, and several non-safety related indicator and setpoint changes.

Bullet 2:

For those BOP areas (Matrix 5 of RS-001) that are potentially impacted:

+ All instances where existing design and licensing basis criteria and commitments are not satisfied under SPU, where criteria are not used consistently, or where SPU conditions are not bounded by previous analyses, should be clearly identified, discussed in detail (including impact on plant operation), and fully justified. This would include (for example) any changes in analytical methodologies or assumptions, taking credit for additional operator actions or crediting operator response times that are less conservative than previously assumed, and failure to satisfy design specifications. A summary listing of any exceptions should be included in the submittal to facilitate NRC review.
+ All instances where SPU conditions will result in challenges to BOP equipment or marginal performance that could have a safety impact should be highlighted for NRC review and consideration.
+ Measures for assuring compliance with vendor recommendations and standard industry practice, including any restrictions that will be placed on plant operation, should be discussed. Operation that could impact safety that is contrary to existing criteria, vendor recommendations, and/or applicable industry standards should be fully justified.
+ The considerations referred to in the Regulatory Evaluation Sections of RS-001, Section 3.3, Insert 5, should be addressed.

FPL Energy Seabrook Response:

See FPL Energy Seabrook response to Bullet 1. Additionally, the following should be noted:

- Only NRC approved (approved for use at Seabrook Station, or approved generically, as summarized in LAR Attachment 1, Table 1.2-1) analytical methodologies were used to demonstrate that the SPU meets design and licensing criteria.
- Assumptions regarding operator actions and response times utilized as inputs to accident analyses have not changed as a result of the SPU and no new actions are created. For cases where operator response times are determined as an output of accident analyses, some individual operator action times have changed, but all remain within bounding limits.
- There are no instances where BOP systems and equipment that have an impact on safety will fail to satisfy design specifications.
- There are no instances where BOP systems and equipment that have an impact on safety will be challenged or have marginal performance.
- There are no instances where BOP systems and equipment that have an impact on safety will not comply with existing criteria, vendor recommendations, and/or applicable industry standards.
- FPL Energy Seabrook utilized RS-001, including the Section 3.3 inserts, as input for preparation of SPU system and component evaluations and the LAR.

Bullet 3:

Acceptance should be based on satisfying all existing licensing-basis criteria, including applicable commitments that have been made. A summary of the basis for acceptance, including a brief discussion of the bounding considerations and acceptance criteria that are impacted by SPU; analyses that have been completed; and a comparison of the existing capability vs. the capability following SPU implementation vs. the licensing-basis acceptance criteria should be included for each area of review.

FPL Energy Seabrook Response:

See FPL Energy Seabrook response to Bullet 1. Additionally, based on the analyses and evaluations performed for the SPU, the Seabrook Station licensing bases, as revised by the LAR accident analyses (Attachment 1, Section 6.0) and Technical Specification changes (Attachment 2), and applicable commitments are satisfied.

Bullet 4:

A discussion of the startup testing program, including a description of how analytical conclusions will be confirmed, should be provided (see RS-001 for guidance). In particular, where existing design criteria will not be satisfied or marginal performance is expected under SPU conditions, plant performance should be confirmed during plant startup and initial full power operation against suitable acceptance criteria.

FPL Energy Seabrook Response:

Power Ascension Testing

The planned Seabrook Station SPU testing is described in LAR Attachment 1, Section 12.0 (page 12-1). The test plan has been developed and is summarized below in Table 2 – "Seabrook Station SPU Power Ascension Test Plan Summary." Although it is not required for an SPU, the test plan was developed consistent with the guidance of RS-001, "Review Standard for Extended Power Uprates," and as applicable, NUREG-0800, Draft Section 14.2.1, "Generic Guidelines for Extended Power Uprate Testing Programs."

The purpose of this plan is to demonstrate that changes made to the plant hardware and instrumentation and control systems have been properly designed and implemented, and to demonstrate that the plant can be operated safely at the SPU power level. Implicit in the mission of this comprehensive post-modification and power ascension test plan is the demonstration that the engineering calculations are correct and that the SPU operation is bounded by the analysis that was performed. The SPU test plan has been developed to confirm satisfactory plant performance for low power physics testing and full power operations at the SPU power level, and to demonstrate that all design criteria are satisfied.

The test plan was developed considering three aspects: 1) power ascension testing, including low power physics testing, 2) vibration monitoring, and 3) post-modification testing for the plant changes.

First, following completion of post refueling low power physics testing, power ascension testing necessary to ensure that the plant can be safely operated at the SPU power level will be conducted. The methodology used for this aspect was to review each test listed in UFSAR Table 14.2.5, Initial Test Program, for applicability to the plant restart after the modifications required by the SPU have been implemented. The Initial Test Program, as described in Chapter 14 of the Seabrook Station UFSAR was planned using a methodology similar to NUREG-0800, Section 14.2, "Initial Test Program – Final Safety Analysis Report." The modifications required for the SPU and modifications to improve margins, plant performance and efficiency are listed in the SPU LAR 04-03, Attachment 1, Section 10.6 (page 10-7). Additionally, modifications that are being performed that are not required for the SPU and not identified in the LAR, were considered in the development of Table 2.

Second, vibration monitoring will be performed on systems and components reasonably affected by the SPU and the attendant increases in steam and feed flow (See below).

Third, post-modification testing will validate the engineering analysis and implementation of the changes. Post-modification tests for each modification will be carried out in accordance with plant design process procedures.

A dedicated SPU restart procedure will be written to temporarily supercede the normal restart procedure. The SPU restart procedure will be written to: 1) control the sequence and coordination of existing plant startup procedures with the new procedures written to validate the changes due to the SPU, 2) ensure the engineering analysis and subsequent implementation of modifications, including setpoint changes and calibrations, are correct, and 3) allow safe ascension to the SPU power level. This temporary procedure will reference dedicated SPU test procedures, including the gathering of plant thermal and electrical performance data. The SPU test procedures and results will be reviewed and approved by plant engineering, management, and the site safety review committee. In accordance with Seabrook Station Technical Specifications, Section 6.8.1.1, a startup report for the SPU will be generated and sent to the Nuclear Regulatory Commission within 90 days of completing the startup test program.

Table 2 below describes the testing and data collection for the SPU, related modifications, and areas of increased monitoring.

TABLE 2
SEABROOK STATION
SPU POWER ASCENSION TEST PLAN SUMMARY

SYSTEM / COMPONENT	MODIFICATION DESCRIPTION (See LAR Section 10.6)	TESTS
Main Turbine	Modify high pressure turbine steam path	1) Post-modification performance test 2) Overspeed test 3) Vibration baseline with post-modification monitoring 4) Turbine thermal performance
Turbine – Generator Set	Overall SPU changes	1) Torsional tests 2) Electric performance tests
Moisture Separator Reheaters	Replace moisture separator reheater internals	1) Post-modification performance test 2) Monitoring during power ascension for expected thermal parameters
Heater Drain Piping	Replace system valves as required	1) Monitor for excess movement and vibration 2) Monitor heater drain tank and feedwater heater levels
Condensate Pumps	Upgrade condensate pump impellers	1) Full flow test in vendor's shop 2) Monitor discharge pressure and flow 3) Monitor pump vibration
Main Feedwater Pump	Change speed controller setpoint Note: Speed to remain the same and flow increases due to increased suction pressure	1) Monitor pump speed 2) Monitor discharge pressure and flow 3) Monitor pump vibration
BOP Systems piping and components (Main Steam, Extraction Steam, Condensate and Feedwater, Heater Drain)	Heater drain pump flow increase Steam and feed flow increases	1) Monitor pumps for vibration 2) Monitor piping for excess movement and vibration.
Generator Step-up Transformer Coolers	Increase generator step-up transformer cooler capability	Monitor cooling performance including verification of temperature data.
Instrumentation and Control Systems	Setpoint changes	Verify setpoint changes correctly implemented via the Seabrook Station design control program.

TABLE 2 (continued)
SEABROOK STATION
SPU POWER ASCENSION TEST PLAN SUMMARY

SYSTEM / COMPONENT	MODIFICATION DESCRIPTION (See LAR Section 10.6)	TESTS
Power Ascension Testing Summary		
		Major Prerequisites • Plant in Mode 2 • Post refueling low power physics testing completed • Steamflow normalization factors reviewed. • Feedwater temperature bias constants reviewed. • Quadrant Power Tilt Ratio (QPTR) normalization factors set to 1.0. • Software to support analysis of the upcoming fuel cycle has been successfully installed on the Reactor Analysis Workstation. • Reactor Coolant System ΔT rescaling reviewed. • Calorimetric software is set to the appropriate mode • Turbine impulse pressure scaling has been reviewed.
Rod Control System	NA	1) Drop time measurement 2) Position indication 3) Worth measurement (See Prerequisites)
Reactor, Reactor Coolant System piping and Steam Generator internals	NA	Vibration and loose parts monitor in service
Ventilation Systems	NA	Ventilation system operability test (Reference Technical Requirements Manual (TRM))
Chemical and Volume Control System	NA	Maintain primary and secondary chemistry within the requirements of the Chemistry Control Program.
Plant Process Computer	NA	1) Validate control and test software for the Main Plant Computer System. 2) Verify calorimetric calculation is correct.
Reactor Core	NA	Utilize plant procedures for post-refueling power physics testing and Seabrook uprate power ascension testing to verify applicable core design parameters.

TABLE 2 (continued)
SEABROOK STATION
SPU POWER ASCENSION TEST PLAN SUMMARY

SYSTEM / COMPONENT	MODIFICATION DESCRIPTION (See LAR Section 10.6)	TESTS
NSSS	NA	1) Utilize the Seabrook uprate power ascension testing procedure to trend parameters, evaluate data, and rescale instrumentation (ΔT, Nuclear Instrumentation, turbine impulse pressure). 2) Ensure systems that determine reactor thermal power are properly calibrated.
Engineered Safety Features Equipment	NA	Utilize the plant technical specification surveillance program to verify operability of Engineered Safety Features Systems.
Plant Radiation Levels	NA	Utilize Seabrook Station Radiation Protection Manual to verify acceptable plant radiation levels.

Piping Vibration

Vibration monitoring, where appropriate, has been addressed in the planning of post-SPU testing. In the development of the system engineering evaluations supporting the SPU, vibration effects were evaluated with consideration of the increase in flow. System health reports, periodically prepared and issued as part of an ongoing program, were reviewed for outstanding vibration issues.

For the Seabrook Station SPU, there is no mass or volumetric flow rate change in the Reactor Coolant System (primary side). Therefore, vibration issues on the primary side of the plant are not expected.

On the secondary side, most flow rates will increase in proportion to the increase in power. Flow rates and/or velocities in the main steam, extraction steam, heater drain, and condensate and feedwater systems were evaluated and found to be acceptable. System walkdowns will be performed during power ascension to the SPU power level to ensure vibrations for piping systems, and components remain acceptable. System walkdowns are performed under the standardized plant engineering guideline procedure. The procedure specifically calls for the monitoring of vibration. Equipment vibration will be monitored under the ongoing plant Condition Based Maintenance Program. Vibration issues, if any, for the pre-SPU plant (at shutdown) will be established via the system walkdown and Condition Based Maintenance Program.

The turbine–generator and moisture separator reheaters will also be monitored during power ascension.

Specific BOP piping or components that are in the vibration monitoring scope include:

1. BOP systems
   - Main and extraction steam lines
   - Feedwater and condensate lines
   - Moisture separator reheater and heater drain lines
2. Turbine-generator
3. Components - feedwater, heater drain, and condensate pumps and motors

   Note: Main feedwater pump speed will remain at approximately the same speed as current operation. Increased feedwater flow results from increased feedwater pump suction pressure. The increased suction pressure is generated by an enhanced condensate pump impeller design.

Observation #1:

Does methodology satisfy licensing basis criteria in all respects; are there any exceptions? [Attachment 1, Section 1.2, Pages 1-4, 1-5]

FPL Energy Seabrook Response:

The methodology utilized for SPU analyses and evaluations satisfy the Seabrook Station licensing basis, as revised by the LAR accident analyses (Attachment 1, Section 6.0) and Technical Specification changes (Attachment 2), without exception.

Observation #2:

What "expectations" of RS-001 are not satisfied? [Attachment 1, Section 1.3, Page 1-8]

FPL Energy Seabrook Response:

As provided in the matrices in LAR Attachment 1, Tables 1.3-1 through 1.3-13 (page 1-9), and the evaluations and analysis in the referenced LAR sections, FPL Energy Seabrook considers that all expectations of RS-001 are satisfied.

Observation #3:

With respect to Note 1, what about any impact due to plant modifications? Also, there should not be two different "Note 1', listings. [Attachment 1, Table 1.3-5, Page 1-12]

FPL Energy Seabrook Response:

There are no plant modifications associated with the SPU that will impact the conclusions in Note 1 of LAR Attachment 1, Table 1.3-5 (page 1-12). Although there are two different "Note 1" listings, the "Note 1" in LAR Attachment 1, Table 1.3-5 (page 1-12) applies to both "Internally Generated Missiles" table entries, and the "Note 1" in LAR Attachment 1, Table 1.3-5 (page 1-13) applies to the "Light Load Handling System" table entry.

Observation #4:

The NSSS parameter acceptance criteria should include "within the bounds of the existing licensing basis." [Attachment 1, page 2-2, Section 2.4]

FPL Energy Seabrook Response:

The acceptance criteria for the SPU parameters is that they provide Seabrook Station with adequate flexibility and margin for plant operation within the bounds of the current licensing basis as revised by the Accident Analysis in LAR Attachment 1, Section 6.0 and the Technical Specification changes in LAR Attachment 2.

Observation #5:

With respect to Note 1, is this consistent with the plant licensing basis? [Attachment 1, Table 4.1-1, Page 4-10]

FPL Energy Seabrook Response:

The BOP Curve identified in LAR Attachment 1, Table 4.1-1 (page 4-10) was used as the decay heat model for the current licensing basis for Seabrook Station, and the Residual Heat Removal cooldown analysis for the SPU used the same model. Thus, use of the BOP Curve is consistent with the current licensing basis.

Observation #6:

Why is criteria ok? What is steam generator pressure increase following load rejection? What was original licensing basis criteria? [Attachment 1, Section 4.2.3.3.2, Page 4-17]

FPL Energy Seabrook Response:

The maximum design load rejection is the most limiting transient for operation of the Condensate and Feedwater Systems. Seabrook Station was originally designed and licensed for a maximum load rejection of 50 percent of full power without a reactor trip, crediting automatic reactor control including rod control, steam generator level control, pressurizer pressure and level control, and steam dump control. In order to meet this licensing basis, adequate feedwater flow must be provided to the steam generators to prevent a reactor trip on low steam generator water level. As a result, Westinghouse established a balance of plant interface criteria for the Condensate and Feedwater Systems which required that the systems be able to supply 103 percent of the rated feedwater flow, assuming a 75 psi increase above full load steam pressure and the feedwater control valves wide open. Accordingly, in order to meet the Seabrook Station licensing basis for the SPU, the Condensate and Feedwater Systems must be capable of supplying 103 percent of the rated feedwater flow (rated feedwater flow is the highest steam flow presented in LAR Attachment 1, Table 2.3-1 (page 2-3), or 16.52 million lb/hr) with a 75 psi increase above full load steam pressure and the feedwater control valves wide open. The system hydraulic evaluation summarized in LAR Attachment 1, Subsection 8.4.3 (page 8-18) was performed and demonstrated that the interface criteria, and thus the original licensing basis could still be achieved at the SPU conditions.

The 50 percent load rejection analysis performed for the SPU indicates that the peak steam generator shell side pressure is approximately 1075 psia which occurs about one minute into the event. Since this peak pressure is well below the set pressure for main steam system atmospheric dump valves and main steam safety valves, the valves will not lift during this transient.

Observation #7:

Why not 102% power; do assumptions satisfy licensing basis; any exceptions? [Attachment 1, Section 4.2.3.4.1, Page 4-18)

FPL Energy Seabrook Response:

All SPU analyses were performed at the analyzed SPU core power level of 3659 MWt (3678 MWt NSSS power level) which is 102% of the requested licensed core power level (3587 MWt). All assumptions satisfy the licensing basis.

Observation #8:

Why are "best estimate" values used? Is this consistent with licensing basis? [Attachment 1, Table 8.2-1, Page 8-5]

FPL Energy Seabrook Response:

The "best estimate" discussion / clarification in Note 1 for the heat balance parameter entries contained in LAR Attachment 1, Table 8.2-1 (page 8-5), was provided to differentiate these BOP parameters from the similar main steam flow values presented in the "Design Operating Parameters" presented in LAR Attachment 1, Table 2.3-1 (page 2-3). The information contained in LAR Attachment 1, Table 2.3-1 is used for various NSSS accident analyses and thus may be different.

The current and SPU parameters summarized in LAR Attachment 1, Table 8.2-1, were developed based on conservative design heat balance models which were "tuned" to correspond to the current plant performance (Refer to LAR Attachment 1, Section 8.2, page 8-3). The parameters provided in LAR Attachment 1, Table 8.2-1 were developed utilizing heat balances based on an analyzed SPU core power level of 3659MWt (3678 MWt NSSS power level) which is 102% of the requested licensed core power level of 3587 MWt. Margin was also provided in the hydraulics analysis of the condensate and feedwater pump capacity to account for potential pump wear. Thus, the parameters provided in this table are conservative and consistent with the licensing basis.

Observation #9:

No details about the turbine-generator evaluation, overspeed protection, auxiliaries are provided, just conclusion. [Attachment 1, Section 8.3 Pages 8-11/12)

FPL Energy Seabrook Response:

Turbine Generator

The evaluation of the turbine-generator and associated auxiliary equipment is summarized in LAR Attachment 1, Subsection 8.3 (page 8-11). The following supplemental information provides additional details of the evaluation.

The evaluation, performed by General Electric Energy Services (GE), assessed the impact of increases in throttle flow on the Seabrook Station turbine-generator at the corresponding rated throttle pressure. These evaluations were based on the heat balances for SPU flow conditions and output increases at the analyzed core power level of 3659 MWt (3678 MWt NSSS power level).

The objective of the evaluation was to maintain adequate design margins, to provide long life and trouble-free operation, and to meet the SPU objectives for performance and capacity. To achieve these objectives, these evaluations examined whether any modification and replacement requirements would be necessary to implement operation of the unit at SPU steam conditions.

GE engineering practice is to maintain adequate design margins when evaluating an existing turbine-generator unit for operation at an uprated condition to ensure high standards of reliability and output at the uprated operating conditions. Therefore, the bases of the SPU evaluations were to evaluate the actual mechanical margins that exist in the turbine-generator at the SPU design conditions relative to the current design standards and to determine if there were technical issues with operating the unit at the SPU conditions.

Thermodynamic, mechanical, and operational scenarios were considered and evaluated at the SPU conditions that produce the maximum stress levels. Components were evaluated on the basis of these SPU conditions, and where applicable, recommendations were made to replace or modify turbine-generator components. This design philosophy was intended to result in reliability and integrity equivalent to what would be expected for a new unit designed for the same steam conditions and service. GE will design the new components provided for the high pressure turbine modification to current GE engineering design standards.

New turbine steam specification data were developed for the SPU conditions using the thermodynamic cycle specifications for the SPU valves wide open conditions which are in excess of the SPU analyzed power level mentioned above. Analyses were performed in the following areas using the new turbine steam data:

- Steam specifications for each turbine stage, including temperature and pressure absolute levels, pressure differentials, and expected stage kilowatt outputs;
- Shells, casings, and bolting at the increased temperature and pressure levels;

- Stationary steam path components for increased temperature and pressure levels, and pressure differentials;
- Turbine bucket stresses for the expected increased stage outputs;
- Rotors for increased torsional loads;
- Couplings for increased torsional loads and output transmission (including bolting);
- Rotor dynamics and stability;
- Increased thrust loads and potential thrust imbalances;
- Increased journal bearing loads and temperatures;
- Review of turbine piping and relief valves;
- Stop, control, and combined intermediate valves for increased flows and pressures;
- The valves wide open mechanical review of the turbine evaluated steady-state, impact, and
- Vibratory stresses due to abnormal operations that might affect the turbine operation. Typical steady-state stresses are wheel and rotor torsional loadings, bucket steam-bending stresses, and pressure differential loadings across shells, casings and diaphragms.

Shells and Casings:

The shells, casings and horizontal bolting of the Seabrook Station turbine were evaluated for SPU operation at the elevated pressure levels throughout the turbine consistent with the throttle pressure of 979.3 psia at valves wide open. The review included analysis of shell stresses; bending, shear, and crush stresses for the diaphragm ledges; ledge thickness; and horizontal joint bolting. The in-service shells, casings and bolting all have adequate design margin for continued reliable service under the SPU conditions and, therefore, no modifications to these components are necessary.

First Stage Nozzle Plates and Diaphragms:

The first stage nozzles and subsequent high pressure turbine diaphragms were not evaluated, as they will be replaced as part of the high pressure turbine modifications. The low pressure turbine diaphragms were evaluated for the SPU steam conditions and valves wide open operation. The results demonstrated that the low pressure turbine diaphragms have adequate structural design margins for operation at the SPU steam conditions. The small change in the steam moisture content associated with the power SPU has negligible effect on the erosion/corrosion of the steam path components.

The maintenance history on the current turbine shows that the diaphragms have required only normal maintenance.

Turbine Buckets:

The Seabrook Station turbine consists of seven double-flow high pressure stages in a turbine shell casting and three sets of seven double-flow low pressure stages in three separate exhaust hoods. The method of evaluating the dynamic stress of buckets, other than the first stage or standard-design latter low pressure stage buckets, is through the use of a calculated parameter termed the load factor. The first high pressure stage buckets are exposed to special loadings, which are governed by other design criteria. These other design factors affect the performance of the bucket row during startups and off-peak load operation.

The load factor was developed as a design parameter and was based on an evaluation of the steam bending moments and stress, and on a comparison of this value with operating experience. The first stage buckets and subsequent high pressure buckets were not evaluated, as they will be replaced as part of the high pressure turbine modifications. With the steam flow increase for the SPU, the load bucket factors for each stage increase for all seven low pressure turbine bucket stages. For the SPU valves wide open steam conditions, the buckets will remain within the normal design limits and therefore, are acceptable for the SPU. The low pressure turbine stage temperature increases were calculated to be small and would thus have a negligible effect on the bucket and rotor material strength. All other bucket stresses, such as the centrifugal stress, are within the allowables for the original and SPU steam conditions.

Turbine Rotors:

A mechanical review of the turbine rotors was conducted to evaluate steady-state, vibratory, and upset stress conditions that are affected by the SPU steam conditions and loadings. Typical steady-state stresses are wheel and rotor torsional loadings and steam bending stresses. Rotor dynamics and stability, as well as rotor critical speeds and bucket group vibration, are examples of vibratory reviews that were conducted to ensure that the latest GE technology is applied in evaluating the turbine design for SPU steam conditions and flow capacity. In addition, the rotors were evaluated for transient and impulse step conditions such as synchronization out-of-phase and short circuiting of a line to ground fault. These factors can impose impact loadings on the shaft and couplings that are significantly larger than those experienced when operating at steady state. These situations were reviewed to determine if the currently installed rotors could be reliably operated at the SPU conditions based on the latest GE design criteria. The review analysis indicates that steady-state and upset conditions affecting the current rotor train are within normal design limits for the SPU conditions. Rotor multi-span critical speeds and rotor stability margins will also remain within design guidelines. There are no significant changes to the rotor assembly inertias and natural frequencies since these characteristics depend on the dimensional configuration of the rotating elements and steam temperatures. For this SPU, the Seabrook Station #2 high pressure rotor will be used, which has the same design as Seabrook Station #1 and all low pressure rotors will be re-used. The SPU only represents a small incremental change in the steam conditions.

During the development of the Seabrook Station turbine at the original design stage, several stresses and other requirements were independently evaluated. GE has followed a practice of using *screening limits* in order to minimize the number of mathematical iterations performed during this phase. Another limit, defined as *experience limit,* was also established and based on the experimental and operating experience of GE turbines. This limit was used as the maximum allowable stress that the turbine rotors could be operated without reliability concerns. The low pressure rotor torsional stresses increase by approximately 4% at the SPU valves wide open steam conditions as a result of the increased transmitted torque. At these design valves wide open steam conditions, the calculated rotor torsional steady-state stresses exceed normal *screening limits* for design at the number 6, 7 and 8 journal bearing locations. However, these stresses are within the *experience limit*, and therefore will be acceptable for the SPU conditions.

The short circuit and synchronization out-of-phase stress values are below the screening limit.

With re-use of the high pressure rotor design and re-use of the complete low pressure rotors for this SPU, the SPU condition has no effect on the turbine-generator rotor torsional frequency characteristics. No additional testing or analysis will be required with respect to the rotor torsional dynamics.

Steam Piping:

The main steam inlet piping and the crossaround piping were evaluated for the SPU steam conditions and valves wide open operation. The results demonstrated that this piping has adequate structural design margins for operation at the SPU steam conditions. The small change in the steam moisture content associated with the SPU has negligible effect on the erosion/corrosion of these pipe components. The steam flow velocities are acceptable at the SPU flow volumes. Therefore, no changes or modifications are required for the main steam piping and crossaround piping.

Valves:

The existing angle body main stop-control valve casings were designed for 1250 psig operating pressure, and therefore are adequate for the SPU steam conditions. The existing control valve operating cylinders are also adequate for the higher throttle pressure.

The pressure drop from the combined intercept valve inlet to the low pressure turbine bowl is approximately 3.4 %, and is expected to remain the same for the SPU because the increased low pressure flow is achieved entirely by a corresponding increase in crossaround pressure. The combined intercept valves are satisfactory for the SPU.

The steam flow velocities are acceptable at the SPU flow volumes. The control valves currently operate at 2 admissions and will continue to do so after SPU implementation. Therefore, no changes or modifications are required for the stop valves, control valves or combined intercept valves.

Thrust Review:

The present thrust bearing in the unit is located in the turbine standard between the double flow high pressure section and the low pressure turbine A hood. It is a Straddle Independently Mounted Bearing with an active area of 300 square inches. The turbines consist of opposed double-flow sections, and because of this symmetry, the unit is ideally balanced with the exception of the end-packing regions which have low pressure associated with small diameter step changes which result in low thrust. The current thrust bearing has adequate design margin and the SPU would not significantly change the total thrust of the unit and therefore no modification are needed for the thrust bearing.

The existing journal bearings are elliptical liner bearings. Since the bearing loadings will not be affected by the SPU steam conditions, the load carrying capacity of the bearings is adequate for the SPU conditions.

Moisture Separator Reheater Vessels:

The Seabrook Station moisture separator reheater system includes six cross-around relief valves between the moisture separator reheater vessels and the low pressure turbine inlets. While the moisture separator reheater vessel normal operating pressure will increase to around 190 psia with the SPU, this pressure will still be less than the 270 psig maximum pressure capability of the moisture separator reheater vessels. Crossaround relief valves protect the crossaround components from excessive pressure in case the intercept valves malfunction.

Allowable relief valve settings have been identified for reference purpose in order to assure that pressure limitations of the moisture separator reheater vessels are not exceeded. These allowable limits are met for the SPU steam conditions.

Turbine Lubricating Oil System:

Since no bearing modifications (journal bearings and thrust bearing) are required, the present lube oil system will be adequate and no modifications would be required for the SPU.

Rotor Train Overspeed Potential:

The increase in steam flow volumes will increase the potential for rotor overspeed during loss of load transients. An evaluation of overspeed potential has been performed by GE as part of the high pressure turbine modification redesign. The evaluation demonstrated that current overspeed trip settings will not have to be changed for the SPU conditions (see further discussion below).

Steam Seal System:

The basic design of the steam seal system will remain unchanged. The levels of change in the flows through the steam seal system are small and will not require any modifications to the retained components.

Unit History Review:

The GE Product Service records for this turbine were reviewed. The records reviewed included GE initiated field modifications, alignment records, and technical service communications between GE and Seabrook Station regarding turbine operation. The engineering records for this turbine were reviewed including original manufacturing deviation drawing records, field modification drawing records, and drawing records of spare parts provided. Nothing was found in any of the records that would affect the ability of this turbine to accommodate the SPU.

The generator review included the following components:

- Stator winding
- Stator core
- Rotor shaft
- Field winding
- High voltage bushings
- Current transformers
- Hydrogen gas cooling system
- Stator cooling water system
- ALTERREX excitation system

Turbine Missile Probability and Overspeed Setting

In addition to the mechanical review of the turbine rotors described above, wheel missile probabilities for the low pressure turbine rotors currently installed, in combination with the modified high pressure turbine, were recalculated. The results of this analysis demonstrated that the total probability of missile generation by the turbine, when operating at SPU conditions, will be less than the probability (P_1) stated in Section 3.5.1.3 of the Seabrook Station UFSAR, and therefore would be acceptable.

As mentioned above, the analysis and evaluation of the turbine performed by GE included a verification that the current overspeed trip setpoints remain acceptable.

Observation #10:

EFW: What elements of current licensing basis are affected; how does current capability compare with SPU capability (quantitative discussion); what is the licensing basis acceptance criteria; why acceptable?

FPL Energy Seabrook Response:

The current licensing basis of the Emergency Feedwater System is unaffected by the proposed SPU. As described in LAR Attachment 1, Subsections 4.2.3.4 and 8.4.4 (pages 4-17 and 8-22, respectively), the Emergency Feedwater System design requirements do not change for the proposed SPU and, hence, the system and components will continue to provide the required core decay heat removal for design basis events following the implementation of the proposed SPU. The Emergency Feedwater System will also continue to meet the requirements of General Design Criteria 4, 19, 34, and 44.

The flow requirements of the Seabrook Station Emergency Feedwater System are dictated by the accident analyses, including the Condition II limiting requirement of a total of 650 gpm from one Emergency Feedwater Pump. These limiting transients and accident analyses were performed to confirm that the Emergency Feedwater System capability is acceptable at the SPU conditions, and are described in LAR Attachment 1, Subsections 6.3.2, 6.3.3.2, and 8.4.4 (pages 6-72, 6-106, and 8-22, respectively). The analysis demonstrates that for the limiting transient and accident analyses, the Emergency Feedwater System is capable of removing the stored energy, residual decay heat, and reactor coolant pump heat, maintaining required steam generator level, and preventing the pressurizer from becoming water-solid.

The maximum required condensate storage tank capacity is based on the limiting event of loss-of-offsite power and is described in LAR Attachment 1, Subsection 4.2.3.4.1 (page 4-18) in further detail. The current licensing basis requires that in the event of loss-of-offsite power, sufficient condensate storage tank usable inventory must be available to bring the unit from full power to hot standby conditions, maintain the plant at hot standby for four hours, and then cooldown the reactor coolant system to the residual heat removal system cut-in temperature (350°F) in five hours. Since the required condensate storage tank storage inventory is a function of plant rated power and other NSSS design parameters, a new analysis was performed to determine required inventory for the range of NSSS parameters for the proposed SPU. The analysis concluded that a minimum usable inventory of 190,000 gallons meets the licensing basis for the SPU. Therefore, no change is required to the condensate storage tank Technical Specification limit of 212,000 gallons.

Additional Information Requested During the Telephone Conversation on April 27, 2004:

During the telephone conversation with the NRC on April 27, 2004, several questions were raised regarding the evaluation of flow accelerated corrosion associated with balance of plant systems. Provided below is a clarification of the flow accelerated evaluation presented in LAR Attachment 1.

Flow Accelerated Corrosion (FAC) Program

The intent of LAR Attachment 1, Subsection 9.1.3, "Flow Accelerated Corrosion Program," (page 9-2) was to address the impact of the SPU on all BOP systems currently in the Seabrook Station Flow Accelerated Corrosion Program, rather than address them individually in each BOP system section.

As summarized in LAR Attachment 1, Subsection 9.1.3, the primary objective of the Flow Accelerated Corrosion Program is to maintain the long-term process of flow accelerated corrosion detection and monitoring in piping systems, so that pipe wall thinning can be mitigated or reduced to prevent pipe failures. The major variables that affect the flow accelerated corrosion process have been identified as piping geometry, component internal geometry, piping material composition, fluid temperature, flow velocities, fluid chemistry (including pH and oxygen content), and moisture content. No changes to water chemistry are planned as a result of the SPU. Similarly, piping geometry, materials and associated components will not change. The remaining variables that could affect flow accelerated corrosion are fluid temperature, flow velocities, and moisture content.

The evaluations of the Main Steam, Extraction Steam, Condensate and Feedwater, and Heater and Moisture Separator Drains Systems are summarized in LAR Attachment 1, Subsections 8.4.1, 8.4.2, 8.4.3, and 8.4.8 (pages 8-13, 8-17, 8-18, and 8-28, respectively). These evaluations included an assessment of the changes in fluid temperature, flow velocities, and moisture content. In all cases, fluid temperature changes and moisture content changes as a result of the SPU were determined to be negligible. Velocity changes as a result of the SPU were also small (~5-8%), and in all cases remained within accepted industry standards and economic line sizing criteria. Changes to piping flow velocities are summarized in Table 3 below. Note that the intent of LAR Attachment 1, Table 9.1.3-1 (page 9-4) was to demonstrate that flow accelerated corrosion wear rates remained within acceptable limits for the worst case piping system. These results would bound the effects of the SPU on other systems.

Piping systems that are susceptible to flow accelerated corrosion are currently modeled using the EPRI CHECWORKS computer program. As part of the implementation of the SPU, the current computer program will be revised to include the post-SPU operating parameters, including flow, temperature, pressure, and steam quality. The revised model will predict the new flow accelerated corrosion wear rates expected after the SPU, and these results will be utilized to select the inspection points required to establish new baseline data for significant wear areas. During the refueling outage prior to the SPU implementation, the number of inspection points will be increased to include both those normally scheduled, and also the added points selected to obtain new baseline data. Following the SPU, Flow Accelerated Corrosion Program activities will be continued to monitor wear, and to take required corrective action during future plant operation.

TABLE 3
SEABROOK STATION
BALANCE OF PLANT SYSTEM FLOW VELOCITIES

LAR Subsection 8.4.1 - Main Steam System	**CURRENT**	**SPU**
Main Steam Header – Flow Velocity (fps)	118	124

LAR Subsection 8.4.2 – Extraction Steam System						
	Extraction Steam to 26 Feedwater Heaters		Extraction Steam to 25 Feedwater Heaters		Extraction Steam to 24 Feedwater Heaters	
	CURRENT	**SPU**	**CURRENT**	**SPU**	**CURRENT**	**SPU**
Flow Velocity (fps)	119	150	148	183.1	101.8	109.8
	Extraction Steam to 23 Feedwater Heaters		Extraction Steam to 22 Feedwater Heaters		Extraction Steam to 21 Feedwater Heaters	
	CURRENT	**SPU**	**CURRENT**	**SPU**	**CURRENT**	**SPU**
	173	178	204	206	180	179

LAR Subsection 8.4.3 – Condensate And Feedwater Systems	**CURRENT**	**SPU**
Flow Velocities (fps) - '/' separates different piping sizes		
Hotwell to Condensate Pump Header	2.7	2.8
Condensate Pump Header (Main Header / Pump Inlet)	3.9 / 5.1	4.1 / 5.4
Condensate Pump Discharge to Steam Packing Exhauster (Pump Outlet / Packing Exhauster Inlet)	8.5 / 7.3	9.0 / 7.8
Steam Packing Exhauster to #21 Feedwater Heaters (Packing Exhauster Outlet / Heater Inlet)	7.3 / 8.2	7.8 / 8.7
Number 21 to 22 Feedwater Heaters.	8.4	8.9
Number 22 to 23 Feedwater Heaters (#22 Outlet / Common / #23 Inlet)	8.5 / 7.6 / 8.5	9.1 / 8.1 / 9.1
Number 23 to 24 Feedwater Heaters	8.8	8.9
Number 24 to 25 Feedwater Heaters (#24 Outlet / Common / #25 Inlet)	9.0 / 8.0 / 9.3	9.6 / 8.5 / 9.9
Number 25 to Feedwater Pump Suction	9.6	10.2
Feedwater Pump Suction	19.8	21.6
Feedwater Pump Discharge to #26 Feedwater Heaters (Pump Discharge / #26 Inlet)	23 / 16.0	25 / 17.3
#26 Feedwater Heaters to Steam Generators (#26 Outlet / Steam Generator Inlet)	16.9 / 19.1	18.5 / 20.8

LAR Subsection 8.4.8 – Heater Drains	**CURRENT**	**SPU**
Flow Velocities (fps) - '/' separates different piping sizes		
Moisture Separator Reheater to Heater Drain Tank	0.6 / 1.0	0.8 / 1.3
Reheater Drain Tank to #26 Feedwater Heaters	4.2	4.0

	#26 Feedwater Heaters to #25 Feedwater Heaters		#25 Feedwater Heaters. to Heater Drain Tank		#24 Feedwater Heaters to #23 Feedwater Heaters	
	CURRENT	**SPU**	**CURRENT**	**SPU**	**CURRENT**	**SPU**
Flow Velocity (fps)	4.4 / 10.4	4.6 / 10.8	5.3	5.5	3.9	4.2
	#23 Feedwater Heaters to #22 Feedwater Heaters		#22 Feedwater Heaters to #21 Feedwater Heaters		#21 Feedwater Heaters to Condenser	
	CURRENT	**SPU**	**CURRENT**	**SPU**	**CURRENT**	**SPU**
	5.8	6.2	3.4	4.3	3.7 / 12.1	3.9 / 12.8

Enclosure 2 to NYN-04047

Specific NRC Information Request

DRAFT REQUEST FOR ADDITIONAL INFORMATION

RELATED TO POWER UPRATE LICENSE AMENDMENT REQUEST

SEABROOK STATION

DOCKET NO. 50-443

By letter dated March 17, 2004, FPL Energy Seabrook, LLC (Seabrook or the licensee) submitted an amendment request. The proposed amendment would increase the maximum authorized reactor core power level for Seabrook from 3411 megawatt thermal (MWt) to 3587 MWt. This represents a nominal increase of 5.16% rated thermal power.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the information the licensee provided that supports the proposed amendment and requests the following additional information to clarify the submittal:

Based on our review of the licensee's submittal dated March 17, 2004, regarding a request for NRC to approve a stretch power uprate (SPU) for Seabrook, it has been determined that the licensee's submittal needs to be supplemented and documented with the following additional information in order to complete our acceptance review:

- The submittal should identify those BOP areas (Matrix 5 of RS-001) that are potentially impacted from a safety perspective (including consideration of licensing basis criteria and commitments that have been made) as a result of the proposed SPU, and those that are not impacted (provide explanation for the "no safety impact determination," such as the original design-basis analysis is bounding). This will help to focus NRC review effort and expedite the completion of the review.
    + The SPU evaluation of BOP systems (Matrix 5 of RS-001) should include consideration of all design and licensing basis criteria that apply, including any commitments that have been made. Any instances where the plant licensing basis or commitments are not being satisfied as a result of the SPU should be specifically identified and justified in accordance with 10 CFR 50.59 requirements and the licensee's commitment tracking and control program.
- For those BOP areas (Matrix 5 of RS-O01) that are potentially impacted:
    + All instances where existing design and licensing basis criteria and commitments are not satisfied under SPU, where criteria are not used consistently, or where SPU conditions are not bounded by previous analyses, should be clearly identified, discussed in detail (including impact on plant operation), and fully justified. This would include (for example) any changes in analytical methodologies or assumptions, taking credit for additional operator actions or crediting operator response times that are less conservative than previously assumed, and failure to satisfy design specifications. A summary listing of any exceptions should be included in the submittal to facilitate NRC review.

ATTACHMENT

  + AU instances where SPU conditions will result in challenges to SOP equipment or marginal performance that could have a safety impact should be highlighted for NRC review and consideration.
  + Measures for assuring compliance with vendor recommendations and standard industry practice, including any restrictions that will be placed on plant operation, should be discussed. Operation that could impact safety that is contrary to existing criteria, vendor recommendations, and/or applicable industry standards should be fully justified.
  + The considerations referred to in the Regulatory Evaluation Sections of RS-001, Section 3.3, Insert 5, should be addressed.

- Acceptance should be based on satisfying all existing licensing-basis criteria, including applicable commitments that have been made. A summary of the basis for acceptance, including a brief discussion of the bounding considerations and acceptance criteria that are impacted by SPU; analyses that have been completed; and a comparison of the existing capability vs. the capability following SPU implementation vs. the licensing-basis acceptance criteria should be included for each area of review.
- A discussion of the startup testing program, including a description of how analytical conclusions will be confirmed, should be provided (see RS-O01 for guidance). In particular, where existing design criteria will not be satisfied or marginal performance is expected under SPU conditions, plant performance should be confirmed during plant startup and initial full power operation against suitable acceptance criteria.

Specific Observations:

1. Does methodology satisfy licensing basis criteria in all respects; are there any exceptions? [Attachment 1, Section 1.2, Pages 1-4, 1-5)
2. What "expectations" of RS-0O1 are not satisfied? [Attachment 1, Section 1.3, Page 1-8)
3. With respect to Note 1, what about any impact due to plant modifications? Also, there should not be two different "Note 1', listings. [Attachment 1, Table 1.3-5, Page 1-12]
4. The NSSS parameter acceptance criteria should include "within the bounds of the existing licensing basis." [Attachment 1, page 2-2, Section 2.4]
5. With respect to Note 1, is this consistent with the plant licensing basis? [Attachment 1, Table 4.1-1, Page 4-10]
6. Why is criteria ok? What is steam generator pressure increase following load rejection? What was original licensing basis criteria? [Attachment 1, Section 4.2.3.3.2, Page 4-17]
7. Why not 102% power; do assumptions satisfy licensing basis; any exceptions? [Attachment 1, Section 4.2.3.4.1, Page 4-18)

8. Why are "best estimate" values used? Is this consistent with licensing basis? [Attachment 1, Table 8.2-1, Page 8-5]
9. No details about the turbine-generator evaluation, overspeed protection, auxiliaries are provided, just conclusion. [Attachment 1, Section 8.3 Pages 8-11/12)
10. EFW: What elements of current licensing basis are affected; how does current capability compare with SPU capability (quantitative discussion); what is the licensing basis acceptance criteria; why acceptable?

ATTACHMENT

Enclosure 3 to NYN-04047

No Significant Hazards Consideration Analysis

NO SIGNIFICANT HAZARDS CONSIDERATION ANALYSIS

The proposed license amendment (LAR 04-03) will revise the Seabrook Station facility operating license NPF-86 and the Technical Specifications to increase the licensed core thermal power by approximately 5.2% from 3411 megawatts thermal (MWt) to 3587 MWt. FPL Energy Seabrook, LLC (FPL Energy Seabrook) evaluated the following Seabrook Station UFSAR Chapter 15 accidents at the increased power level using NRC approved methodologies.

- Loss of coolant accidents
- Steam generator tube rupture
- Excessive heat removal due to Feedwater System malfunctions
- Excessive increase in secondary steam flow
- Inadvertent opening of a steam generator dump, relief, or safety valve
- Steam system piping failure
- Loss of external load / turbine trip
- Loss of normal Feedwater flow
- Loss of nonemergency AC power to plant auxiliaries
- Feedwater System pipe break
- Partial and complete loss of reactor coolant flow
- Reactor coolant pump locked rotor / shaft break
- Uncontrolled rod control cluster assembly bank withdrawal from a subcritical condition
- Uncontrolled rod control cluster assembly bank withdrawal at power
- Rod control cluster assembly misoperation
- Chemical and Volume Control System malfunction that results in a decrease in boron concentration in the Reactor Coolant System
- Inadvertent loading and operation of a fuel assembly in an improper position
- Spectrum of rod control cluster assembly ejection accidents
- Inadvertent operation of Emergency Core Cooling System during power operation
- Chemical and Volume Control System malfunction that increases reactor coolant inventory
- Inadvertent opening of a pressurizer safety or relief valve
- Anticipated transient without scram
- Station blackout

In accordance with 10 CFR 50.92, FPL Energy Seabrook has concluded that the proposed changes do not involve a significant hazards consideration. The basis for the conclusion that the proposed changes do not involve a significant hazards consideration is as follows:

1. **The proposed amendment would not involve a significant increase in the probability or consequences of an accident previously evaluated.**

   Results of the analyses of the events listed above at the increased core thermal power continue to satisfy each event's acceptance criteria and the probability of occurrence remains within the previously analyzed ranges and therefore there is no significant change. The consequences of previously evaluated accidents are not adversely affected by the proposed changes. An evaluation of structures, systems and components (SSC), including interface and control systems that could be affected by the proposed change in the core thermal power was performed. Structures, systems and components will continue to perform their design function and performance requirements for these systems will continue to be satisfied. The proposed changes do not increase the likelihood of a failure of a SSC needed to mitigate the consequences of an accident. In addition, the proposed changes were determined not to initiate an accident of any kind.

   Dose consequences of the events were evaluated at the increased core thermal power using the alternate source term methodology. The evaluations demonstrated that the dose rates to the general public and Seabrook Station personnel remain within the regulatory limits specified in 10 CFR 100 and therefore there is no significant change.

   Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously analyzed.

2. **The proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.**

   No new accident scenarios, failure mechanisms, or limiting single failures are introduced as a result of the proposed increased core thermal power. The change has no adverse affect on any safety-related system and does not change the design function, operation or integrity of any safety-related system. Additionally, no new safety-related equipment is being added or replaced as a result of the proposed change.

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

3. **The proposed changes do not involve a significant reduction in a margin to safety.**

   Results of the analyses of the events listed above at the increased core thermal power continue to satisfy each event's acceptance criteria. Safety margins for fission product barriers and equipment required to prevent or mitigate the consequences of an accident are not adversely affected by the proposed change. Changes in setpoints for actuation of equipment necessary to mitigate the consequences of an accident do not adversely affect the outcome of any postulated accident.

The dose rates for the events remain below the regulatory limits specified in 10 CFR 100 for the general public and Seabrook Station personnel. Operation at the increased power level will not challenge the integrity of any fission product barrier. Plant systems will continue to be operated with sufficient operating margin and within existing design and safety limits. Operator response to emergency and off-normal plant conditions are not adversely affected. Therefore, the proposed changes do not involve a significant reduction in a margin to safety.

Based on the above, FPL Energy Seabrook concludes that the proposed changes do not constitute a significant hazards consideration.