Attachment 5 Contains Proprietary Information
Withhold Attachment 5 from public disclosure under 10 CFR 2.390

NEXTera ENERGY SEABROOK

June 12, 2014

10 CFR 2.390
10 CFR 50.90

SBK-L-14090
Docket No. 50-443

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Seabrook Station

Supplement to License Amendment Request 13-05, Fixed Incore Detector System Analysis Methodology

References:

1. NextEra Energy Seabrook, LLC letter SBK-L-13121, "License Amendment Request 13-05, Fixed Incore Detector System Analysis Methodology," September 10, 2013 (ML13260A160)

2. NRC letter "Seabrook Station, Unit No. 1 - Request for Additional Information for License Amendment Request 13-05, Fixed Incore Detector System Analysis Methodology," February 10, 2014 (ML14034A381, ML14034A366)

3. NextEra Energy Seabrook, LLC letter SBK-L-14049, "Response to Request for Additional Information Regarding License Amendment Request 13-05, Fixed Incore Detector System Analysis Methodology," March 12, 2014 (ML14078A059)

In Reference 1, NextEra Energy Seabrook, LLC (NextEra) submitted License Amendment Request (LAR) 13-05 to revise the Seabrook Station Technical Specifications (TS). The proposed change revises TS 6.8.1.6.b, Core Operating Limits Report, by adding AREVA Licensing Report ANP-3243P, "Seabrook Station Unit 1 Fixed Incore Detector System Analysis Supplement to YAEC-1855PA," which supplements and modifies the previously approved methodology in YAEC-1855PA, "Seabrook Station Unit 1 Fixed Incore Detector System Analysis," October, 1992. The proposed change also modifies the surveillance requirements associated with the heat flux hot channel factor and nuclear enthalpy rise hot channel factor to include revised uncertainty values when measurement is obtained using the fixed incore detector system.

ADD1
NRR

In Reference 2, the NRC staff requested additional information to support its review of the LAR, and NextEra provided the additional information in Reference 3. Following subsequent discussions with the NRC staff regarding the requested additional information, NextEra determined that a supplement to the LAR would address the staff's concern with the proposed changes. As a result, the enclosure to this letter supplements the information provided in Reference 1.

The enclosure to this letter contains five attachments. Attachment 1 provides markups of the TS pages showing the revised proposed changes. This attachment replaces the markup of the TS pages provided as Attachment 1 in Reference 1. Attachment 2 contains a revised markup of the TS Bases showing the proposed changes and replaces Attachment 5 in Reference 1.

Attachments 3 and 5 contain non-proprietary and proprietary versions, respectively, of AREVA document ANP-3243P, Seabrook Station Unit 1 Fixed Incore Detector System Analysis Supplement to YAEC-1855PA, Revision 1. Attachments 3 and 5 supersede Attachments 4 and 2, respectively, in Reference 1.

Attachment 5 contains information proprietary to AREVA and is supported by an affidavit in Attachment 4 signed by AREVA, the owner of the information. The affidavit sets forth the basis on which the information may be withheld from public disclosure and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR 2.390. Accordingly, NextEra requests that the information proprietary to AREVA be withheld from public disclosure in accordance with 10 CFR 2.390.

This supplement to LAR 13-05 does not alter the conclusion in Reference 1 that the change does not present a significant hazards consideration pursuant to 10 CFR 50.92.

No new or revised commitments are made as a result of this letter.

Should you have any questions regarding this letter, please contact Mr. Michael Ossing, Licensing Manager, at (603) 773-7512.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on June 12, 2014

Sincerely,

Dean Curtland
Site Vice President
NextEra Energy Seabrook, LLC

Enclosure

cc: NRC Region I Administrator
NRC Project Manager
NRC Senior Resident Inspector

Director Homeland Security and Emergency Management
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ENCLOSURE

Supplement to License Amendment Request 13-05, Fixed Incore Detector System Analysis Methodology

Supplement to
License Amendment Request 13-05,
"Fixed Incore Detector System Analysis Methodology"

Table of Contents

1.0 Description

In Reference 1, NextEra Energy Seabrook, LLC (NextEra) submitted License Amendment Request (LAR) 13-05 to the Technical Specifications (TS) for Seabrook Station. The proposed change would revise TS 6.8.1.6.b, Core Operating Limits Report, by adding AREVA Licensing Report ANP-3243P, "Seabrook Station Unit 1 Fixed Incore Detector System Analysis Supplement to YAEC-1855PA," which supplements and modifies the previously approved methodology in YAEC-1855PA, "Seabrook Station Unit 1 Fixed Incore Detector System Analysis," October, 1992. The proposed change also modifies the surveillance requirements associated with the heat flux hot channel factor and nuclear enthalpy rise hot channel factor to include revised uncertainty values when measurement is obtained using the fixed incore detector system (FIDS).

In Reference 2, the NRC transmitted a Request for Additional information (RAI) on LAR 13-05, and NextEra submitted the response to that RAI in Reference 3. In subsequent discussions between NextEra and the NRC, the staff raised concerns regarding the uncertainty analysis performed for the FIDS analysis system and described in both YAEC-1855PA and ANP-3243P. In order to appropriately address these concerns, the uncertainty analysis for the FIDS analysis system has been performed using a methodology more representative of the true measurement uncertainty of the FIDS analysis system.

This supplement to LAR 13-05 provides a revision to AREVA Licensing Report ANP-3243P, "Seabrook Station Unit 1 Fixed Incore Detector System Analysis Supplement to YAEC-1855PA," replacing the uncertainty analysis of the FIDS analysis system with a new uncertainty analysis. The uncertainty analysis in Revision 0 of ANP-3243P followed the uncertainty analysis methodology described in YAEC-1855PA to determine the accuracy of the system with the proposed modifications to the FIDS analysis methodology. The new uncertainty analysis in Revision 1 of ANP-3243P determines the measurement uncertainty for the F_Q and $F_{\Delta H}$ TS surveillance parameters with the proposed modifications to the FIDS analysis methodology following an uncertainty analysis methodology that is more representative of the true measurement uncertainty.

The measurement of a core power distribution is built upon a series of comparisons between measured incore signals and predicted incore signals in instrumented locations of the core, and expansion of the resultant power distribution data to non-instrumented locations. In YAEC-1855PA the uncertainty for detector processing is calculated by comparing detector signals measured at various core conditions to predictions of the detector signals at these same core conditions. While the FIDS uncertainty based on the difference between measured and predicted detector signals is conservatively bounding, it is not a good representation of the true measurement uncertainty. The YAEC-1855PA uncertainty analysis is replaced by a method that propagates the uncertainties through the FIDS analysis system using a Monte Carlo statistical simulation and determines a better representation of the true measurement uncertainty for F_Q and $F_{\Delta H}$ over a wide range of conditions.

The revision to ANP-3243P continues to support the conclusion that the revised FIDS analysis methodology remains comparable in accuracy and functionality to the original YAEC-1855PA methodology and moveable incore detector system (MIDS).

The results of this uncertainty analysis require the modification of the previously proposed changes to Technical Specifications (TS) 4.2.2.2.b, 4.2.2.3 and 6.8.1.6.b.10. Although the results of the new uncertainty analysis determined slightly lower measurement uncertainty values for the FIDS analysis methodology, use of measurement uncertainty values of 4.0% for $F_{\Delta H}$ and 5.0% for F_Q are proposed for consistency with the measurement uncertainty values for the MIDS.

2.0 Proposed Technical Specification Changes

TS mark-ups are provided in Attachment 1, and a summary of the affected TSs follows. The discussion below shows the TS changes as originally proposed in LAR 13-05 and then shows the TS changes as proposed in this supplement to LAR 13-05. The changes to the existing TS are shown with strikeouts and bolded italic insertions.

- 4.2.2.2.b

  The proposed TS submitted with LAR 13-05:

  > Increasing the measured $F_Q(Z)$ component of the power distribution map by 3% to account for manufacturing tolerances and further increasing the value by 5% when using the moveable incore detectors or 5.~~21~~***35***% when using the fixed incore detectors to account for measurement uncertainties.

  The proposed new wording is as follows:

  > Increasing the measured $F_Q(Z)$ component of the power distribution map by 3% to account for manufacturing tolerances and further increasing the value by 5% ~~when using the moveable incore detectors or 5.21% when using the fixed incore detectors~~ to account for measurement uncertainties.

- 4.2.2.3.

  The proposed TS submitted with LAR 13-05:

  > When $F_Q(Z)$ is measured for reasons other than meeting the requirements of Specification 4.2.2.2, an overall measured $F_Q(Z)$ shall be obtained from a power distribution map and increased by 3% to account for manufacturing tolerances and further increased by 5% when using the moveable incore detectors or 5.~~21~~***35***% when using the fixed incore detectors to account for measurement uncertainty.

The proposed new wording is as follows:

When $F_Q(Z)$ is measured for reasons other than meeting the requirements of Specification 4.2.2.2, an overall measured $F_Q(Z)$ shall be obtained from a power distribution map and increased by 3% to account for manufacturing tolerances and further increased by 5% ~~when using the moveable incore detectors or 5.21% when using the fixed incore detectors~~ to account for measurement uncertainty.

- 6.8.1.6.b.10

The proposed TS submitted with LAR 13-05:

10. YAEC-1855PA, "Seabrook Station Unit 1 Fixed Incore Detector System Analysis," October, 1992.

    ANP-3243P, "Seabrook Station Unit 1 Fixed Incore Detector System Analysis Supplement to YAEC-1855PA," Revision 0, July 2013.

    Methodology for Specification:

    3.2.1 - AXIAL FLUX DIFFERENCE

    3.2.2 - Heat Flux Hot Channel Factor

    3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor

The proposed new wording is as follows:

10. YAEC-1855PA, "Seabrook Station Unit 1 Fixed Incore Detector System Analysis,"October, 1992.

    ANP-3243P, "Seabrook Station Unit 1 Fixed Incore Detector System Analysis Supplement to YAEC-1855PA," Revision 1, May 2014.

    Methodology for Specification:

    3.2.1 - AXIAL FLUX DIFFERENCE

    3.2.2 - Heat Flux Hot Channel Factor

    3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor

3.0 Regulatory Evaluation

The uncertainty analysis methodology in ANP-3243P, Revision 1 is similar to that employed by the Reference 4 and 5 core power distribution monitoring systems previously reviewed and approved by the NRC.

This submittal does not alter the significant hazards consideration or the environmental assessment previously submitted with LAR 13-05 in Reference 1.

4.0 References

1. Seabrook Station License Amendment Request 13-05, "Fixed Incore Detector System Analysis Methodology," SBK-L- 13121, September 10, 2013.
2. NRC letter to Seabrook Station, "Seabrook Station, Unit No. 1 – Request for Additional Information for License Amendment Request 13-05, Fixed Incore Detector System Analysis Methodology, (TAC No. MF2751)," February 10, 2014.
3. Seabrook Station Response to Request for Additional Information Regarding License Amendment Request 13-05, "Fixed Incore Detector System Analysis Methodology," SBK-L-14049, March 12, 2014.
4. R. Kochendarfer, "Statistical Universal Power Reconstruction with Fixed Margin Technical Specifications," ANP-10301P-A. AREVA, Inc., September 2013.
5. R. Kochendarfer, C. T. Rombaugh and A.Y. Cheng, "Fixed Margin Technical Specifications," BAW-10158P-A. Babcock and Wilcox, August 1986.

ATTACHMENT 1

Marked-up Technical Specification Pages

SURVEILLANCE REQUIREMENTS

4.2.2.1 The provisions of Specification 4.0.4 are not applicable.

4.2.2.2 $F_Q(Z)$ shall be evaluated to determine if $F_Q(Z)$ is within its limits by:

a. Using the incore detectors to obtain a power distribution map at any THERMAL POWER greater than 5% of RATED THERMAL POWER.

b. Increasing the measured $F_Q(Z)$ component of the power distribution map by 3% to account for manufacturing tolerances and further increasing the value by 5% ~~when using the moveable incore detectors or 5.21% when using the fixed incore detectors~~ to account for measurement uncertainties.

c. Satisfying the following relationship:

$$F_Q^M(Z) \leq \frac{F_Q^{RTP} \times K(Z)}{P \times W(Z)} \quad \text{for } P > 0.5$$

$$F_Q^M(Z) \leq \frac{F_Q^{RTP} \times K(Z)}{0.5 \times W(Z)} \quad \text{for } P \leq 0.5$$

where $F_Q^M(Z)$ is the measured $F_Q(Z)$ increased by the allowances for manufacturing tolerances and measurement uncertainty, F_Q^{RTP} is the F_Q limit, K(Z) is the normalized $F_Q(Z)$ as a function of core height, P is the relative THERMAL POWER, and W(Z) is the cycle dependent function that accounts for power distribution transients encountered during normal operation. F_Q^{RTP}, K(Z), and W(Z) are specified in the COLR.

d. Measuring $F_Q^M(Z)$ according to the following schedule:

1) Upon achieving equilibrium conditions after exceeding by 20% or more of RATED THERMAL POWER, the THERMAL POWER at which $F_Q(Z)$ was last determined*, or

2) At least once per 31 Effective Full Power Days (EFPD), whichever occurs first.

* During power escalation at the beginning of each cycle, power level may be increased until a power level for extended operation has been achieved and a power distribution map obtained.

g. The limits specified in Specification 4.2.2.2.c, 4.2.2.2.e, and 4.2.2.2.f above are not applicable in the following core plane regions:

1) Lower core region from 0 to 10%, inclusive.

2) Upper core region from 90 to 100%, inclusive.

4.2.2.3 When $F_Q(Z)$ is measured for reasons other than meeting the requirements of Specification 4.2.2.2, an overall measured $F_Q(Z)$ shall be obtained from a power distribution map and increased by 3% to account for manufacturing tolerances and further increased by 5% ~~when using the moveable incore detectors or 5.21% when using the fixed incore detectors~~ to account for measurement uncertainty.

4.2.2.4 (THIS SPECIFICATION NUMBER IS NOT USED)

6.8.1.6.b (Continued)

8. YAEC-1856P, "System Transient Analysis Methodology Using RETRAN for PWR Applications," December, 1992.

   Methodology for Specification:
   2.2.1 - Limiting Safety System Settings
   3.1.1.3 - Moderator Temperature Coefficient
   3.1.3.5 - Shutdown Rod Insertion Limit
   3.1.3.6 - Control Rod Insertion Limits
   3.2.1 - AXIAL FLUX DIFFERENCE
   3.2.2 - Heat Flux Hot Channel Factor
   3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor

9. YAEC-1752, "STAR Methodology Application for PWRs, Control Rod Ejection, Main Steam Line Break," October, 1990.

   Methodology for Specification:
   3.1.1.3 - Moderator Temperature Coefficient
   3.1.3.5 - Shutdown Rod Insertion Limit
   3.1.3.6 - Control Rod Insertion Limits
   3.2.1 - AXIAL FLUX DIFFERENCE
   3.2.2 - Heat Flux Hot Channel Factor
   3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor

10. YAEC-1855PA, "Seabrook Station Unit 1 Fixed Incore Detector System Analysis," October, 1992.

INSERT →

   Methodology for Specification:
   3.2.1 - AXIAL FLUX DIFFERENCE
   3.2.2 - Heat Flux Hot Channel Factor
   3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor

11. YAEC-1624P, "Maine Yankee RPS Setpoint Methodology Using Statistical Combination of Uncertainties - Volume 1 - Prevention of Fuel Centerline Melt," March, 1988.

   Methodology for Specification:
   3.2.1 - AXIAL FLUX DIFFERENCE
   3.2.2 - Heat Flux Hot Channel Factor
   3.2.3 - Nuclear Enthalpy Rise Hot Channel Factor

INSERT

ANP-3243P, "Seabrook Station Unit 1 Fixed Incore Detector System Analysis Supplement to YAEC-1855PA," Revision 1, May 2014.

ATTACHMENT 2

Marked-up Technical Specification Bases Page (Information Only)

3/4.2.2 and 3/4.2.3 HEAT FLUX HOT CHANNEL FACTOR and NUCLEAR ENTHALPY RISE HOT CHANNEL FACTOR (Continued)

$F^N_{\Delta H}$ will be maintained within its limits provided Conditions a. through d. above are maintained. Margin is maintained between the safety analysis limit DNBR and the design limit DNBR. There is additional margin available to offset any other DNBR penalties and for plant design flexibility.

uncertainties

When an $F_Q(Z)$ measurement is taken, an allowance for both measurement ~~error~~ and manufacturing tolerance must be made. An allowance of 5% is appropriate for ~~a full core map taken with the movable incore detectors, while 5.21% is appropriate for surveillance results determined with the fixed incore detectors~~. A 3% allowance is appropriate for manufacturing tolerance.

measurement uncertainties

The hot channel factor $F^M_Q(Z)$ is measured periodically and increased by a cycle and height dependent power factor appropriate to Relaxed Axial Offset Control (RAOC) operation, W(Z), to provide assurance that the limit on the hot channel factor $F_Q(Z)$ is met. W(Z) accounts for the effects of normal operation transients and was determined from expected power control maneuvers over the full range of burnup conditions in the core. The W(Z) function for normal operation is specified in the CORE OPERATING LIMITS REPORT per Specification 6.8.1.6.

When RCS $F^N_{\Delta H}$ is measured, no additional allowances are necessary prior to comparison with the established limit. Appropriate $F^N_{\Delta H}$measurement uncertainties are already incorporated into the limits $F^N_{\Delta H}$ established in the CORE OPERATING LIMITS REPORT for each measurement system, and a bounding $F^N_{\Delta H}$ measurement uncertainty has been applied in determination of the design DNBR value. The appropriate $F^N_{\Delta H}$ measurement ~~uncertainties are 4.13% for the fixed incore detector system and 4% for the movable incore detector system~~.

uncertainty is 4%

3/4.2.4 QUADRANT POWER TILT RATIO

The purpose of this specification is to detect gross changes in core power distribution between monthly Incore Detector System surveillances. During normal operation the QUADRANT POWER TILT RATIO is set equal to 1.0 once acceptability of core peaking factors has been established by review of incore surveillances. The limit of 1.02 is established as an indication that the power distribution has changed enough to warrant further investigation.

ATTACHMENT 3

AREVA Licensing Report ANP-3243NP, Revision 1, "Seabrook Station Unit 1 Fixed Incore Detector System Analysis Supplement to YAEC-1855PA" (Non-proprietary)

ATTACHMENT 4

AREVA Affidavit for AREVA Licensing Report ANP-3243P, Revision 1

AFFIDAVIT

COMMONWEALTH OF VIRGINIA)
) ss.
CITY OF LYNCHBURG)

1. My name is Gayle F. Elliott. I am Manager, Product Licensing, for AREVA Inc. (AREVA) and as such I am authorized to execute this Affidavit.

2. I am familiar with the criteria applied by AREVA to determine whether certain AREVA information is proprietary. I am familiar with the policies established by AREVA to ensure the proper application of these criteria.

3. I am familiar with the AREVA information contained in the report ANP-3243P, Revision 1, entitled "Seabrook Station Unit 1 Fixed Incore Detector System Analysis Supplement to YAEC-1855PA," dated May 2014 and referred to herein as "Document." Information contained in this Document has been classified by AREVA as proprietary in accordance with the policies established by AREVA for the control and protection of proprietary and confidential information.

4. This Document contains information of a proprietary and confidential nature and is of the type customarily held in confidence by AREVA and not made available to the public. Based on my experience, I am aware that other companies regard information of the kind contained in this Document as proprietary and confidential.

5. This Document has been made available to the U.S. Nuclear Regulatory Commission in confidence with the request that the information contained in this Document be withheld from public disclosure. The request for withholding of proprietary information is made in accordance with 10 CFR 2.390. The information for which withholding from disclosure is

requested qualifies under 10 CFR 2.390(a)(4) "Trade secrets and commercial or financial information."

6. The following criteria are customarily applied by AREVA to determine whether information should be classified as proprietary:

(a) The information reveals details of AREVA's research and development plans and programs or their results.

(b) Use of the information by a competitor would permit the competitor to significantly reduce its expenditures, in time or resources, to design, produce, or market a similar product or service.

(c) The information includes test data or analytical techniques concerning a process, methodology, or component, the application of which results in a competitive advantage for AREVA.

(d) The information reveals certain distinguishing aspects of a process, methodology, or component, the exclusive use of which provides a competitive advantage for AREVA in product optimization or marketability.

(e) The information is vital to a competitive advantage held by AREVA, would be helpful to competitors to AREVA, and would likely cause substantial harm to the competitive position of AREVA.

The information in this Document is considered proprietary for the reasons set forth in paragraphs 6(c) and 6(d) above.

7. In accordance with AREVA's policies governing the protection and control of information, proprietary information contained in this Document has been made available, on a limited basis, to others outside AREVA only as required and under suitable agreement providing for nondisclosure and limited use of the information.

8. AREVA policy requires that proprietary information be kept in a secured file or area and distributed on a need-to-know basis.

9. The foregoing statements are true and correct to the best of my knowledge, information, and belief.

SUBSCRIBED before me this 29
day of May, 2014.

Danita R. Kidd

Danita R. Kidd
NOTARY PUBLIC, STATE OF VIRGINIA
MY COMMISSION EXPIRES: 12/31/16
Reg. # 205569

DANITA R. KIDD
COMMONWEALTH
OF VIRGINIA
NOTARY PUBLIC