

November 12, 2009

EA-09-145

Mr. Gene St. Pierre  
Site Vice President  
NextEra Energy Seabrook, LLC  
Seabrook Station  
c/o Mr. Michael O'Keefe  
P.O. Box 300  
Seabrook, NH 03874

SUBJECT: FINAL SIGNIFICANCE DETERMINATION OF WHITE FINDING WITH ASSESSMENT FOLLOWUP, AND NOTICE OF VIOLATION (NRC INSPECTION REPORT NO. 05000443/2009007, SEABROOK STATION, UNIT NO. 1)

Dear Mr. St. Pierre:

This letter provides you the final significance determination of the preliminary White finding sent to you in a letter dated August 28, 2009. That August 28, 2009 letter also transmitted NRC Inspection Report No. 05000443/2009007, which provided details regarding the finding. This current letter also provides the result of our assessment of the current performance of Seabrook Station (Seabrook). The updated assessment of Seabrook supplements, but does not supersede, our mid-cycle assessment letter issued on September 1, 2009.

As described in the August 28, 2009 letter, the finding involved the failure to establish adequate design control measures to modify a cooling water flange on the B emergency diesel generator (EDG), one of two safety-related EDGs relied upon to provide electricity to emergency loads during a loss of off-site power. As a result of the inadequate design, the B EDG developed a leak during a routine test on February 25, 2009, and operators secured the B EDG without completing the test. This finding also involved an apparent violation of 10 CFR 50, Appendix B, Criterion III, "Design Control."

In the NRC August 28, 2009 letter, the NRC had also provided you with an opportunity to request a Regulatory Conference (RC) or provide a written response to the preliminary significance determination. At the request of NextEra Energy Seabrook, LLC (NextEra), an RC was held on September 30, 2009 in the NRC Region I office in King of Prussia, Pennsylvania, to discuss the root cause evaluation of the finding and the differences between the NRC's and NextEra's assessment of the safety significance of the finding. During the RC, NextEra staff did not contest the performance deficiency, the related violation, or the NRC description of the event. NextEra also provided additional information in a letter dated September 22, 2009. During the RC, as well as in a subsequent submittal received by the NRC on October 9, 2009, NextEra staff presented a revised risk analysis model, which supported a different view that the finding was of less safety significance than the NRC's preliminary safety determination of the finding as White.

To support its views, NextEra staff presented information regarding the Seabrook Station Supplemental Emergency Power System (SEPS), a system comprised of two additional diesel generator sets (DGs), which are used to supply backup power to safety-related electrical loads when a safety-related EDG is out of service, or, if a safety-related EDG fails during a loss of all off-site power event. Specifically, NextEra provided an electrical analysis to demonstrate that the SEPS, via one of two of its DGs, is capable of powering electrical loads in a loss of off-site power event when a safety-related EDG is also out of service or has failed during the event. NextEra contended that crediting this one-of-two DG mode of SEPS operation decreases the safety significance of the event to Green.

After considering the information developed during the inspection and the information provided by NextEra at the RC and in writing on September 22, 2009 and October 9, 2009, the NRC has concluded that the finding is appropriately characterized as having low to moderate significance to safety, and is therefore characterized as White. In summary, the NRC concluded that NextEra failed to demonstrate that having only one SEPS diesel available during some events would assure adequate power to supply needed safety equipment during those events. The NRC has also determined that NextEra's proposal to use single SEPS success criteria, with predicted low margins to the equipment operating limits and extrapolated data based on engineering judgment, represents a loss of "defense-in-depth." Additionally, the NRC is concerned about the uncertainty of operator actions as they respond during a potential overload of the SEPS DG. In conclusion, the NRC finds that your current use of two-out-of-two SEPS engine success criteria is appropriate for your risk assessment; this results in the estimate of the annualized incremental core damage probability is  $2.27E-6$  for Unit 1, a low to moderate safety significance, and therefore, a White finding. Each of the determinations expressed above is detailed in Enclosure 2.

You have 30 calendar days from the date of this letter to appeal the staff's significance determination for this finding. Such appeals will be considered to have merit only if they meet the criteria given in NRC Inspection Manual Chapter 0609, Attachment 2. An appeal must be sent in writing to the Regional Administrator, Region I, 475 Allendale Rd., King of Prussia, PA 19406.

The NRC has also determined that the failure to establish adequate design control measures to modify the cooling water flange on the B EDG is a violation of 10 CFR Appendix B, Criterion III, "Design Control," as cited in the enclosed Notice of Violation (Notice) (Enclosure 1). The circumstances surrounding the violation were described in NRC Inspection Report No. 05000443/2009007. In accordance with the NRC Enforcement Policy, the Notice is considered an escalated enforcement action because it is associated with a White finding.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response.

As a result of our review of Seabrook performance, including this White finding, we have assessed Seabrook to be in the Regulatory Response column of the NRC's Action Matrix. Therefore, we plan to conduct a supplemental inspection using Inspection Procedure 95001, "Inspection for One or Two White Inputs in a Strategic Performance Area," when your staff has notified us of your readiness for this inspection. This inspection procedure is conducted to provide assurance that the root cause and contributing causes of risk significant performance issues are understood, the extent of condition is identified, and the corrective actions are sufficient to prevent recurrence.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Sincerely,

*/RA/*

Samuel J. Collins  
Regional Administrator

Docket No.: 50-443  
License No.: NPF-86

Enclosures:

1. Notice of Violation
2. NRC Basis for Final Significance Determination

cc w/encl: Distribution via ListServ

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Sincerely,

**/RA/**

Samuel J. Collins  
Regional Administrator

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**SUNSI Review Complete: AEP (Reviewer's Initials)**

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\*WRaymond concurred via email to R1Enforcement resource on 10/29/09.

\*\*OE provides quick review (not a formal concurrence). This was provided verbally to A. DeFrancisco on 11/05.

\*\*\*see previous concurrence page

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## NOTICE OF VIOLATION

NextEra Energy Seabrook, LLC  
Seabrook Station

Docket No. 50-443  
License No. NPF-86  
EA-09-145

During an inspection documented in NRC Inspection Report No. 05000443/2009007, issued on August 28, 2009, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is set forth below:

10 CFR 50 Appendix B Criterion III, "Design Control," states, in part, that measures shall be established to assure that regulatory requirements and the design basis for systems and components are correctly translated into specifications and instructions. Measures shall also be established for the selection and review for suitability of application of materials and parts that are essential to the safety-related functions of the systems and components.

The Seabrook Station Design Control Manual (DCM), developed pursuant to the above to establish design control measures for safety related components, including the emergency diesel generators (EDG), states, in Chapter 2, Section 8.0, that the Maintenance Support Evaluation (MSE) is the design control measure to be implemented in support of maintenance. When preparing the MSE, the DCM requires that the design inputs and interdisciplinary review guidelines on Figures 4-1-1 through 4-1-14 shall be used to prepare and develop the design change and understand the areas impacted. DCM Figure 4-1-1, Design Inputs, and Figure 4-1-3, Independent Reviewer Guidelines, requires that the design shall consider mechanical requirements such as stresses and vibration; whether materials are suitable for the application; credible failure modes of connected equipment; and, shall account for equipment performance history.

Contrary to the above, on January 31, 2009, NextEra Energy Seabrook, LLC, completed Work Order 0821400 on the B EDG without adequately establishing measures to assure that regulatory requirements and the design basis for systems and components were correctly translated into specifications and instructions. Specifically, design change 08MSE211, implemented by the Work Order, to modify and repair a two bolt flange (joint JTR005) on the B EDG right bank turbocharger, did not adequately: (1) control welding stresses during repair, assure post weld flange alignment was acceptable, or address the impacts of known vibrations on flange performance and gasket compression; (2) address the suitability of gasket materials relative to flange specific conditions (cupping and bowing); and, (3) consider the flange performance history and potential failures to account for equipment performance history and credible failure modes of connected equipment. As a result, the B EDG turbocharger flange JTR005 failed during B EDG operation on February 25, 2009, causing a rapid loss of jacket cooling water and the EDG being declared inoperable.

This violation is associated with a White finding.

Pursuant to the provisions of 10 CFR 2.201, NextEra Energy Seabrook, LLC, is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to the Regional Administrator, Region I, and a copy to the NRC Resident Inspector at the facility that is the

subject of this Notice, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation; EA-09-145" and should include: (1) the reason for the violation, or, if contested, the basis for disputing the violation, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time. If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be publicly available in the NRC Public Document Room or from the NRC's document system (ADAMS), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated this 12<sup>th</sup> day of November 2009

## Enclosure 2: Evaluation of the Licensee's Positions, NRC's Response, and the NRC Final Significance Determination

On September 30, 2009, the NRC held a Regulatory Conference with representatives of NextEra Energy Seabrook, LLC (NextEra) Seabrook Station, to discuss the significance of a finding involving the failure to establish adequate design control measures to modify a cooling water flange on the B emergency diesel generator (EDG). The inadequate modification led to the development of a leak from the B EDG during a routine test on February 25, 2009, requiring operators to secure the B EDG without completing the test.

At the conference, NextEra staff highlighted differences between the NRC's risk assessment of the finding, as provided in NRC Inspection Report No. 05000443/2009007, dated August 28, 2009, and NextEra's risk assessment that the licensee developed subsequent to identification of the preliminary White finding. NextEra staff also provided additional information in writing to the NRC on October 9, 2009.

### SUMMARY OF NEXTERA'S POSITION

Specifically, NextEra staff presented information regarding the Seabrook Station Supplemental Emergency Power System (SEPS), a system comprised of two additional diesel generator sets (DGs), which are used to supply backup power to safety-related electrical loads when a safety-related EDG is out of service, or, if a safety-related EDG fails during a loss of all off-site power event. Specifically, NextEra provided an electrical analysis to demonstrate that only one of the two SEPS DGs are needed to provide the required electrical loads in a loss of off-site power event when a safety-related EDG fails, or is out of service, during the event, and that crediting this one-of-two DG mode of SEPS operation decreases the safety significance of the event to Green. In support of its position, NextEra stated that: (1) SEPS capacity, based on a one of two SEPS diesel generator success criteria, is supported by detailed analysis and vendor test data; (2) electrical analysis of the SEPS design has identified additional margin in the capability of the SEPS system, enabling a single SEPS DG to supply loss of offsite power loads without tripping; and, (3) operator actions required for successful SEPS operation do not include reduction of SEPS load.

### NRC EVALUATION OF NEXTERA'S POSITION

1. NextEra contended that SEPS capacity, based on a one of two SEPS diesel generator success criteria, is supported by detailed analysis and vendor test data.

The NRC determined that NextEra did not demonstrate acceptable results using one of two SEPS for some low probability events, such as both SEPS DGs starting and one subsequently failing (failure-to-run scenario). To support its demonstration, NextEra relied on a sensitivity analysis in its evaluation of the one of two SEPS success criteria. NextEra's analysis of the SEPS failure modes and reliance on a sensitivity analysis is inconsistent with the standard modeling of equipment failures in the Seabrook Probabilistic Risk Assessment (PRA). Further, the NextEra analysis was performed using generic diesel failure data, and the NRC also concluded that the application of generic class 1E EDG failures, operating within their design, is not representative of the failure rates that would be anticipated in a single SEPS operating at 108% of its design with degraded frequency and voltage. The NRC further determined that NextEra's evaluation did not consider the residual heat removal and cooling tower pump test

scenarios impacting loading on the diesels. Regulatory Guide 1.200 states that success criteria analysis as it relates to PRA determines the minimum requirements for each function and ultimately the systems used to perform the functions necessary to prevent core damage given an initiating event. Therefore, the NRC concludes that the only mode of SEPS operation that has been adequately demonstrated by design, factory and on-site testing is based on a two of two SEPS diesel generator success criteria, not a one of two criteria as described in NextEra's evaluation.

2. NextEra contended that electrical analysis of the SEPS design has identified sufficient margin in the capability of the SEPS system, enabling a single SEPS DG to supply loss of offsite power loads without tripping.

The NRC considered that one of two SEPS appears to work by NextEra's engineering analysis. However, the engine overload condition combined with narrow margins to operating limits and protection settings, presents uncertainty in engine and support system performance, such that successful single SEPS operation cannot be reasonably assured. Most significantly, the NRC determined that there is very little margin between the calculated electrical current level for the predicted EDG overload condition and the over current setpoint for the DG output breaker. In addition, NextEra's evaluation for the single SEPS was based on factory tests of a similar engine and it did not provide sufficient information to validate that the data from the similar engine was applicable to the Seabrook SEPS units. Therefore, the NRC concludes that adequate additional margin is not supported by the electrical or risk analysis.

3. NextEra contended that operator actions required for successful SEPS operation do not include reduction of SEPS load.

Regarding the role of operators in the risk evaluation, the NRC acknowledges the NextEra analysis of operator actions to successfully assure operation using a single SEPS engine. However, while the path through emergency procedure ECA 0.0 appears to demonstrate success under tightly constrained assumptions, there remains some question as to what operators would do if placed in the postulated scenario. The EDG fault setting report provided by NextEra for the overload condition includes many fault effects that were not addressed by NextEra's analysis. The NRC continues to question whether: (1) these faults would prompt operators to take actions that would negatively impact the success of a single SEPS engine run; and, (2) the operators would reduce EDG loading per the procedure or remove needed loads. Therefore, the NRC notes that uncertainty in operator actions combined with the limited guidance provided in the available procedures makes it difficult to assure success on a single SEPS engine.

In summary, the NRC concluded that NextEra failed to demonstrate success for one of two SEPS during some events as appropriate. The NRC has also determined that NextEra's proposal to use single SEPS success criteria, with predicted low margins to the equipment operating limits and extrapolated data based on engineering judgment, represents a loss in defense-in-depth. Additionally, the NRC determined that uncertainty in operator actions for SEPS load reduction is a concern. In conclusion, the NRC finds that continued use of the two-out-of-two SEPS engines recovery criteria is appropriate in the risk assessment; this results in the estimate of the annualized incremental core damage probability is  $2.27E-6$  for Unit 1, a low to moderate safety significance, and therefore, a White finding.