UNITED STATES
NUCLEAR REGULATORY COMMISSION
Region III
2443 Warrenville Road, Suite 210
Lisle IL 60532-4352

December 18, 2013

EA-13-182

Mr. Richard L. Anderson
Vice President
NextEra Energy Duane Arnold, LLC
3277 DAEC Road
Palo, IA 52324-9785

SUBJECT: FINAL SIGNIFICANCE DETERMINATION OF A WHITE FINDING WITH ASSESSMENT FOLLOWUP AND NOTICE OF VIOLATION; NRC INSPECTION REPORT NO. 05000331/2013011; DUANE ARNOLD ENERGY CENTER

Dear Mr. Anderson:

This letter provides you the final significance determination of the preliminary White finding discussed in our previous communication dated September 30, 2013, which included U.S. Nuclear Regulatory Commission (NRC) Inspection Report No. 05000331/2013010. The finding involved the licensee's failure to prescribe a work instruction of a type appropriate to the circumstances for the re-assembly of the 'A' standby diesel generator lube oil heat exchanger. Specifically, the work instruction did not contain sufficient detail and acceptance criteria, appropriate torque values, and operating experience information to ensure the heat exchanger gasket was properly compressed.

At your request, a Regulatory Conference was held on November 5, 2013, to discuss your views on this issue. A summary of the conference presentation was issued on November 21, 2013, and is available in the NRC's Agencywide Documents Access and Management System (ADAMS) at Accession Number ML13326A066. You also provided a timeline of events which was placed into ADAMS at Accession Number ML13308A798.

During the meeting, you stated that you agreed that there was a performance deficiency, but that you disagreed with the significance of the issue. Specifically, your staff stated that you believed that the exposure time for the issue was only a period of 3.69 days as compared to the 22 days assumed by the NRC. You also stated that some of the assumptions used by the NRC in its probabilistic risk assessment model, known as the SPAR model, were overly conservative. The NRC noted that you used one set of assumptions when you ran your own PRA model and a different set of assumptions when you ran the NRC's SPAR model.

The NRC also reviewed the information you submitted both prior to the Regulatory Conference on October 29 and after the conference on November 12, 2013. After considering all the information presented, the NRC concluded that no changes to the preliminary determination were necessary. An explanation of how we considered your position on different aspects of the NRC evaluation is provided in Enclosure 1.

Therefore, after considering the information developed during the inspection and the additional information provided on October 29, 2013, during the Regulatory Conference, and on November 12, 2013, the NRC has concluded that the finding is appropriately characterized as White, a finding of low to moderate risk significance.

You have 30 calendar days from the date of this letter to appeal the staff's determination of significance for the identified White finding. An appeal must be sent in writing to the Regional Administrator, Region III, 2443 Warrenville Road, Lisle, IL 60532-4352, and must address the criteria in NRC Inspection Manual Chapter 0609, Attachment 2, "Process for Appealing NRC Characterization of Inspection Findings (SDP Appeal Process)."

The NRC has also determined that the failure of NextEra Energy Duane Arnold, LLC, to prescribe instructions appropriate to the circumstances is a violation of Title 10 of the Code of Federal Regulations, Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," as cited in the Notice of Violation (Notice) found in Enclosure 2. The circumstances surrounding the violation were described in detail in NRC Inspection Report No. 05000331/2013010. In accordance with the NRC Enforcement Policy, the Notice is considered escalated enforcement action because it is associated with a White finding.

The NRC has concluded that information regarding the reasons for the violation, the corrective actions taken and planned to be taken to correct the violation, and the date when full compliance was achieved, is already adequately addressed on the docket in NRC Inspection Report No. 05000331/2013010. Therefore, you are not required to respond to this letter unless the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to provide additional information, you should follow the instructions specified in the enclosed Notice.

As a result of our review of Duane Arnold's performance, including this White finding, we have assessed the plant to be in the Regulatory Response column of the NRC's Action Matrix, effective the 3rd quarter of 2013. 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 and the extent of cause are identified, and the corrective actions are sufficient to prevent recurrence.

For administrative purposes, this letter is issued as NRC Inspection Report 05000331/2013011. Additionally, apparent violation (AV) 05000331/2013010-01 is now closed and violation (VIO) 05000331/2013010-01 is opened in its place.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management 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. The NRC also includes significant enforcement actions on its Web site at http://www.nrc.gov/reading-rm/doc-collections/enforcement/actions.

Sincerely,

/RA by A. Boland for/

Cynthia D. Pederson
Regional Administrator

Docket No. 50-331
License No. DPR-49

Enclosures:
1. Analysis of Licensee Risk Information
2. Notice of Violation

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ANALYSIS OF LICENSEE RISK INFORMATION

The U.S. Nuclear Regulatory Commission (NRC) performed two different reviews of risk information on this issue. The first was on the information provided in the October 29, 2013, letter submittal which is available in the NRC's Agencywide Documents Access and Management System (ADAMS) at Accession Number ML13308A317. The second was on the information provided during the November 5 Regulatory Conference and on November 12, 2013, to support the statements made during the conference. The meeting summary for the November 5 Regulatory Conference letter is available at Accession Number ML13326A066 and the November 12 letter is in ADAMS at Accession Number ML13322B157 (non-public). Our review is provided below.

October 29 Letter Review

The NRC reviewed the additional information provided in your October 29, 2013, letter. The letter provided Revision 1 of probabilistic risk assessment (PRA), 'A' standby diesel generator lube oil heat exchanger (SBDG LO HX). A previous revision of this document was reviewed by the NRC prior to issuing our preliminary significance determination.

The NRC documented several differences between the NextEra PRA assessment and the NRC preliminary significance determination in NRC Inspection Report 05000331/2013010. Notably, the NRC determined that the licensee's assessment used an outdated curve for emergency alternating-current (AC) power recovery, misapplied convolution factors in determining AC power recovery, and did not consider common cause failure potential for the SBDG. The NRC reviewed the Revision 1 assessment and concluded that none of these differences were addressed and no new information was provided in the assessment. The NRC also reviewed the cut-set results of the Revision 1 evaluation and determined that if emergency AC power, convolution factors, and common cause failure were treated in a manner similar to the NRC significance determination process (SDP) analysis that the results would likely also show a delta core damage frequency (CDF) greater than 1E-6/yr, and would be consistent with the NRC SDP assessment.

November 5 Regulatory Conference and November 12 Information Submittal

At the Regulatory Conference NextEra presented the results of an evaluation performed using the NRC Standardized Plant Analysis Risk (SPAR) Model with different model inputs than the NRC used in its preliminary determination. As discussed during the conference, some of the inputs were also different than used in the NextEra PRA assessment. On November 12, NextEra provided to the NRC a copy of the model used and a human reliability assessment that supported one of the model inputs.

The NRC considered this information and determined that no changes to the preliminary SDP evaluation were required. For several of the proposed model inputs, the NRC evaluated the inputs and concluded that the final SDP result was relatively insensitive to those inputs. For other proposed inputs the NRC determined that no new additional information was presented to support a revised input value. The key model inputs proposed were presented on Slide 32 of the Regulatory Conference presentation (ADAMS accession number ML13308A905) and are summarized below with the NRC evaluation of the input.

Exposure Time

NextEra presented the position that the 'A' SBDG exposure time began on March 6, 2013, when the engine was tagged out for cable inspections that resulted in LO system de-energization and room ventilation dampers opening. The station's root cause evaluation (RCE) team determined that the engine tag out led to a thermal transient on the LO HX that resulted in a reduction in the LO HX flange compression, oil wetting of the gasket surface, and extrusion of the gasket upon post-inspection testing on March 8, 2013. New information presented at the conference included the results of LO HX flange inspections that were performed in September 2013 that eliminated a portion of the RCE root cause of the potential for "flaws between flange mating surfaces."

Although this was noted by the NRC in the inspection report as an unknown potential cause that was not considered in the station's engineering analyses, there was no new or additional information provided to address the NRC's other concerns noted in Inspection Report 05000331/2013010 with the station's determination of exposure time. Specifically, the NRC was not provided reasonable assurance that the gasket would not have failed at some point during the performance of its PRA mission time absent the LO HX thermal transient on March 6, 2013. Therefore, the NRC concluded that February 16, 2013, (last successful performance of surveillance testing) remained a more appropriate start date to begin the exposure time of 22 days.

In making a risk-informed decision on the significance of the finding, the NRC also considered that the improperly torqued gasket had been in place for approximately 100 days with the plant in operation. For SDP analysis, the NRC considers both the observed failure and the potential that the performance deficiency and the degraded condition could evolve to a catastrophic failure of the gasket and a failure to run of the SBDG differently than what actually occurred.

Credit for "A" SBDG Recovery

NextEra presented the position that the 'A' SBDG was repairable and could be recovered in less than 9 hours. The Regulatory Conference presentation indicated that the preliminary NRC SDP evaluation did not credit 'A' SBDG recovery.

During the conference, the NRC discussed how the preliminary NRC SDP evaluation credited the 'A' SBDG recovery as described in Inspection Report 05000331/2013010 using the emergency AC power non-recovery curves that are posted at the "Results and Databases" section of the NRC public website for operating reactors in Table 6, "EDG Non-Recovery Probability for Selected Times." The website where this can be found is http://nrcoe.inel.gov/resultsdb/LOSP. As no new information was provided on this issue, the NRC did not change its conclusion regarding credit for diesel generator recovery.

Aligning Diesel Fire Pump Time Frame

NextEra presented the position that the diesel fire pump could be aligned after two hours and the NRC SPAR model considered a time frame of 12 hours.

The NRC SPAR model and assessment does not specify a time frame for aligning the diesel fire pump. However, the SPAR model only considers the diesel fire pump as a late injection source of water in sequences where the reactor core isolation cooling system (RCIC) or the high pressure coolant injection (HPCI) system is successful. For the dominant sequences in the NRC assessment, the diesel fire pump was assumed to be needed around 12 hours into the event when containment parameters would require emergency reactor pressure vessel depressurization and preclude further use of RCIC or HPCI.

River Water System Maintenance Unavailability

NextEra presented the position that the maintenance unavailability of a river water system train was less than three days per year which equates to a probability that the train is unavailable due to maintenance of 6E-3.

The preliminary NRC SDP used a probability of the train being unavailable due to maintenance of 5E-2. The NRC determined that use of the value of 6E-3 was appropriate; however, since it is likely that other plant-specific initiating event frequencies, failure probabilities, or maintenance unavailabilities of important components are higher than those used by the NRC, we did not change this particular value in our best estimate assessment. The NRC considered the NextEra position as part of a sensitivity evaluation and determined that the revised input had only a small change on the estimated change in core damage frequency and would not change the overall conclusion of the detailed risk evaluation.

AC Power Recovery Time Frame

NextEra presented the position that the AC power recovery time frame was greater than 24-hours because it credited the portable diesel-driven fire pump, containment venting and the technical support center (TSC) diesel generator as mitigating equipment and because the “A” SBDG could run for greater than five hours in its degraded state. The Regulatory Conference presentation indicated that the preliminary NRC SDP evaluation considered an AC power recovery time frame of 12 hours.

To clarify, the NRC SPAR model considers AC power recovery at various times depending on the status of injection systems, reactor pressure vessel leakage, battery life, and containment heat removal. For the dominant station blackout (SBO) sequences in this SDP evaluation, AC power recovery is modeled up to 30 minutes, if no injection was available; up to 5 hours if injection was available but the TSC diesel was not aligned to charge the batteries; and up to 12 hours for sequences where injection was available and the TSC diesel generator was successfully aligned. At about 12 hours, thermal-hydraulic studies generally show that containment parameters will require reactor depressurization and steam-driven mitigating systems will no longer be available. The basis for the use of 12 hours as a point at which transition from successful RCIC operation to use of the firewater and containment venting was documented in NRC Inspection Report 05000331/2013010. However, beyond 12 hours the NRC SPAR model credited continued use of the TSC diesel generator to supply power to battery chargers to allow for containment venting and continued injection using the portable diesel-driven fire pump.

During the conference, NextEra personnel stated that operators may continue to use the RCIC system during a longer duration station blackout event based on guidance from the technical support center. After the conference, the NRC reviewed Duane Arnold emergency operating procedures (EOPs) and training and concluded that there was no existing guidance for deviating from EOP containment limits that would eventually require the reactor to be depressurized. Once the reactor was depressurized, portable equipment would be necessary for further injection. The NRC concluded that up to 12 hours was a reasonable time for successful RCIC operation, given that the time to reach containment limits would be variable.

The NextEra position, as stated at the Regulatory Conference, was that the 'A' SBDG would run for greater than five hours with the improperly installed gasket. The NRC noted in the SPAR model that was modified by NextEra that the 'A' SBDG was actually modeled as being able to run for 12 hours. In the preliminary SDP, the NRC modeled the 'A' SBDG as being able to run for approximately one hour. This input to the risk evaluation was based on the actual run time observed between February 16, 2013, the date of the last successful surveillance test of the SBDG, and March 8, 2013, when the gasket failed catastrophically. The NRC concluded that there was not sufficient supporting technical evidence provided to conclude that the SBDG would have run longer than approximately one hour with an improperly installed gasket.

Number of Main Control Room (MCR) Panels with potential to cause Fire-Induced LOOP

NextEra presented the position that a fire in two out of 74 main control room panels could cause loss of offsite power event.

The preliminary NRC SDP considered that a fire in nine out of 74 panels could cause a loss of offsite power event. The NRC information was based on the licensee Individual Plant Examination of External Events (IPEEE) while the NextEra position was based on information from the cable database used for transition to NFPA 805. The NRC determined that the use of this revised frequency may be appropriate and performed a sensitivity evaluation using the revised input. Since the original NRC estimate for fire risk contribution was not a significant contributor to the preliminary SDP result, the reduction in fire frequency did not have a significant impact on the result. The NRC did not change our preliminary estimate because no other plant fire risk information was provided. Therefore, the NRC cannot preclude that other fire risk inputs are possibly non-conservative and overall fire risk could be somewhat higher than estimated, based on the discussion at the Regulatory Conference. Nevertheless, the sensitivity evaluation showed that the change in a single fire risk input value would not change the overall conclusion of the detailed risk evaluation.

NOTICE OF VIOLATION

NextEra Energy Duane Arnold, LLC
Duane Arnold Energy Center

Docket No. 50-331
License No. DPR-49
EA-13-182

During an NRC inspection conducted from April 8 to September 5, 2013, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

> Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions of a type appropriate to the circumstances and be accomplished in accordance with these instructions.
>
> Contrary to the above, on October 18, 2012, an activity affecting quality for the safety-related 'A' standby diesel generator lube oil heat exchanger tube bundle replacement was not prescribed by instructions appropriate to the circumstances. Specifically, on October 18, 2012, the licensee completed work order 40132858, which replaced the 'A' standby diesel generator lube oil heat exchanger tube bundle. The work order did not contain a specific and detailed sequence for re-assembly of the heat exchanger and connected piping system to achieve uniform and appropriate compression of the tube bundle-to-shell gasket. This contributed to the catastrophic failure of the tube bundle-to-shell gasket during a maintenance run of the engine on March 8, 2013, rendering the 'A' standby diesel generator unavailable.

This violation is associated with a White SDP finding.

The NRC has concluded that information regarding the reason for the violation, the corrective actions taken and planned to correct the violation and prevent recurrence, and the date when full compliance was achieved is already adequately addressed on the docket in NRC Inspection Report No. 05000331/2013010. However, you are required to submit a written statement or explanation pursuant to Title 10 of the Code of Federal Regulations Section 2.201 if the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to respond, clearly mark your response as a "Reply to a Notice of Violation, EA-13-182" and send it to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to the Regional Administrator, Region III, and a copy to the NRC Resident Inspector at the Duane Arnold Energy Center, within 30 days of the date of the letter transmitting this Notice of Violation (Notice).

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.

If you choose to respond, your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. Therefore, to the extent possible, the response

should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

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

Dated this 18th day of December, 2013

should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction. The NRC also includes significant enforcement actions on its Web site at http://www.nrc.gov/reading-rm/doc-collections/enforcement/actions.

Sincerely,

/RA by A. Boland for/

Cynthia D. Pederson
Regional Administrator

Docket No. 50-331
License No. DPR-49

Enclosures:
1. Analysis of Licensee Risk Information
2. Notice of Violation

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1 OE concurrence received via email from L. Casey on December 11, 2013.

Letter to Richard L. Anderson from Cynthia D. Pederson dated December 18, 2013

SUBJECT: FINAL SIGNIFICANCE DETERMINATION OF A WHITE FINDING WITH ASSESSMENT FOLLOWUP AND NOTICE OF VIOLATION; NRC INSPECTION REPORT NO. 05000331/2013011; DUANE ARNOLD ENERGY CENTER

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