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

February 11, 2014

EA-13-223

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. 05000331/2014007; 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 November 14, 2013, which included U.S. Nuclear Regulatory Commission (NRC) Inspection Report No. 05000331/2013004. The finding involved the failure of your staff to perform an immediate operability determination in accordance with licensee procedures on June 21, 2013, when a reactor core isolation cooling (RCIC) system turbine speed indicator in the main control room was found degraded. Specifically, your staff failed to consider the degraded speed indication indicative of a problem within the RCIC electronic governor module circuitry (failed voltage-dropping resistor) that resulted in the inoperability of RCIC. This was not discovered until August 22, 2013, when the RCIC turbine tripped on overspeed during startup for post-maintenance surveillance testing, which was beyond the time allowed by your Technical Specifications.

At your request, a regulatory conference was held on January 8, 2014, to discuss your views on this issue. A copy of the Duane Arnold presentation was previously placed in the NRC's Agencywide Documents Access and Management System (ADAMS) at accession number ML14007A229. During the meeting, you described your assessment of the significance of the finding and the corrective actions taken to resolve it, including the root cause evaluation of the finding. You attributed the root cause of the failure to incorrect assessment of the RCIC system when the condition report and work request were screened. A partial list of attendees at this meeting is included in Enclosure 1.

During the meeting, you stated that you agreed with the performance deficiency, but that you disagreed with the significance of the finding. Specifically, your staff stated that you believed that recovery of RCIC was an easily performed task, well within the operator's capability from the control room. To demonstrate this, you presented a video recording of a simulator session conducted following discovery of the failure. A copy of the video recording is available in ADAMS at accession number ML14031A380.

The NRC also reviewed the information you submitted both prior to the conference, on December 19, 2013, and after the conference on January 10, 2014.

The NRC revised the preliminary evaluation to incorporate the new information that you provided regarding the use of the control rod drive system as a high pressure injection system for loss of main feedwater events when the RCIC system and the high pressure coolant injection system are unavailable. This change lowered our initial core damage frequency risk estimate from 3.5E-6/year to 1.7E-6/year.

The NRC also performed several sensitivity studies on the revised risk estimate to assess the impact of RCIC recovery and also to assess the uncertainty of the fire risk contribution. With respect to recovery, the NRC concluded that while RCIC recovery may be possible in certain scenarios, the human error probability estimates would be very high given the lack of specific procedures and training to operate the system in a non-standard alignment under high stress conditions. Sensitivity evaluations were performed that provided limited recovery credit to internal event station blackout scenarios only. For other scenarios, the NRC staff concluded that operators would be more likely to pursue mitigating strategies such as reactor vessel depressurization and use of low pressure systems that are covered in the emergency operating procedures. The sensitivity studies showed that the risk estimate did not significantly change (i.e., did not drop below White) when considering limited recovery potential.

The NRC also further considered the uncertainty in the fire risk estimate, which was based on information from the Individual Plant Examination of External Events (IPEEE). Additional review of more current fire probabilistic risk assessment (PRA) information from the National Fire Protection Association (NFPA) 805 (“Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants”) fire PRA performed to support your license amendment would likely increase the estimated change in core damage frequency given a failure of the RCIC system. The NRC performed sensitivity studies to evaluate the likely effects of the NFPA-805 insights on the risk outcome. However, the NRC concluded that a higher fire risk estimate for the finding would not increase the overall significance of the finding beyond low to moderate safety significance.

Additional details of our assessment are contained in Enclosure 2.

Therefore, after considering the information developed during the inspection and the additional information provided on December 19, 2013, January 10, 2014, and during the regulatory conference, 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. Such appeals will be considered to have merit only if they meet the criteria given in NRC Inspection Manual Chapter 0609, Attachment 2, “Process for Appealing NRC Characterization of Inspection Findings (Significance Determination Process Appeal Process).” An appeal must be sent in writing to the Regional Administrator, Region III, 2443 Warrenville Road, Lisle, IL 60532-4352.

The NRC has also determined that the failure of NextEra Energy Duane Arnold, LLC, involved a violation of your Technical Specifications (TS) 3.5.3 as cited in the Notice of Violation (Notice) found in Enclosure 3. The circumstances surrounding the violation were described in detail in NRC Inspection Report No. 05000331/2013004. 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. 05000331/2013004. 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 and the White finding issued on December 18, 2013, we have assessed the plant to be in the Degraded Cornerstone column of the NRC's Action Matrix, effective the 3rd quarter of 2013. Therefore, we plan to conduct a supplemental inspection to evaluate your response to both findings using Inspection Procedure 95002, "Supplemental Inspection for One Degraded Cornerstone or Any Three 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 individual and collective risk-significant performance issues are understood; to independently assess and provide assurance that the extent of condition and the extent of cause of individual and collective risk-significant performance issues are identified; to independently determine if safety culture components caused or significantly contributed to the individual and collective risk-significant performance issues; and to provide assurance that a licensee's corrective actions for risk-significant performance issues are sufficient to address the root and contributing causes and prevent recurrence. The 95002 inspection will be conducted in lieu of the 95001 inspection discussed in the December 18, 2013, letter (ML13353A487).

For administrative purposes, this letter is issued as NRC Inspection Report 05000331/2014007. Additionally, apparent violation (AV) 05000331/2013004-03 is now closed and violation (VIO) 05000331/2013004-03 is opened in its place.

In accordance with Title10 of the Code of Federal Regulations (10 CFR) Section 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, 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/

Cynthia D. Pederson
Regional Administrator

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

Enclosures:
1. Regulatory Conference List of Attendees
2. Analysis of Licensee Information
3. Notice of Violation

cc w/encls: Distribution via ListServ

REGULATORY CONFERENCE
LIST OF ATTENDEES

NextEra Energy
Richard Anderson, Site Vice President
Anil Julka, Fleet Risk and Reliability Manager
Mike Davis, Site Licensing/EP Manager
Tom Gordon, Assistant Operations Manager
Jim Petro, Fleet Licensing Manager
Jeff Pladsen, Reactor Operator
Larry Lee, ERIN Engineering

U.S. Nuclear Regulatory Commission
Anne Boland, Acting Deputy Regional Administrator, Region III
Ken O'Brien, Acting Division Director, Division of Reactor Projects (DRP), Region III
Christine Lipa, Chief, Branch 1, DRP, Region III
Steven Orth, Enforcement Officer, Region III
Lucas Haeg, Senior Resident Inspector, Duane Arnold site, DRP, Region III
Roy Elliott, Acting Resident Inspector, Duane Arnold site, DRP, Region III (via phone)
Laura Kozak, Senior Risk Analyst, DRP, Region III
Julio Lara, Acting Deputy Director, DRP, Region III
Jack Giessner, Acting Deputy Director, Division of Reactor Safety (DRS), Region III
Jason Draper, Reactor Engineer, DRP, Region III
Viktoria Mitlyng, Public Affairs Officer, Region III
Harral Logaras, Government Liaison Specialist, Region III
Alan Dahbur, Senior Reactor Engineer, Engineering Branch 3, DRS, Region III
Chuck Zoia, Operations Engineer, Operations Branch, DRS, Region III
Patricia Lougheed, Senior Enforcement Coordinator, Region III
Lauren Casey, Enforcement Specialist, Office of Enforcement (via phone)
Mahesh Chawla, Project Manager, Office of Nuclear Reactor Regulation (NRR) (via phone)
Jeff Circle, Senior Reliability and Risk Analyst, NRR (via phone)
Joseph Giitter, Director, Division of Risk Assessment, NRR (via phone)
Donald Helton, Senior Reliability and Risk Engineer, Office of Research (via phone)
Stephen Vaughn, Reactor Operations Engineer, NRR (via phone)
Sunil Weerakkody, Chief, PRA Operational Support Branch, NRR (via phone)
Dori Willis, Alternate Enforcement Coordinator, NRR, (via phone)
See-Meng Wong, Senior Reliability and Risk Analyst, NRR (via phone)

Public
Angela Leek, Bureau Chief, Radiological Health – Department of Public Health, State of Iowa
Ruth Thomas, Environmentalists, Inc.

ANALYSIS OF LICENSEE RISK INFORMATION

Manual Recovery of Reactor Core Isolation Cooling (RCIC) by Throttling MO-2405 from the Control Room

During the regulatory conference, you stated that operators could recover the RCIC system from the control room by throttling MO-2405, the RCIC turbine stop valve. You used a human error probability (HEP) for the failure to recover RCIC of 0.1 in the risk calculations that you performed and considered this to be a bounding value. The key factors in calculating the HEP were that the annunciator response procedure directs the operator to manipulate MO-2405, the Conduct of Operations manual requires manual control of non-functioning automatic controls, the handle of the valve indicates the valve can be throttled, operators are experienced in throttling MO-2405, and a simulator verification indicated that operators would first throttle MO-2405.

In the initial inspection report documenting this finding, dated November 14, 2013, the NRC described our review of the potential to recover the RCIC system and our conclusion that the recovery methods proposed were not likely to be reliable given a lack of procedure direction to perform this action under high stress conditions. The NRC again reviewed your position, including the procedures and other information discussed during the regulatory conference. The NRC did not agree that the annunciator response procedure would necessarily lead to throttling MO-2405. The procedure instructs the operator to determine the cause of the turbine trip, correct the cause if possible, and reset the turbine by fully opening MO-2405. A RCIC turbine overspeed trip could result from many different causes, with a failed dropping resistor in the governor power supply being just one of those potential causes. Correcting the cause of the trip was actually not possible without repair efforts to replace the failed dropping resistor. The annunciator response procedure did not provide instruction to operate the system in a non-standard alignment after an overspeed trip. Our review of the Conduct of Operations manual found that it was general guidance to operators and not directly related to this recovery action. In the regulatory conference presentation, you described procedure guidance and experience in manually operating MO-2405 every refueling outage during a surveillance test designed to test the RCIC overspeed trip circuit. You presented a video recording in which operators recovered RCIC function by manually throttling MO-2405 from the control room. However, the NRC reviewed the RCIC overspeed test procedure and determined that the valve is operated manually, locally, with the RCIC turbine and pump uncoupled – and not operated from the control room. You acknowledged this difference during the conference. The NRC staff concluded that the experience gained through operating the valve during the test is not applicable to the actions that would be necessary to actually control flow with the RCIC system during an emergency by throttling this valve from the control room. In summary, we maintain our original position that the proposed recovery action is not covered by plant procedures.

In using the Standardized Plant Analysis Risk - Human Reliability Analysis Method (SPAR-H) to estimate a human error probability for the failure to recover RCIC by throttling MO-2405, the NRC calculated very high failure rates due to the lack of procedures, low previous applicable experience or training, and the high stress conditions that would exist during the scenarios of interest. Additionally, any recovery of RCIC using this method would only be applied to those scenarios where the high pressure coolant injection and low pressure coolant injection systems are not available. If these other systems remained available, the NRC concluded that operators would attempt to use them in accordance with existing training and procedures.

Manual Recovery of RCIC by Throttling the Turbine Steam Supply Valve MO-2404 from RCIC Room

Although not credited in your risk evaluation of the finding, you presented a second potential RCIC recovery option of throttling the RCIC turbine steam supply valve MO-2404 using Severe Accident Management Procedure (SAMP) 703.

The NRC agreed with your evaluation that it would not be appropriate to consider both proposed methods of recovery in a risk evaluation because of the high dependency of manual recovery of RCIC using SAMP 703 and the proposed recovery method of manually operating the RCIC turbine stop valve MO-2405 from the control room.

Credit for the Control Rod Drive (CRD) System during a Loss of Main Feedwater Event

You presented information that the control rod drive system could be used as a high pressure injection system during loss of main feedwater events when RCIC and HPCI are not available. The NRC staff reviewed your supporting calculations and agreed that early CRD injection with two pump operation could prevent core damage in this scenario. We updated our SPAR model to credit CRD as a potential success path for loss of main feedwater events, which revised our initial core damage frequency risk estimate from 3.56 E-6/year to 1.7 E-6/year.

Connection between Loss of Offsite Power and the Emergency Diesel Generator (EDG) Heating Ventilation and Air Conditioning (HVAC) Systems

Your presentation discussed an error in the SPAR model regarding the EDG HVAC system. At the regulatory conference the NRC informed NextEra that this error had been corrected in the SPAR model version used for the preliminary detailed risk evaluation.

Fire PRA

You concluded that credit for throttling MO-2405 reduced the fire risk to Green.

In addition to the NRC's conclusions on recovery stated earlier, the NRC had previously determined that any potential for recovery would not be applied to sequences where operators would more likely pursue mitigating strategies such as reactor vessel depressurization and use of low pressure systems that are covered in emergency operating procedures, which were the dominant fire scenarios with RCIC failed. As a result, the NRC did not consider any potential recovery for fire scenarios in the sensitivity evaluations that were performed consistent with our preliminary SDP evaluation.

NOTICE OF VIOLATION

NextEra Energy Duane Arnold, LLC
Duane Arnold Energy Center

Docket No. 50-331
License No. DPR-49
EA-13-223

During an NRC inspection conducted from July 1 to September 30, 2013, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

> Duane Arnold Technical Specification Limiting Condition for Operation (LCO) 3.5.3 states, in part, "The RCIC System shall be Operable."
>
> Condition A of LCO 3.5.3, Required Action A.2, directs, in part, restoration of the reactor core isolation cooling (RCIC) system to an operable status within 14 days of discovery of an inoperable condition.
>
> Condition B of LCO 3.5.3, Required Action B.1, directs, in part, placing the reactor in Mode 3 within 12 hours of not completing the actions in Condition A.
>
> Contrary to the above, from June 21, 2013, to August 24, 2013, the RCIC system was inoperable; however, the licensee did not enter Condition A of LCO 3.5.3 until August 22, 2013, a period greater than 14 days. The licensee did not restore the RCIC system to operable status and did not place the reactor in Mode 3 as required by Condition B of LCO 3.5.3. Specifically, on June 21, 2013, the licensee identified a degraded speed indicator in the main control room that provided indication that the RCIC system was inoperable but failed to recognize the RCIC system's inoperability until August 22, 2013.

This violation is associated with a White Significance Determination Process 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. 05000331/2013004 and during the regulatory conference held on January 8, 2014. 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-13-223" 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, 2443 Warrenville Road, Lisle, IL 60532 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, U. S. 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 11th day of February, 2014

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/

Cynthia D. Pederson
Regional Administrator

Docket No. 50-331
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Enclosures:
1. Regulatory Conference List of Attendees
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bcc w/encls: Ruth Thomas, Environmentalists, Inc.

See Previous Concurrences

FILE NAME: G:\ORAIII\EICS\ENFORCEMENT\Cases\Enforcement Cases 2013\EA-13-223 Duane Arnold RCIC\EA-13-223 Duane Arnold draft final significance letter.docx

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DATE	01/31/14	01/31/14	01/31/14	01/31/14	02/07/14	02/10/14	02/10/14

OFFICIAL RECORD COPY

1 OE concurrence received via email from L. Casey on February 7, 2014.

Letter to Richard L. Anderson from Cynthia D. Pederson dated February 11, 2014

SUBJECT: FINAL SIGNIFICANCE DETERMINATION OF A WHITE FINDING WITH ASSESSMENT FOLLOWUP AND NOTICE OF VIOLATION; NRC INSPECTION REPORT NO. 05000331/2014007; DUANE ARNOLD ENERGY CENTER

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