



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION III  
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November 1, 2016

Mr. Thomas A. Vehec  
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Palo, IA 52324-9785

**SUBJECT: DUANE ARNOLD ENERGY CENTER—NRC INTEGRATED INSPECTION  
REPORT 05000331/2016003**

Dear Mr. Vehec:

On September 30, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Duane Arnold Energy Center. On October 6, 2016, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The enclosed report represents the results of this inspection.

Based on the results of this inspection, the NRC has identified two issues that were evaluated under the significance determination process as having very low safety significance (Green). The NRC has also determined two violations are associated with these issues. A third issue was evaluated under the traditional enforcement process as a Severity Level IV violation. Because the licensee initiated condition reports to address these issues, these violations are being treated as Non-Cited Violations (NCVs), consistent with Section 2.3.2 and Section 6.9.d.9 of the Enforcement Policy. These NCVs are described in the subject inspection report.

If you contest the violations or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to: (1) the Regional Administrator, Region III; (2) the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and (3) the NRC Resident Inspector at the Duane Arnold Energy Center.

In addition, if you disagree with the cross-cutting aspect assigned to any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region III, and the NRC Resident Inspector at the Duane Arnold Energy Center.

T. Vehec

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In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records System (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

K. Stoedter, Chief  
Branch 1  
Division of Reactor Projects

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

Enclosure:  
Inspection Report 05000331/2016003

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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

Report No: 05000331/2016003

Licensee: NextEra Energy Duane Arnold, LLC

Facility: Duane Arnold Energy Center

Location: Palo, IA

Dates: July 1 through September 30, 2016

Inspectors: C. Norton, Senior Resident Inspector  
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Approved by: K. Stoedter, Chief  
Branch 1  
Division of Reactor Projects

Enclosure

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## SUMMARY

Inspection Report (IR) 05000331/2016003; 07/01/2016 – 09/30/2016; Duane Arnold Energy Center; Follow-up of Events and Operability Determinations.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. Two Green findings were identified by the inspectors. These findings involved Non-Cited Violations (NCVs) of U.S. Nuclear Regulatory Commission (NRC) requirements. An additional item was evaluated under the traditional enforcement process as a Severity Level IV issue. The significance of inspection findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects within the Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," dated July 2016.

### **NRC-Identified and Self-Revealed Findings**

#### **Cornerstone: Mitigating Systems**

- **Green.** A self-revealed finding of very low safety significance and a non-cited violation (NCV) of Technical Specification (TS) 5.4, "Procedures," was self-revealed due to the licensee's failure to implement a written procedure recommended in Regulatory Guide 1.33, Revision 2, Appendix A, dated February 1978. Specifically, the licensee did not implement Administrative Control Procedure 1408.23, "Controls to the DAEC [Duane Arnold Energy Center] Switchyard," which led to the loss of one credited offsite power source and an increase in plant risk on August 22, 2016. This issue was entered into the licensee corrective action program (CAP) as Condition Report (CR) 02151255. The licensee's corrective actions included correcting the incorrect relay wiring information which led to the loss of the offsite source and revising ACP 1408.23 to define the systematic process that will be used to review modifications, either planned or emergent, made by ITC to the DAEC Switchyard.

The inspectors determined the licensee's failure to implement a written procedure recommended in Regulatory Guide 1.33 was a performance deficiency. This issue was determined to be more than minor in accordance with IMC 0612, Appendix B, "Issue Screening," dated September 7, 2012, because it affected the equipment performance attribute of the mitigating systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the performance deficiency resulted in the lockout of the T-1 transformer which required entry into TS 3.8.1 due to the loss of a required offsite power source. Using IMC 0609 Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," issued June 19, 2012, the inspectors determined the finding to be of very low safety significance because all of the questions in Exhibit 2, "Mitigating Systems Screening Questions," were answered "no." The finding was associated with the cross-cutting aspect of Work Management because the licensee failed to identify and manage risk and coordinate within different job groups. [H.5] (Section 4OA3)

- Severity Level IV. The inspectors identified a Severity Level IV NCV of 10 CFR Part 50.72(a)(1) and 10 CFR Part 50.73(a)(1) due to the licensee's failure to make a required 8-hour non-emergency notification and a 60 day Licensee Event Report to the NRC after discovering a loss of safety function for the reactor core isolation cooling (RCIC) system. The licensee documented this issue in the CAP as CR 02156273 and planned to perform a causal evaluation for the failure to recognize the reportable condition.

The inspectors previously evaluated the RCIC system's loss of safety function under the SDP as a finding of very low safety significance (Green) as documented in Section 1R22.b of NRC Integrated Inspection Report 05000331/2016002-01 (ML16221A619). Violations of the NRC's reporting requirements are dispositioned using the traditional enforcement process because they are considered to be violations that potentially impede or impact the regulatory process. The inspectors reviewed the guidance in Section 6.9, Paragraph d.9, of the NRC Enforcement Policy and determined the violation associated with the failure to report was a Severity Level IV Violation because the previously evaluated loss of safety function was determined to be a Green finding under the SDP. No cross cutting aspect was assigned to this issue due to the issue being a traditional enforcement violation. (Section 1R15)

- Green. A finding of very low safety significance and an NCV of 10 CFR Part 50, Appendix B, Criterion II, "Quality Assurance Program," was identified by the inspectors for the licensee's failure to follow Quality Assurance Program implementing procedure PI-AA-104-1000, "Condition Reporting." Specifically, the licensee failed to properly classify a condition report documenting the inappropriate revision of an alarm response procedure as a condition adverse to quality. This issue was subsequently entered into the licensee CAP as CR 2160423. Corrective actions included revising the alarm response procedure and taking action to evaluate the incorrect classification.

The inspectors determined that the failure to follow a Quality Assurance Program implementing procedure was more than minor in accordance with IMC 0612, Appendix B, "Issue Screening," dated September 7, 2012, because it impacted the procedure quality attribute of the mitigating systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using IMC 0609 Appendix A, "The Significance Determination Process for Findings At-Power," issued June 19, 2012, the inspectors determined the finding to be of very low safety significance because it did not represent an actual loss of function for greater than the TS allowed outage time. The finding was associated with the Problem Identification and Resolution cross-cutting aspect of Evaluation because the licensee failed to thoroughly evaluate issues to ensure that resolutions addressed the causes and extent of conditions commensurate with their safety significance. [P.2] (Section 1R15)

## REPORT DETAILS

### Summary of Plant Status

Duane Arnold Energy Center (DAEC) was operating at full power at the beginning of the inspection period. The plant remained at full power with the exception of brief down-power maneuvers to accomplish rod pattern adjustments until July 30, 2016, when the licensee reduced power to 61 percent to perform a control rod sequence exchange. Following the sequence exchange, the licensee commenced a gradual power ascension and returned to full power on August 7, 2016. The plant remained at full power with the exception of brief down-power maneuvers to accomplish rod pattern adjustments until August 20, 2016, when DAEC began the end of cycle coast down. DAEC ended the inspection period at 92 percent reactor power.

### 1. REACTOR SAFETY

#### **Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, and Emergency Preparedness**

#### 1R01 Adverse Weather Protection (71111.01)

##### .1 External Flooding

##### a. Inspection Scope

The inspectors evaluated the design, material condition, and procedures for coping with the design basis probable maximum flood. The evaluation included a review to check for deviations from the descriptions provided in the Updated Final Safety Analysis Report (UFSAR) for features intended to mitigate the potential for flooding from external factors. As part of this evaluation, the inspectors checked for obstructions that could prevent draining, checked that the roofs did not contain obvious loose items that could clog drains in the event of heavy precipitation, and determined that barriers required to mitigate the flood were in place and operable. Additionally, the inspectors performed a walkdown of the protected area to identify any modification to the site which would inhibit site drainage during a probable maximum precipitation event or allow water ingress past a barrier. The inspectors also walked down underground bunkers/manholes subject to flooding that contained multiple train or multiple function risk-significant cables. The inspectors also reviewed the abnormal operating procedure (AOP) for mitigating the design basis flood to ensure it could be implemented as written. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one external flooding sample as defined in Inspection Procedure (IP) 71111.01-05.

##### b. Findings

No findings were identified.

.2 Readiness For Impending Adverse Weather-Extreme Heat/Drought Conditions

a. Inspection Scope

The inspectors performed a detailed review of the licensee's procedures and preparations for operating the facility during an extended period of time when ambient outside temperature was high and the ultimate heat sink was experiencing elevated temperatures. The inspectors focused on plant specific design features and implementation of the procedures for responding to or mitigating the effects of these conditions on the operation of the facility's well water system. Inspection activities included a review of the licensee's adverse weather procedures, daily monitoring of the off-normal environmental conditions, and that operator actions specified by plant specific procedures were appropriate to ensure operability of the facility's normal and emergency cooling systems. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one adverse weather protection sample as defined in IP 71111.01-05.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

The inspectors performed partial system walkdowns of the following risk-significant systems:

- "A" River Water Supply (RWS) with "B" RWS unavailable due to preplanned maintenance;
- "B" RWS and "B" Emergency Service Water (ESW) systems while the "A" RWS was out of service for emergent repair;
- "A" Residual Heat Removal Service Water (RHRSW) system with "B" ESW, "B" RHRSW and "B" Standby Diesel Generator (SBDG) unavailable for preplanned maintenance; and
- "B" SBDG system with the High Pressure Core Injection (HPCI) system unavailable for preplanned maintenance.

The inspectors selected these systems based on their risk significance relative to the Reactor Safety Cornerstones at the time they were inspected. The inspectors attempted to identify any discrepancies that could impact the function of the system and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, UFSAR, Technical Specification (TS) requirements, outstanding work orders (WOs), condition reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there



were no obvious deficiencies. The inspectors also verified the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the corrective action program (CAP) with the appropriate significance characterization. Documents reviewed are listed in the Attachment to this report.

These activities constituted four partial system walkdown samples as defined in IP 71111.04–05.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

.1 Routine Resident Inspector Tours (71111.05Q)

a. Inspection Scope

The inspectors conducted fire protection walkdowns which were focused on availability, accessibility, and the condition of firefighting equipment in the following risk-significant plant areas:

- control building elevation 786' and elevation 800' (all fire zones);
- pump house elevation 757' (all fire zones);
- reactor building elevation 716' (fire zones 1–B and 1–D through 1–H);
- turbine building elevation 757' (all fire zones); and
- outside above ground and owner controlled area elevation 757' (fire zones 23–A and switchyard).

The inspectors reviewed areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capability, maintained passive fire protection features in good material condition, and implemented adequate compensatory measures for out-of-service, degraded or inoperable fire protection equipment, systems, or features in accordance with the licensee's fire plan.

The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant's Individual Plant Examination of External Events with later additional insights, their potential to impact equipment which could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event.

Using the documents listed in the Attachment to this report, the inspectors verified fire hoses and extinguishers were in their designated locations and available for immediate use; fire detectors and sprinklers were unobstructed; transient material loading was within the analyzed limits; and fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified minor issues identified during the inspection were entered into the licensee's CAP. Documents reviewed are listed in the Attachment to this report.

These activities constituted five quarterly fire protection inspection samples as defined in IP 71111.05–05.

b. Findings

No findings were identified.

.2 Annual Fire Protection Drill Observation (71111.05A)

a. Inspection Scope

On September 7, 2016, the inspectors observed a fire brigade activation associated with an unannounced fire drill for a fire on turbine building elevation 757'. Based on this observation, the inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors also verified the licensee staff identified deficiencies, openly discussed them in a self-critical manner at the drill debrief, and took appropriate corrective actions. Specific attributes evaluated were:

- proper wearing of turnout gear and self-contained breathing apparatus;
- proper use and layout of fire hoses;
- employment of appropriate firefighting techniques;
- sufficient firefighting equipment brought to the scene;
- effectiveness of fire brigade leader communications, command, and control;
- search for victims and propagation of the fire into other plant areas;
- smoke removal operations;
- utilization of pre-planned strategies;
- adherence to the pre-planned drill scenario; and
- drill objectives.

Documents reviewed are listed in the Attachment to this report.

These activities constituted one annual fire protection inspection sample as defined in IP 71111.05–05.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Resident Inspector Quality Review of Licensed Operator Requalification (71111.11Q)

a. Inspection Scope

On August 31, 2016, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification training. The inspectors verified operator performance was adequate, evaluators were identifying and documenting crew performance problems, and training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms;
- correct use and implementation of abnormal and emergency procedures;

- oversight and direction from supervisors; and
- ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications.

The crew's performance in these areas was compared to pre-established operator action expectations and successful critical task completion requirements. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one quarterly licensed operator requalification program simulator sample as defined in IP 71111.11-05.

b. Findings

No findings were identified.

.2 Annual Operating Test Results (71111.11A)

a. Inspection Scope

The inspector reviewed the overall pass/fail results of the Annual Operating Test, administered by the licensee from June 27, 2016, through August 5, 2016, required by Title 10 of the *Code of Federal Regulations* (10 CFR) 55.59(a). The results were compared to the thresholds established in Inspection Manual Chapter (IMC) 0609, Appendix I, "Licensed Operator Requalification Significance Determination Process," to assess the overall adequacy of the licensee's Licensed Operator Requalification Training program to meet the requirements of 10 CFR 55.59.

This inspection constituted one annual licensed operator requalification examination results sample as defined in IP 71111.11-05.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine Quarterly Evaluations

a. Inspection Scope

The inspectors evaluated degraded performance issues involving the following risk-significant systems:

- Reactor Core Isolation Cooling (RCIC) Barometric Condenser Check Valve Replacement; and
- Transformer 1 Outage for 'R' Breaker Replacement.

The inspectors reviewed events such as where ineffective equipment maintenance had resulted in valid or invalid automatic actuations of engineered safeguards systems and independently verified the licensee's actions to address system performance or condition problems in terms of the following:

- implementing appropriate work practices;

- identifying and addressing common cause failures;
- scoping of systems in accordance with 10 CFR 50.65(b) of the maintenance rule;
- characterizing system reliability issues for performance;
- charging unavailability for performance;
- trending key parameters for condition monitoring;
- ensuring 10 CFR 50.65(a)(1) or (a)(2) classification or re-classification; and
- verifying appropriate performance criteria for structures, systems, and components (SSCs)/functions classified as (a)(2), or appropriate and adequate goals and corrective actions for systems classified as (a)(1).

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified maintenance effectiveness issues were entered into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two quarterly maintenance effectiveness samples as defined in IP 71111.12-05.

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)

a. Inspection Scope

The inspectors reviewed the licensee's evaluation and management of plant risk for the maintenance and emergent work activities affecting risk-significant and safety-related equipment listed below to verify that the appropriate risk assessments were performed prior to removing equipment for work:

- unplanned change in risk caught by Operations prior to performing work start;
- switchyard 125 volt direct current ground;
- HPCI Steam Supply Packing Leak;
- de-channeling and re-inspecting fuel;
- install flood barrier strong back in Pumphouse; and
- Transformer 1 unavailable with river water supply and Pumphouse ventilation work.

These activities were selected based on their potential risk significance relative to the Reactor Safety Cornerstones. As applicable for each activity, the inspectors verified risk assessments were performed as required by 10 CFR 50.65(a)(4) and were accurate and complete. When emergent work was performed, the inspectors verified the plant risk was promptly reassessed and managed. The inspectors reviewed the scope of maintenance work, discussed the results of the assessment with the licensee's probabilistic risk analyst or shift technical advisor, and verified plant conditions were consistent with the risk assessment. The inspectors also reviewed TS requirements and walked down portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met. Documents reviewed during this inspection are listed in the Attachment to this report.

These maintenance risk assessments and emergent work control activities constituted six samples as defined in IP 71111.13–05.

b. Findings

No findings were identified.

1R15 Operability Determinations and Functional Assessments (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- HPCI/RCIC common mode failure when vacuum breaker block valves not full open;
- HPCI stop valve packing leak;
- Chemistry Issues;
- Standby liquid control level indication;
- RCIC Reportability; and
- Residual Heat Removal/Core Spray (CS) Keep Fill pump multiple non-functionalities.

The inspectors selected these potential operability issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the evaluations to ensure TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TS and UFSAR to the licensee’s evaluations to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations. Additionally, the inspectors reviewed a sampling of corrective action documents to verify the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the Attachment to this report.

This inspection constituted six operability determinations and functional assessment samples as defined in IP 71111.15–05.

b. Findings

(1) Failure to Satisfy 10 CFR 50.72 and 10 CFR 50.73 Reporting Requirements for a Condition that Could Have Prevented Fulfillment of a Safety Function

Introduction. The inspectors identified a Severity Level IV non-cited violation (NCV) of 10 CFR Part 50.72(a)(1) and 10 CFR Part 50.73(a)(1) due to the licensee’s failure to make a required 8-hour non-emergency notification and a 60 day Licensee Event Report after discovering a RCIC system condition which could have prevented the system from fulfilling its safety function needed to mitigate the consequences of an accident.

Description. Section 1R22.b of Inspection Report (IR) 05000331/2016002 documented that on April 28, 2016, while operating at full power, the licensee entered an unplanned inoperability of the RCIC system while performing surveillance test procedure 3.3.6.1–28, “RCIC Steam Line Flow High Channel Functional.” The licensee performed an immediate operability determination (IOD) in accordance with procedure EN–AA–203–1001, “Operability Determination/Functionality Assessments,” and determined the unplanned inoperability did not constitute a condition reportable to the NRC.

The inspectors conducted an independent review of the RCIC issue which included reviewing licensee documents, operations and maintenance-related actions and corrective actions of the event. The inspectors found the licensee’s actions to be adequate with one exception. Procedure EN–AA–203–1001, Section 4.3, step 10 states, “if the IOD concludes that the SSC is not operable, then the [Shift Manager] shall determine and implement TS required actions and perform immediate reporting requirements, in accordance with LI–AA–102–1001, Regulatory Reporting, and consultation with Licensing as time permits.” Procedure LI–AA–102–1001, “Regulatory Reporting,” Section 4.0, Step 1 states, in part, “Upon recognition of an event or condition that requires reporting in accordance with any of the applicable requirements in Attachment 1 to this procedure, [Shift Manager] shall initiate the report. Additional guidance is contained in NRC’s NUREG–1022.”

NUREG–1022, “Event Report Guidelines 10 CFR 50.72 and 50.73,” Revision 3, provides guidance for determining whether issues or events are required to be reported to the NRC. Section 3.2.7 of NUREG–1022 provides specific guidance related to events or conditions that could have prevented the fulfillment of a safety function. Section 3.2.7 states, in part, “this criterion is based on the assumption that safety-related SSCs are intended to mitigate the consequences of an accident. Items within the scope include only safety-related SSCs required by the TS to be operable to mitigate the consequences of an accident as discussed in Chapter 6 and 15 of the UFSAR (or equivalent chapters). Accidents are identified as events of moderate frequency, infrequent incidents, or limiting faults as discussed in Regulatory Guide 1.70, ‘Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition).’” Section 3.2.7 further states, in part, “There are a limited number of single-train systems that perform safety functions (e.g., the HPCI system in Boiling Water Reactors). For such systems, inoperability of the single train is reportable even though the plant TS may allow such a condition to exist for a limited time.”

The inspectors reviewed RCIC design basis documents and determined, as documented in Section 4OA5.1.b of IR 05000331/2015007, the RCIC system at Duane Arnold Energy Center is classified as safety-related and, per TS Section 3.5, “Emergency Core Cooling Systems and RCIC System,” the system is required to be operable in MODE 1. The RCIC system was also credited in the analysis for a loss of feedwater flow event, which is an event of moderate frequency in UFSAR Chapter 15.

The inspectors concluded that given the information available to the licensee at the time the IOD was performed, the licensee should have determined the unplanned inoperability of the RCIC system was reportable. Therefore, the licensee should have made a required 8-hour non-emergency notification call to the NRC Operations Center on April 28, 2016, in accordance with 10 CFR Part 50.72(a)(1) as a condition that could have prevented fulfillment of a safety function, as defined by Part 50.72(b)(3)(v)(D). The

inspectors further determined the licensee failed to report the above conditions to the NRC within 60 days of discovery, in this case 60 days from April 28, 2016, in accordance with 10 CFR, Part 50.73(a)(2)(v)(B). The inspectors discussed this issue with the licensee, who documented the inspectors concerns in Condition Report (CR) 2156273. The licensee planned to perform a causal evaluation for the failure to recognize the reportable condition and to reevaluate reportability thereafter. Because the violation is associated with reportability for a past issue which was corrected on April 28, 2016, the continued non-compliance does not present an immediate safety or security concern.

Analysis. The inspectors determined they had previously evaluated the technical issue which led to the RCIC system inoperability as a performance deficiency. This performance deficiency was documented as a finding of very low safety significance (Green) in Section 1R22.b of NRC Inspection Report 05000331/2016002. However, failures to comply with the requirements delineated in 10 CFR 50.72 and 50.73 were dispositioned under the traditional enforcement process as they could potentially impede or impact the regulatory process. When this occurs, the NRC uses the color of the associated technical issue to determine the severity level of the traditional enforcement item.

The inspectors previously determined, in Section 1R22.b of IR 05000331/2016002, the underlying issue was finding of very low safety significance (Green). Consistent with the guidance in Section 6.9, Paragraph d.9, of the NRC Enforcement Policy, the violation associated with this finding was determined to be a Severity Level IV Violation.

Enforcement. Title 10 CFR Part 50.72(a)(1)(ii) requires, in part, that the licensee shall notify the NRC Operations Center via the Emergency Notification System of those non-emergency events specified in Paragraph (b) that occurred within three years of the date of discovery. Title 10 CFR Part 50.72(b)(3)(v)(D) requires, in part, the licensee shall notify the NRC as soon as practical and in all cases within eight hours of the occurrence of any event or condition that at the time of discovery could have prevented the fulfillment of the safety function of the structures or systems that are needed to mitigate the consequences of an accident.

Title 10 CFR Part 50.73(a)(1) requires, in part, that the licensee submit an LER for any event of the type described in this paragraph within 60 days after the discovery of the event. Lastly, 10 CFR Part 50.73(a)(2)(v)(D) requires, in part, that the licensee report any condition that could have prevented the fulfillment of the safety function of systems that are needed to mitigate the consequences of an accident.

Contrary to the above, the licensee failed to notify the NRC Operations Center via the Emergency Notification System of a non-emergency event within 8-hours after discovery on April 28, 2016, and failed to submit a required LER within 60 days of that date. Specifically, the licensee failed to notify the NRC of the RCIC system's inability to fulfill its safety function to mitigate the consequences of an event after an unexpected equipment failure occurred during surveillance testing. The licensee plans to perform a causal evaluation for the failure to recognize the reportable condition and to reevaluate reportability thereafter. In accordance with Section 6.9 of the NRC's Enforcement Policy, this violation was determined to be a Severity Level IV violation because it was

associated with a finding of very low safety significance (Green). Because this issue was entered in the licensee's CAP as CR 2156273, this violation is being treated as an NCV consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000331/2016003-01, Failure to Satisfy 10 CFR 50.72 and 10 CFR 50.73 Reporting Requirements for a Condition that Could Have Prevented Fulfillment of a Safety Function)**

(2) Failure to Evaluate a Condition Adverse to Quality in Accordance with the Duane Arnold Energy Center Corrective Action Program

Introduction. The inspectors identified a finding of very low safety significance (Green) and an NCV of 10 CFR Part 50 Appendix B, Criterion II, "Quality Assurance Program," for the failure to follow Quality Assurance Program Implementing Procedure PI-AA-104-1000, "Condition Reporting." Specifically, the licensee failed to properly classify a condition report documenting the inappropriate revision of an alarm response procedure due to human error as a condition adverse to quality (CAQ).

Description. On June 9, 2016, the licensee screened CR 2136505, "ARP [Alarm Response Procedure] 1C03C, [coordinates: C-5, HPCI/RCIC Vacuum Breakers MO-2290A/B Not Fully Opened], technically incorrect", as a condition not adverse to quality (NCAQ). The condition report identified that on October 15, 2015, the guidance contained in ARP 1C03C, coordinates C-5, was revised to incorrectly state that HPCI and RCIC were operable when the vacuum breaker block valves were not fully opened, when in fact, this condition would have made both HPCI and RCIC inoperable and placed the plant in a 12-hour shutdown limiting condition for operation (LCO).

The CR initiator searched the electronic operations log from October 15, 2015, until June 9, 2016, for alarm C-5 on 1C03C and text pertaining to the HPCI/RCIC vacuum breaker block valves, and returned no results. A search for completed work on the vacuum breaker block valve equipment also returned no results. The licensee screened the condition as an NCAQ, took steps to correct the alarm tile guidance, but performed no further evaluation of the condition.

Attachment 4 of PI-AA-104-1000, "Guidance on the Classification of Condition Reports," Section 6, "Human Performance/Performance Improvement Programs," is used to implement the Quality Assurance Program and provides the following description under Severity Level 2 CAQ: "Significant shortcomings in corrective action, human performance, operator experience, or self-assessment programs that warrant causal analysis." The licensee failed to classify the significant human performance shortcoming of revising an ARP to provide guidance that could have resulted in the licensee unknowingly entering a 12-hour shutdown LCO as a CAQ. As a result, the licensee did not perform a causal analysis to identify additional procedures, subsequently identified by NRC inspectors, which could have unknowingly made HPCI and RCIC inoperable. This issue was entered into the licensee's CAP as CR 2160423 to evaluate the licensee's classification of condition reports.

On September 13, 2016, the inspectors identified that STP 3.3.5.1-08, "Calibration of Drywell Pressure-High Inst," and STP 3.3.5.1-09, "Funct Test of Drywell Press-High Inst" contained steps that under certain conditions, specifically during coincident low HPCI steam line pressure, could have closed the HPCI/RCIC vacuum breaker block



valves. The inspectors identified that STP 3.3.5.1–09 was performed on October 30, 2015, while in Mode 1 when HPCI and RCIC were required to be operable, and ARP guidance was incorrect. On this occasion, however, because the coincident low HPCI steam line pressure was not sensed, the logic for the block valves to close was not actuated and HPCI and RCIC were not made inoperable. Had the surveillance been performed during the HPCI maintenance window while the HPCI steam line was isolated the licensee would have unknowingly entered TS LCO 3.5.1.J to be in Mode 3 in 12 hours. The licensee initiated CR 2155738, “STP could cause unplanned 12-hour shutdown LCO-NRC identified,” and took steps to correct STPs 3.3.5.1–08/09.

Analysis. The inspectors determined the failure to follow a Quality Assurance Program implementing procedure and correctly classify the shortcoming in human performance which led to an incorrect procedure change as a CAQ was a performance deficiency. The performance deficiency was determined to be more than minor and a finding because it impacted the procedure quality attribute of the mitigating systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors applied IMC 0609, Attachment 4, “Initial Characterization of Findings,” to this finding. The inspectors answered “No” to all questions within Table 3–SDP Appendix Router, and transitioned to IMC 0609, Appendix A, “The Significance Determination Process for Findings At-Power,” dated June 19, 2012. Per Exhibit 2, “Mitigating Systems Screening Questions,” the inspectors determined that because the vacuum breaker block valves did not close during the performance of STP 3.3.5.1–09 on October 30, 2015, the finding did not represent an actual loss of function for greater than the TS allowed outage time and screened as very low safety significance (Green). The inspectors determined that the finding was cross-cutting in the Problem Identification and Resolution aspect of Evaluation because the organization failed to thoroughly evaluate the issue to ensure that resolution addressed the causes and extent of conditions commensurate with their safety significance. [P.2]

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion II, “Quality Assurance Program,” requires, in part, that the applicant shall establish at the earliest practicable time, consistent with the schedule for accomplishing the activities, a quality assurance program which complies with the requirements of this appendix. This program shall be documented by written policies, procedures, or instructions and shall be carried out throughout plant life in accordance with those policies, procedures, or instructions.

Attachment 4 of PI-AA–104–1000, “Guidance on the Classification of Condition Reports,” Section 6, “Human Performance/Performance Improvement Programs,” describes a Severity Level 2 CAQ as significant shortcomings in corrective action, human performance, operator experience, or self-assessment programs that warrant causal analysis.

Contrary to the above, on June 9, 2016, the licensee failed to carry out the Quality Assurance Program in accordance with PI-AA–104–1000. Specifically, the licensee failed to classify a significant shortcoming in human performance identified in CR 2136505, which could have resulted in the licensee unknowingly entering a 12-hour

shutdown LCO, as a CAQ. This resulted in the licensee's failure to perform an evaluation to identify STPs that could have unknowingly made HPCI and RCIC inoperable. Corrective actions included correcting the STPs to address HPCI and RCIC operability when the HPCI/RCIC vacuum breaker block valves are not fully opened and initiating CR 2160423 to address corrective action program screening issues.

Because the violation was of very low safety significance (Green) and the issue was entered into the licensee's CAP as CR 02160423, consistent with Section 2.3.2 of the NRC Enforcement Policy, it is being treated as an NCV. **(NCV 05000331/2016003-02, Failure to Identify and Evaluate a Condition Adverse to Quality)**

1R18 Plant Modifications (71111.18)

a. Inspection Scope

The inspectors reviewed the following modifications:

- Hardened Containment Vent System Modification; and
- FLEX Modification.

The inspectors reviewed the configuration changes and associated 10 CFR 50.59 safety evaluation screening against the design basis, the UFSAR, and the TS, as applicable, to verify that the modification did not affect the operability or availability of the affected system(s). The inspectors, as applicable, observed ongoing and completed work activities to ensure that the modifications were installed as directed and consistent with the design control documents; the modifications operated as expected; post-modification testing adequately demonstrated continued system operability, availability, and reliability; and that operation of the modifications did not impact the operability of any interfacing systems. As applicable, the inspectors verified that relevant procedure, design, and licensing documents were properly updated. Lastly, the inspectors discussed the plant modification with operations, engineering, and training personnel to ensure that the individuals were aware of how the operation with the plant modification in place could impact overall plant performance. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two permanent modification samples as defined in IP 71111.18-05.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed the following post-maintenance activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- RCIC Barometric Condenser Check Valve Replacement PMT (post maintenance testing); and

- Hardened Containment Vent System-Purge Gas System; Post Installation PMT.

These activities were selected based upon the structure, system, or component's ability to impact risk. The inspectors evaluated these activities for the following (as applicable): the effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed; acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate; tests were performed as written in accordance with properly reviewed and approved procedures; equipment was returned to its operational status following testing (temporary modifications or jumpers required for test performance were properly removed after test completion); and test documentation was properly evaluated. The inspectors evaluated the activities against TSs, the UFSAR, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with post-maintenance tests to determine whether the licensee was identifying problems and entering them in the CAP and that the problems were being corrected commensurate with their importance to safety. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two post-maintenance testing samples as defined in IP 71111.19-05.

b. Findings

No findings were identified.

1R20 Outage Activities (71111.20)

.1 Refueling Outage Activities

a. Inspection Scope

The inspectors reviewed the Outage Safety Plan (OSP) and contingency plans for the DAEC refueling outage to confirm that the licensee had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense-in-depth. The pre-outage activities listed below:

- licensee configuration management, including maintenance of defense-in-depth commensurate with the OSP for key safety functions and compliance with the applicable TS when taking equipment out of service;
- plans for controls over the status and configuration of electrical systems to ensure that TS and OSP requirements were met, and controls over switchyard activities;
- plans for monitoring of decay heat removal processes, systems, and components;
- plans for reactor water inventory controls including flow paths, configurations, and alternative means for inventory addition, and controls to prevent inventory loss;
- plans for controls over activities that could affect reactivity;
- plans for maintenance of secondary containment as required by TS;

- plans for licensee fatigue management, as required by 10 CFR 26, Subpart I;
- plans for refueling activities, including fuel handling and sipping to detect fuel assembly leakage; and
- new fuel inspection, removing channel to re-inspect a bundle that dropped a few inches when not full seated in storage location.

Documents reviewed are listed in the Attachment to this report.

This inspection constituted a partial refueling outage activities sample as defined in IP 71111.20–05.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors reviewed the test results for the following activities to determine whether risk-significant systems and equipment were capable of performing their intended safety function and to verify testing was conducted in accordance with applicable procedural and TS requirements:

- “B” SBDG fast start operability test (Routine);
- “B” CS system operability test (Routine);
- HPCI system isolation logic system functional test (Routine);
- Visual examination of ground area above Section XI ESW buried piping (Routine); and
- Automatic SCRAM functional test (Routine).

The inspectors observed in-plant activities and reviewed procedures and associated records to determine the following:

- did preconditioning occur;
- the effects of the testing were adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- acceptance criteria were clearly stated, demonstrated operational readiness, and were consistent with the system design basis;
- plant equipment calibration was correct, accurate, and properly documented;
- as-left setpoints were within required ranges; and the calibration frequency was in accordance with TSs, the USAR, procedures, and applicable commitments;
- measuring and test equipment calibration was current;
- test equipment was used within the required range and accuracy; applicable prerequisites described in the test procedures were satisfied;
- test frequencies met TS requirements to demonstrate operability and reliability; tests were performed in accordance with the test procedures and other applicable procedures; jumpers and lifted leads were controlled and restored where used;
- test data and results were accurate, complete, within limits, and valid;
- test equipment was removed after testing;

- where applicable for inservice testing activities, testing was performed in accordance with the applicable version of Section XI, American Society of Mechanical Engineers code, and reference values were consistent with the system design basis;
- where applicable, test results not meeting acceptance criteria were addressed with an adequate operability evaluation or the system or component was declared inoperable;
- where applicable for safety-related instrument control surveillance tests, reference setting data were accurately incorporated in the test procedure;
- where applicable, actual conditions encountering high resistance electrical contacts were such that the intended safety function could still be accomplished;
- prior procedure changes had not provided an opportunity to identify problems encountered during the performance of the surveillance or calibration test;
- equipment was returned to a position or status required to support the performance of its safety functions; and
- all problems identified during the testing were appropriately documented and dispositioned in the CAP.

Documents reviewed are listed in the Attachment to this report.

This inspection constituted five routine surveillance testing samples as defined in IP 71111.22, Sections–02 and–05.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine licensee emergency drill on August 31, 2016, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the Control Room and Technical Support Center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the licensee drill critique to compare any inspector-observed weakness with those identified by the licensee staff in order to evaluate the critique and to verify whether the licensee staff was properly identifying weaknesses and entering them into the corrective action program. As part of the inspection, the inspectors reviewed the drill package and other documents listed in the Attachment to this report.

This inspection constituted one emergency preparedness drill sample as defined in IP 71114.06–06.

b. Findings

No findings were identified.

## 2. RADIATION SAFETY

### Cornerstone: Public Radiation Safety

#### 2RS7 Radiological Environmental Monitoring Program (71124.07)

##### .1 Site Inspection

##### a. Inspection Scope

The inspectors walked down select air sampling stations and dosimeter monitoring stations to determine whether they were located as described in the Offsite Dose Calculation Manual (ODCM) and to determine the equipment material condition.

The inspectors reviewed calibration and maintenance records for select air samplers, dosimeters, and composite water samplers to evaluate whether they demonstrated adequate operability of these components.

The inspectors assessed whether the licensee had initiated sampling of other appropriate media upon loss of a required sampling station.

The inspectors observed the collection and preparation of environmental samples from select environmental media to determine if environmental sampling was representative of the release pathways specified in the ODCM and if sampling techniques were in accordance with procedures.

The inspectors assessed whether the meteorological instruments were operable, calibrated, and maintained in accordance with guidance contained in the UFSAR, NRC Regulatory Guide 1.23, "Meteorological Monitoring Programs for Nuclear Power Plants," and licensee procedures. The inspectors assessed whether the meteorological data readout and recording instruments were operable.

The inspectors evaluated whether missed and/or anomalous environmental samples were identified and reported in the annual environmental monitoring report. The inspectors selected events that involved a missed sample, inoperable sampler, lost dosimeter, or anomalous measurement to determine if the licensee had identified the cause and had implemented corrective actions. The inspectors reviewed the licensee's assessment of any positive sample results and reviewed any associated radioactive effluent release data that was the source of the released material.

The inspectors selected SSCs that involve or could reasonably involve a credible mechanism for licensed material to reach ground water, and assessed whether the licensee had implemented a sampling and monitoring program sufficient to detect leakage to ground water.

The inspectors evaluated whether records important to decommissioning, as required by 10 CFR Part 50.75(g), were retained in a retrievable manner.

The inspectors reviewed any significant changes made by the licensee to the ODCM as the result of changes to the land census, long-term meteorological conditions, or modifications to the sampler stations since the last inspection. The inspectors reviewed technical justifications for any changed sampling locations to evaluate whether the

licensee performed the reviews required to ensure that the changes did not affect its ability to monitor the impacts of radioactive effluent releases on the environment.

The inspectors assessed whether the appropriate detection sensitivities with respect to the ODCM were used for counting samples. The inspectors reviewed the quality control program for analytical analysis.

The inspectors reviewed the results of the licensee's interlaboratory comparison program to evaluate the adequacy of environmental sample analyses performed by the licensee. The inspectors assessed whether the interlaboratory comparison test included the media/nuclide mix appropriate for the facility. The inspectors reviewed the licensee's determination of any bias to the data and the overall effect on the radiological environmental monitoring program.

These inspection activities constituted one complete sample as defined in IP 71124.07-05.

b. Findings

No findings were identified.

.2 Groundwater Protection Initiative Implementation

a. Inspection Scope

The inspectors reviewed monitoring results of the groundwater protection initiative to evaluate whether the licensee had implemented the program as intended and to assess whether the licensee had identified and addressed anomalous results and missed samples.

The inspectors evaluated the licensee's implementation of the minimization of contamination and survey aspects of the groundwater protection initiative and the Decommissioning Planning Rule requirements in 10 CFR 20.1406 and 10 CFR 20.1501.

The inspectors reviewed leak and spill events and 10 CFR 50.75 (g) records and assessed whether the source of the leak or spill was identified and appropriately mitigated.

The inspectors assessed whether unmonitored leaks and spills were evaluated to determine the type and amount of radioactive material that was discharged. The inspectors assessed whether the licensee completed offsite notifications in accordance with procedure.

The inspectors reviewed evaluations of discharges from onsite contaminated surface water bodies and the potential for ground water leakage from them. The inspectors assessed whether the licensee properly accounted for these discharges as part of the effluent release reports.

The inspectors assessed whether on-site ground water sample results and descriptions of any significant on-site leaks or spills into ground water were documented in the Annual Radiological Environmental Operating Report or the Annual Radiological Effluent Release Report.

The inspectors determined if significant new effluent discharge points were updated in the ODCM and the assumptions for dose calculations were updated as needed.

These inspection activities constituted one complete sample as defined in IP 71124.07–05.

b. Findings

No findings were identified

.3 Problem Identification and Resolution

a. Inspection Scope

The inspectors assessed whether problems associated with the radiological environmental monitoring program were being identified by the licensee at an appropriate threshold and were properly addressed for resolution. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented by the licensee that involved the radiological environmental monitoring program.

These inspection activities constituted one complete sample as defined in IP 71124.07–05.

b. Findings

No findings were identified.

**4. OTHER ACTIVITIES**

**Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, Occupational Radiation Safety, and Security**

40A1 Performance Indicator Verification (71151)

.1 Mitigating Systems Performance Index—Emergency Alternating Current Power System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index (MSPI) - Emergency Alternating Current (AC) Power System performance for the period from the third quarter 2015 through the second quarter 2016. To determine the accuracy of the Performance Indicator (PI) data reported during those periods, PI definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99–02, “Regulatory Assessment Performance Indicator Guideline,” Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee’s operator narrative logs, MSPI derivation reports, issue reports, event reports and NRC Integrated Inspection Reports for the period of July 2015 through June 2016 to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable



NEI guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one MSPI emergency AC power system sample as defined in IP 71151-05.

b. Findings

No findings were identified.

.2 Mitigating Systems Performance Index—High Pressure Injection Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index - High Pressure Injection Systems PI for the period from the third quarter 2015 through the second quarter 2016. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, MSPI derivation reports, event reports and NRC Integrated Inspection Reports for the period of July 2015 through June 2016 to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one MSPI high pressure injection system sample as defined in IP 71151-05.

b. Findings

No findings were identified.

.3 Mitigating Systems Performance Index—Heat Removal System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index - Heat Removal System PI for the period from the third quarter 2015 through the second quarter 2016. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, MSPI derivation reports, event reports and NRC Integrated Inspection Reports for the period of July 2015 through June 2016 to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed

by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one MSPI heat removal system sample as defined in IP 71151-05.

b. Findings

No findings were identified.

.4 Radiological Effluent Technical Specification/Offsite Dose Calculation Manual  
Radiological Effluent Occurrences

a. Inspection Scope

The inspectors sampled licensee submittals for the radiological effluent Technical Specification/Offsite Dose Calculation Manual radiological effluent occurrences PI for the period from the third quarter 2015 through the first quarter 2016. The inspectors used Performance Indicator definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, to determine the accuracy of the PI data reported during those periods. The inspectors reviewed the licensee's issue report database and selected individual reports generated since this indicator was last reviewed to identify any potential occurrences such as unmonitored, uncontrolled, or improperly calculated effluent releases that may have impacted offsite dose. The inspectors reviewed gaseous effluent summary data and the results of associated offsite dose calculations for selected dates to determine if indicator results were accurately reported. The inspectors also reviewed the licensee's methods for quantifying gaseous and liquid effluents and determining effluent dose. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one Radiological Effluent Technical Specification/Offsite Dose Calculation Manual radiological effluent occurrences sample as defined in IP 71151-05.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152)

.1 Routine Review of Items Entered into the Corrective Action Program

a. Inspection Scope

As part of the various baseline inspection procedures discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify they were being entered into the licensee's CAP at an appropriate threshold, that adequate attention was being given to timely corrective

actions, and that adverse trends were identified and addressed. Attributes reviewed included: identification of the problem was complete and accurate; timeliness was commensurate with the safety significance; evaluation and disposition of performance issues, generic implications, common causes, contributing factors, root causes, extent-of-condition reviews, and previous occurrences reviews were proper and adequate; and that the classification, prioritization, focus, and timeliness of corrective actions were commensurate with safety and sufficient to prevent recurrence of the issue. Minor issues entered into the licensee's CAP as a result of the inspectors' observations are included in the Attachment to this report.

These routine reviews for the identification and resolution of problems did not constitute any additional inspection samples. Instead, by procedure they were considered an integral part of the inspections performed during the quarter and documented in Section 1 of this report.

b. Findings

No findings were identified.

.2 Daily Corrective Action Program Reviews

a. Inspection Scope

In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished through inspection of the station's daily condition report packages.

These daily reviews were performed by procedure as part of the inspectors' daily plant status monitoring activities and, as such, did not constitute any separate inspection samples.

b. Findings

No findings were identified.

.3 Follow-Up Sample for In-Depth Review: Review of Enforcement Discretion Non-Cited Violations Identified During the Duane Arnold 2014 Cyber-Security Inspection 2014403 and Associated Corrective Action Documents

a. Inspection Scope

The inspectors performed a review of the following documents:

- CR 1951676, Condensate Demin PLC [Programmable Logic Controller] CDA [Critical Digital Asset] Evaluation;
- CR 1952356, Evaluate MIDAS [Meteorological Information and Dose Assessment System] Laptops for CDA Determination;
- CR 1956100, Vulnerability in Badging Process Identified During Cyber Insp; CR 1956813, NRC [U.S. Nuclear Regulatory Commission] Potential Violation of MS2 [Milestone 2];

- CR 1935494, Lessons Learned: PSL [Port St. Lucie] Cyber Security Inspection (Milestone 4);
- CR 1952385, Potential NRC Finding Cyber Inspection; CR 1952390, Potential NRC Finding From Cyber Inspection; and
- CR 1954554, 4 CDA'S Need Further Analysis.

The inspectors also interviewed personnel, verified the completion of and assessed the adequacy of the corrective actions taken in response to two NRC identified NCVs and one licensee identified NCV given enforcement discretion.

The inspectors review and evaluation was focused on the NRC and licensee identified cyber-security NCVs to ensure corrective actions were:

- complete, accurate, and timely;
- considered extent of condition;
- provided appropriate classification and prioritization;
- provided identification of root and contributing causes; and
- appropriately focused.

In addition, the inspectors ensured:

- actions taken resulted in the correction of the identified problem;
- negative trends were identified;
- operating experience was adequately evaluated for applicability; and
- applicable lessons learned were communicated to appropriate organizations.

Documents reviewed are listed in the Attachment to this report. This review constituted one follow-up inspection sample for in-depth review as defined in IP 71152-05.

b. Background

In accordance with Title 10 CFR Part 73, Section 54, "Protection of Digital Computer and Communication Systems and Networks (i.e., the Cyber-Security Rule)," each nuclear power plant licensee was required to submit to the NRC for review and approval a cyber-security plan and an associated implementation schedule by November 23, 2009. Temporary Instruction (TI) 2201/004, "Inspection of Implementation of Interim Cyber Security Milestones 1 – 7" was developed to evaluate and verify each nuclear power plant licensee's ability to meet the interim milestone requirements of the Cyber-Security Rule. On April 11, 2014, the NRC completed an inspection at the Duane Arnold Energy Center, which evaluated the interim cyber-security Milestones 1 – 7. During performance of the TI, three NCVs were identified and incorporated into the licensee's CAP. These three NCVs were subsequently given enforcement discretion following the Security Issues Forum Meeting conducted on April 23, 2014. During the week of July 25, 2016, the inspector reviewed the Cyber-Security Milestones 1 – 7 Inspection NCVs as a problem identification and resolution sample. The CAP documents were evaluated to determine the effectiveness of the licensee's corrective actions.

c. Observations

As discussed in the “Inspection Scope” section above, the inspectors’ review was focused on the licensee’s actions to ensure the NCVs corrective actions were appropriately focused to correct the identified problems. In addition, during the inspectors’ review of the cyber-security inspections’ corrective action documents, the following two observations were identified:

- The inspectors’ review of CR 1952390, “Potential NRC Finding from Cyber Inspection,” dated March 27, 2014, Assignment: 01–00, Apparent Cause Evaluation (ACE) 1952390–01, “Potential NRC Violation from Cyber Inspection, Revision 2” dated April 16, 2014, referenced corrective action document CR 1951676–8 that did not exist. As a result, the licensee issued CR 2146361, “ACE References NAMS [Nuclear Asset Management System] Action That Doesn't Exist,” dated July 27, 2016.
- The inspectors’ review of CR 1956813, “NRC Potential Violation of MS2,” dated April 10, 2014, revealed an extent of condition was conducted by the licensee in CR 1952291, “Review Critical Systems for Digital Equipment without EQID's [Equipment ID's],” dated March 27, 2014. The licensee’s extent of condition review resulted in identifying 112 digital components that had not been evaluated. To determine if the devices were CDAs, the licensee completed an assessment of the 112 digital components and concluded that 69 of the 112 digital components were CDAs.

d. Findings

No findings were identified.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153)

.1 Cardox Tank Leak

a. Inspection Scope

On September 6, 2016, the licensee identified a Cardox leak in a flanged connection located in the valve rebuild room. Approximately 40 percent of the tank volume had escaped through the leak. The inspectors monitored the licensee’s response to the leak to ensure the leak was isolated before it impacted personnel or the licensee’s ability to operate the plant. The inspectors reviewed emergency action level (EAL) documents to confirm entry into an EAL was not warranted. The inspectors also reviewed air sampling results to ensure Cardox levels would not impact the licensee’s ability to operate equipment located in spaces adjacent to the valve rebuild room. Documents reviewed are listed in the Attachment to this report.

This event follow-up review constituted one sample as defined in IP 71153–05.

b. Findings

No findings were identified.

.2 Acid Tank Leak

a. Inspection Scope

The inspectors reviewed the licensee's response to an acid tank leak on September 8, 2016. Specifically, the inspectors observed licensee response in the field and reviewed plant procedures for responding to a chemical oil spill. The licensee entered the chemical spill procedure, ensured the spill was contained and took corrective measures to repair the leak. Documents reviewed are listed in the Attachment to this report.

This event follow-up review constituted one sample as defined in IP 71153-05.

b. Findings

No findings were identified.

.3 Unplanned Entry into Technical Specification 3.8.1 due to Lockout of Transformer 1 and Unplanned Change in Risk from Green to Yellow

a. Inspection Scope

The inspectors reviewed the plant's response to a Lockout of Transformer 1 that resulted in an unplanned entry into TS 3.8.1 and an unplanned change in risk from green to yellow on August 22, 2016. Specifically, the inspectors reviewed design basis documents, operating procedures, corrective actions and plants drawings. Documents reviewed are listed in the Attachment to this report.

This event follow-up review constituted one sample as defined in IP 71153-05.

b. Findings

Failure to Implement Controls for Work in the Duane Arnold Energy Center Switchyard Results in Unplanned Technical Specification Entry and an Unplanned Risk Change

Introduction. A self-revealed finding of very low safety significance (Green) and an NCV of TS 5.4, "Procedures," was identified for the licensee's failure to establish, implement and maintain a written procedure recommended in Section 9 of Regulatory Guide (RG) 1.33, Revision 2, Appendix A, dated February 1978. Specifically, the licensee failed to properly implement Administrative Control Procedure (ACP) 1408.23, "Controls to the DAEC [Duane Arnold Energy Center] Switchyard," to ensure instructions, procedures and drawings used to support replacing switchyard breaker 4730 were appropriate to the circumstance. This led to the loss of one credited offsite power source and an increase in plant risk on August 22, 2016.

Description. The DAEC switchyard is owned and maintained by the regional transmission company, ITC. Between August 12 and August 20, 2016, ITC replaced switchyard breaker 4730. The transmission company had previously determined and

notified the licensee the circuit breaker needed to be replaced. To complete the breaker replacement, ITC provided their workers with an ITC as-built breaker design drawing and a new configuration drawing with verbal instructions to change the breaker's configuration from the as-built configuration to that shown on the new configuration drawing.

On August 22, 2016, after the replacement was completed, the 345 kV to 160 kV safety related transformer, (T-1) locked out during performance of DAEC switching operations. The licensee immediately entered TS LCO 3.8.1.A due to one offsite circuit, T-1, being inoperable. The offsite source inoperability also resulted in the licensee recording an unplanned plant risk increase from green to yellow.

The licensee performed an evaluation for the T-1 lockout and determined that the design drawing ITC used to replace breaker 4730 contained an error and resulted in ITC incorrectly configuring the breaker's protective relay device. In addition, the licensee determined that they had not properly implemented requirements contained ACP 1408.23, "Controls to the DAEC Switchyard," to ensure the breaker replacement work instructions were appropriate prior to ITC beginning work in the switchyard.

The inspectors reviewed pertinent regulatory requirements and concluded TS 5.4, "Procedures," required the licensee to establish, implement, and maintain written procedures recommended in RG 1.33, Revision 2, Appendix A, February 1978, "Quality Assurance Program Requirements." Section 9 of RG 1.33 requires that "maintenance that can affect the performance of safety-related equipment be properly pre-planned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstance." Duane Arnold used ACP 1408.23 to implement guidance in Regulatory Guide 1.33 for work performed in the switchyard. Section 3.3.1 of ACP 1408.23 stated, in part, "DAEC is responsible for completing related [switchyard] activities by use of approved site procedures." In addition, Section 3.3.11 stated, in part, "the DAEC modification process shall be used to review ITC switchyard change(s) for DAEC requirements, program impacts, design controlled document, and procedure impacts." The licensee's failure to review ITC switchyard changes prior to ITC replacing breaker 4730 led to ITC incorrectly wiring the protective relay device which resulted in the loss of one required offsite circuit and an increase of plant risk from green to yellow. The licensee corrected the relay wiring, restored T-1 to service, and initiated CR 02151255, "Unplanned loss of Offsite Power Circuit," to address controlling work in the DAEC switchyard.

Analysis: The inspectors determined the licensee's failure to implement a written procedure recommended in RG 1.33, Section 9 as required by TS 5.4 was a performance deficiency. The performance deficiency was determined to be more than minor in accordance with IMC 0612, Appendix B, "Issue Screening," dated September 7, 2012, because it affected the equipment performance attribute of the mitigating systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the performance deficiency resulted in the lockout of T-1 and the loss of a required off-site circuit.

The inspectors applied IMC 0609, Attachment 4, "Initial Characterization of Findings," issued June 19, 2012, to this finding. The inspectors answered "No" to all questions within Table 3, "SDP Appendix Router," and transitioned to IMC 0609, Appendix A, "The

Significance Determination Process (SDP) for Findings At-Power,” issued June 19, 2012. The inspectors determined the finding to be of very low safety significance (Green) because all of the associated questions in Exhibit 2, “Mitigating Systems Screening Questions,” were answered “no.”

The inspectors determined this finding was cross-cutting in the Human Performance aspect of Work Management because the licensee failed to identify and manage the risk associated with the breaker replacement commensurate to the work and the need for coordination within different job groups. Specifically, the licensee’s failure to implement portions of ACP 1408.23 to a level commensurate with the work to be performed by ITC led to an unplanned entry into TS LCO 3.8.1.A, one offsite circuit inoperable, and an unplanned risk increase from green to yellow. [H.5]

Enforcement: Technical Specification 5.4 requires, in part, “written procedures shall be established, implemented, and maintained covering the following activity: The applicable procedures recommended in Regulatory Guide 1.33, Revision 2; Appendix A, February 1978.” Section 9 of RG 1.33, Revision 2, Appendix A, February 1978, requires, in part, “maintenance that can affect the performance of safety-related equipment be properly pre-planned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstance.”

Contrary to the above, between August 12 and August 20, 2016, the licensee failed to implement a written procedure recommended in RG 1.33. Specifically, the licensee failed to implement ACP 1408.23 which required using the DAEC modification process to review ITC changes in the switchyard. This resulted in the loss of one offsite circuit and an increase in plant risk from green to yellow on August 22, 2016. The licensee corrected the relay wiring and revised ACP 1408.23 to specifically define the systematic process that will be used to review modifications, either planned or emergent, made by ITC to the DAEC Switchyard.

Because the violation was of very low safety significance (Green) and the issue was entered into the licensee CAP as CR 02151255, “Unplanned loss of Offsite Power Circuit,” consistent with Section 2.3.2 of the Enforcement Policy, it is being treated as an NCV. **(NCV 05000331/2016003–03, Failure to Implement Controls to the Duane Arnold Energy Center Switchyard Resulting in an Unplanned Technical Specification Limiting Condition for Operation 3.8.1 Entry and an Unplanned Risk Change from Green to Yellow)**

#### 4OA6 Management Meetings

##### .1 Exit Meeting Summary

On October 6, 2016, the inspectors presented the inspection results to you and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

##### .2 Interim Exit Meeting Summary

Interim exits were conducted for:



- The inspection results for the Radiation Safety Program review with Mr. T. Vehec, Site Vice President, on July 15, 2016.
- The inspection results for the Problem Identification and Resolution sample of the Cyber Security Program were discussed with Mr. P. Hansen, Plant General Manager, on July 29, 2016.

The inspectors confirmed that none of the potential report input discussed was considered proprietary. Proprietary material received during the inspection was returned to the licensee.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee

T. Vehec, Site Vice President  
P. Hansen, Plant General Manager  
S. Brown, Site Engineering Director  
M. Davis, Licensing Manager  
M. Fritz, Emergency Preparedness Manager  
B. Simmons, Nuclear Oversight Manager  
R. Wheaton, Operations Director  
D. Morgan, Radiation Protection Manager  
M. Casey, Chemistry Manager  
J. Schwertfeger, Security Manager  
C. Hill, Training Manager  
B. Murrell, Licensing Senior Engineer  
L. Swenzinski, Licensing Senior Engineer  
P. Collingsworth, System Engineering  
D. Church, Engineering Programs Manager  
D. Tanko, Environmental Specialist  
R. Benter, Cyber-Security Specialist  
M. Coleman, Information Management (IM) Manager  
W. Keith, CAP Coordinator  
J. Morrissey, Maintenance Director (Acting)  
J. Probst, Licensing Engineer  
T. Weaver, Licensing Engineer

#### U.S. Nuclear Regulatory Commission

K. Stoedter, Chief, Reactor Projects Branch 1  
M. Chawla, Project Manager, NRR

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

05000331/2016003-01	NCV	Failure to Satisfy 10 CFR 50.72 and 10 CFR 50.73 Reporting Requirements for a Condition that Could Have Prevented Fulfillment of a Safety Function (Section 1R15)
05000331/2016003-02	NCV	Failure to Identify and Evaluate a Condition Adverse to Quality (1R15)
05000331/2016003-03	NCV	Failure to Implement Controls to the Duane Arnold Energy Center Switchyard Resulting in an Unplanned Technical Specification Limiting Condition for Operation 3.8.1 Entry and an Unplanned Risk Change from Green to Yellow (Section 71153)

### Closed

05000331/2016003-01	NCV	Failure to Satisfy 10 CFR 50.72 and 10 CFR 50.73 Reporting Requirements for a Condition that Could Have Prevented Fulfillment of a Safety Function (Section 1R15)
05000331/2016003-02	NCV	Failure to Identify and Evaluate a Condition Adverse to Quality (1R15)
05000331/2016003-03	NCV	Failure to Implement Controls to the Duane Arnold Energy Center Switchyard Resulting in an Unplanned Technical Specification Limiting Condition for Operation 3.8.1 Entry and an Unplanned Risk Change from Green to Yellow (Section 71153)

### Discussed

None.

## LIST OF DOCUMENTS REVIEWED

The following is a partial list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspector reviewed the documents in their entirety, but rather that selected sections or portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

### 1R01 Adverse Weather Protection

- Abnormal Operating Procedure (AOP) 903; Severe Weather; Revision 59
- ARP 1C07B; Turbine Control; Revision 92
- Operating Procedure (OP)-AA-102-1002; Seasonal Readiness; Revision 14
- AOP 902; Flood; Revision 55
- CR 2157369; Initiate Work Order to Seal Penetration
- CR 2157376; Initiate WO to Relocate Gasoline/diesel Storage Tanks
- CR 2157441; Cedar River Flood Warning Assued by NWS
- CR 2157463; Close TB penetration
- CR 2157784; REMP – GWPP Preparations for Cedar River Flood
- CR 2157809; Main Generator H2 Feed Installation
- CR 2157979; EP Sirens to be Removed from Service
- CR 2158118; Additional Siren to be Removed from Service
- CR 2158272; SLE 16-89, Unable to Complete Portion of Patrol – Flood
- CR 2158380; Sirens in Potential Flood Areas and Control Box Height
- CR 2158598; Recovery of AOP 902 – Flood Actions

### 1R04 Equipment Alignment

- OP-AA-102-1003; Guarded Equipment; Revision 7
- Operating Instruction (OI) 410A1; River Water Supply System Electrical Lineup; Revision 12
- OI 410A2; "A" River Water Supply System Valve Lineup and Checklist; Revision 21
- OI 410A4; "B" River Water Supply System Valve Lineup and Checklist; Revision 14
- OI 454A4; "B" ESW System Valve Lineup and Checklist; Revision 18
- OI 416A1; RHRSW System Electrical Lineup; Revision 6
- OI 416A2; "A" RHRSW System Valve Lineup and Checklist; Revision 11
- OI 416A6; RHRSW System Control Panel Lineup; Revision 5
- OI 324A4; [Standby Diesel Generator] SBDG 1G-21 System Valve Lineup and Checklist; Revision 16
- OI324A8; SBDG 1G-21 System Control Panel Lineup; Revision 5
- Drawing BECH-M113; P.&I.D. RHR Service Water and Emergency Service Water Systems; Revision 75
- Drawing BECH-M129; P.&I.D. River Water Supply System Intake Structure; Revision 46
- Drawing BECH-M146; P.&I.D. Service Water System Pumphouse; Revision 89

### 1R05 Fire Protection

- ACP 1412.2; Control of Combustibles; Revision 45
- ACP 1412.4; Impairments to Fire Protection Systems; Revision 78
- FHA-400; Fire Protection Program- Fire Hazards Analysis; Revision 20
- Pre-Fire Plan (PFP)-OC-757; Pre-Fire Plan OAG-OCA El. 757; Revision 2
- PFP-RB-716; Pre-Fire Plan Reactor Building El. 716; Revision 3
- PFP-TB-757; Pre-Fire Plan Turbine Building El. 757; Revision 2

- PFP-CB-786; Pre-Fire Plan Control Building El. 786; Revision 1
- PFP-CB-800; Pre-Fire Plan Control Building El. 800; Revision 0
- PFP-PH-757; Pre-Fire Plan Pump House; Revision 1
- FB-AB-100; DAEC Fire Protection Program; Revision 6
- NG-009D; Fire Drill Evaluation; Revision 7
- CR 02156171; Observation of Unannounced Fire Drill
- CR 02156172; NRC Identified Control Room's Use of the Phonetic Alphabet
- CR 02156175; Fire Brigade Radio Confusion During Unannounced Fire Drill
- EAL Bases Document; HU2; Revision 13

#### 1R11 Licensed Operator Regualification Program

- OP-AA-100-1000; Conduct of Operations; Revision 15
- AD-AA-100-1006; Procedure and Work Instruction Use and Adherence; Revision 5
- OP-AA-103-1000; Reactivity Management; Revision 4
- Reactivity Management Plan; Downpower for Control Rod Exercise; August 2015
- 16TD2; 2016 Emergency Response Drill/Exercise Program; August 31, 2016

#### 1R12 Maintenance Effectiveness

- ER-AA-100-2002; Maintenance Rule Program Administration; Revision 2
- WO 40452271-01; V-2410-Replace Check Valve
- WO 40452273-01; V-2410-Replace Check Valve

#### 1R13 Maintenance Risk Assessments and Emergent Work Control

- Work Planning Guideline-1; Work Process Guideline; Revision 65
- Work Planning Guideline-2; Online Risk Management Guideline; Revision 69
- OP-AA-104-1007; Online Aggregate Risk; Revision 4
- WM-AA-100-1000; Work Activity Risk Management; Revision 8
- OP-AA-102-1003; Guarded Equipment; Revision 17
- WO 40326354-01; Perform PI Test
- CR 02151088; MO 2202, HPCI Steam Supply has a Packing Leak
- WO 40456787; Adjust HPCI Steam Supply to Address Packing Leak
- CR 2150265; Partial Ground Indicated on the Substation Battery
- WO 40485047; 1DSUB; Battery, 125 Volts Direct Current Substation
- DAEC Substation Schematic – Circuit Breaker 5630; 1-2699-0-D-E1573-01
- DAEC Substation Schematic – Circuit Breaker 5940; 1-2699-0-E1573-01
- RFP 401; New Fuel Inspection, Channeling, and Storage; Revision 67
- WO 40299709; Install Strong Back Hardware at Hatches PR-7 and PR08

#### 1R15 Operability Determinations and Functional Assessments

- EN-AA-203-1001; Operability Determinations/Functionality Assessments; Revision 22
- OP-AA-105-1000; Operational Decision-Making; Revision 04
- ACP 1410.2; LCO Tracking and Safety Function Determination Program; Revision 35
- STP 3.3.5.1-08; Calibration of Drywell Pressure – High Instrumentation; Revision 1
- STP 3.3.5.1-09; Functional Test of Drywell Pressure – High Instrumentation; Revision 1
- PI-AA-104-1000; Condition Reporting; Revision 11
- CR 02143005; 1P070-M RHR/CS Fill Pump Thermal Overload Trip
- CR 02143116; Keep Fill Pump Stopped During Thermography
- CR 02144426; 1B4416 Was Difficult to Rack Out

- CR 02146146; HPCI & RCIC Inop and Unavailable when Vacuum Breaker Block Valves are not Fully Opened
- ARP 1C03C C-5; HPCI/RCIC Vacuum Breakers MO-2290A / B Not Full Open; Revision 43; Revision 44; Revision 45
- STP 3.3.5.1-09; Functional Test of Drywell Pressure-High Instrumentation; Revision 1
- STP 3.3.5.1-08; Calibration of Drywell Pressure-High Instrumentation; Revision 1
- UFSAR Sections 6.3 and 5.4.6
- CR 02144676; 1B4416 – Degraded Starter – Thermal Overload
- CR 02144746; 1P070 RHR/CS Keep Fill Pump Tripped
- CR 02144915; RHR/CS Keep Fill Pump Troubleshooting
- CR 02144935; Recurring Trips of 1P070, RHR/CS Keep Fill Pump
- CR 02144965; 1P070 Tripped (Recurring)
- CR 02144966; Alternatives Analysis to Maintain RHR Pressure
- CR 02144971; 1P070 Recurring Trip
- CR 02146146; HPCI & RCIC Inoperable and Unavailable when Vacuum Breaker Block Valves are not Fully Opened
- CR 02148850; HV2202 Packing Leak
- CR 02148872; As Found Value Does Not Meet As Left Requirement
- CR 02151156; XRF Metals Calculation and Calibration Questions
- CR 02156273; NRC RCIC Reportability Position
- STP 3.1.7-03; Standby Liquid Control System Boron Concentration Test; Revision 32
- LI-AA-102-1001; Regulatory Reporting; Revision 12

#### 1R18 Plant Modifications

- WO 40403216-64; Partial Install Cables for UPS and ROS
- WO 40438796-37; Penetration to RB From Switchgear Room
- CR 2156088; FLEX Connections do not Match FLEX Hoses

#### 1R19 Post-Maintenance Testing

- MD-024; Post Maintenance Testing Program; Revision 80
- MD-062; Work Order Task(s); Revision 10
- WO 40387396-82; PMT of HCVS Purge Gas System Tubing and Components
- WO 40452271-04; RCIC Condensate Pump Discharge Check Valves
- OI 150; Reactor Core Isolation Cooling; Revision 83

#### 1R20 Outage Activities

- RFP 401; New Fuel Inspection, Channeling, and Storage; Revision 67

#### 1R22 Surveillance Testing

- ACP 107; Surveillance Tests; Revision 19
- WO 40413416-01; STP 3.8.1-06B “B” SBDG Operability Test (Fast Start)
- STP 3.5.1-01B; “B” Core Spray System Operability Test; Revision 18
- STP 3.3.6.1-49; HPCI System Isolation Logic System Functional Test; Revision 9
- STP NS540004A; Visual Examination of Ground Area above American Society of Mechanical Engineers Section XI Emergency Service Water Loop Buried Piping; Revision 2
- STP 3.3.1.1-22; Automatic SCRAM Functional Test; Revision 22

## 1EP6 Drill Evaluation

- Emergency Response Organization Training Drill; 16TD2; Revision 0

## 2RS7 Radiological Environmental Monitoring Program

- Procedure Number; Procedure Name; Revision Number or Date (Month Day, Year)
- Duane Arnold Energy Center 2015 Annual Radiological Environmental Operating Report Review, May 10, 2016
- Duane Arnold Energy Center Radiological Environmental Program Review; May 29, 2016
- Offsite Dose Assessment Manual; Revision 35
- ESP 4.3.1.1; Airborne Particulate and Iodine Sampling; Revision 34
- ESP 4.3.1.2; Ambient Radiation Sampling; Revision 20
- ESP 4.3.1.3.A; Surface Water Sampling; Revision 25
- ESP 4.3.1.5; Ground Water Sampling; Revision 29
- ESP 4.3.1.5.A; Sampling Site Monitoring Wells; Revision 8
- ESP 4.3.1.15; Milk Sampling; Revision 31
- ESP 4.3.1.16; Special Radiological Sampling; Revision 12
- 2014 Annual Radiological Environmental Operating Report; May 9, 2015
- 2015 Annual Radiological Environmental Operating Report; May 11, 2016
- Work Order Package; 40402945 01; Monthly Calibration of the Meteorological System; May 19, 2016
- Work Order Package; 40371656 01; Monthly Calibration of the Meteorological System; December 22, 2015
- Work Order Package; 40333371 01; Monthly Calibration of the Meteorological System; June 29, 2015
- Work Order Package; 40309089 01; Monthly Calibration of the Meteorological System; February 17, 2015
- DAEC Metrology Lab; Report of Calibration; Low Volume Air Sampler; HP1605; April 20, 2016
- DAEC Metrology Lab; Report of Calibration; Low Volume Air Sampler; HP1605; December 10, 2015
- DAEC Metrology Lab; Report of Calibration; Low Volume Air Sampler; HP1606; May 9, 2016
- DAEC Metrology Lab; Report of Calibration; Low Volume Air Sampler; HP1606; May 14, 2015

## 4OA1 Performance Indicator Verification

- DAEC MSPI Basis Document; Revision 16
- DAEC MSPI Basis Document; Revision 17
- EN-AA-105-1005; MSPI; Revision2
- ACP 1402.4; NRC, WANO & MOPR Performance Indicator Reporting; Revision 20
- Procedure Number; Procedure Name; Revision Number or Date (Month Day, Year)
- NRC PI Data Calculation, Review and Approval; MSPI AC Power System; Third Quarter 2015 through Second Quarter 2016
- NRC PI Data Calculation, Review and Approval; MSPI AC Power System; Third Quarter 2015 through Second Quarter 2016
- NRC PI Data Calculation, Review and Approval; MSPI Heat Removal System; Third Quarter 2015 through Second Quarter 2016

- NRC PI Data Calculation, Review and Approval; MSPI High Pressure Injection System; Third Quarter 2015 through Second Quarter 2016
- STP NS790708; Offsite Effluent Dose Calculation; July 31, 2015
- STP NS790708; Offsite Effluent Dose Calculation; August 26, 2015
- STP NS790708; Offsite Effluent Dose Calculation; September 29, 2015
- STP NS790708; Offsite Effluent Dose Calculation; January 29, 2016
- STP NS790708; Offsite Effluent Dose Calculation; March 2, 2016
- STP NS790708; Offsite Effluent Dose Calculation; March 26, 2016

#### 4OA2 Identification and Resolution of Problems

- OP-AA-100-1002; Plant Status Control Management; Revision 10
- PI-AA-100-1005; Root Cause Analysis; Revision 15
- PI-AA-100-1006; Common Cause Evaluation; Revision 12
- PI-AA-100-1007; Apparent Cause Evaluation; Revision 17
- PI-AA-103-1000; Human Performance Program Monitoring; Revision 7
- PI-AA-103-1000; Human Performance Program Error Reduction Tools; Revision 5
- Corrective Action Program and Conditioning Reporting; Revision 4
- OP-AA-101-1000; Clearance and Tagging; Revision 18
- ACE 1952390; Potential NRC Violation From Cyber Inspection; Revision 2
- ACE 1956813; Report Cyber Security NRC Inspection Finding-NEI 08-09 Milestone 2
- IM-AA-102-1002-F01; Critical System Digital Asset Worksheet; April 1, 2014
- System # / ID: 39.00; System Name: Condensate Demineralizers
- CR 2146361; ACE References NAMS Action That Didn't Exist
- CR 1935494; Lessons Learned: PSL Cyber Security Inspection (Milestone 4)
- CR 1951676; Condensate Demin Programmable Logic Controller CDA Evaluation
- CR 1952291; Review Critical Systems for Digital Equipment Without EQID's
- CR 1952356; Evaluate Meteorological Information and Dose Assessment System Laptops for CDA Determination
- CR 1952385; Potential NRC Finding Cyber Inspection
- CR 1952390; Potential NRC Finding From Cyber Inspection
- CR 1954554; 4 CDA'S Need Further Analysis
- CR 1956100; Vulnerability in Badging Process Identified During Cyber Inspection
- CR 1956813; NRC Potential Violation of MS2
- CR 1956830; NRC Potential Violation of MS6
- CR 1992439; Correction to ACE
- IM-AA-102-1000; Cyber Security Critical System Identification; Revision 4
- IM-AA-102-1002; Cyber Security Assessment; Revisions 5 and 11
- IM-AA-102-1002-F01; Digital Asset Worksheet; Revision 6
- IM-AA-102-1007; Cyber Security Controls for Portable and Mobile Devices; Revisions 9, 10, 11, 12, and 13
- PI-AA-203; Action Tracking Management; Revision 8
- SY-AA-102-1036; Target Set Development; Identification and Maintenance; Revision 3
- ML14134A222; Duane Arnold Energy Center Inspection of TI 2201/004, "Inspection of Implementation of Interim Cyber-Security Milestones 1 - 7" Inspection Report 2014403, May 14, 2014
- ML14316A042; IP 71152, Problem Identification and Resolution; February 26, 2015
- NG-12-0370; DAEC Cyber Security Assessment Team Meeting Minutes, September 12, 2012
- NG-14-0108; DAEC Cyber Security Assessment Team Meeting Minutes; April 2, 2014
- NG-15-0133; NextEra Energy Duane Arnold. LLC Reply to Inspection Report 05000331/2014403; August 14, 2015



- SVP-14-063; Closure of Cyber-Security "Good Faith Enforcement Discretion"  
Findings / Violations; September 2, 2014  
tresys.com; Tresys Technology – XD Air: Securing Air Gap Transfer

#### 4OA3 Follow-Up of Events and Notices of Enforcement Discretion

- Piping and Instrument Drawing Bech M-185; Revision 10
- ACP 1411.14; Chemical/Oil Spill Response
- AOP 301; Loss of Essential Electrical Power; Revision 70
- CR 02151417; T-1 Transformer Lockout
- DAEC Substation Three Line -345KV, 1-2699-0-D-E0308 CR-for construction; Revision 7
- DAEC Substation Three Line -345KV, 1-2699-0-D-E0308 CR-as built; Revision 7

## LIST OF ACRONYMS USED

AC	Alternating Current
ACE	Apparent Cause Evaluation
ACP	Administrative Control Procedure
ADAMS	Agencywide Document Access Management System
AOP	Abnormal Operating Procedure
ARP	Alarm Response Procedure
CAP	Corrective Action Program
CAQ	Condition Adverse to Quality
CDA	Critical Digital Asset
CFR	Code of Federal Regulations
CR	Condition Report
CS	Core Spray
DAEC	Duane Arnold Energy Center
DC	Direct Current
DRP	Division of Reactor Projects
ESW	Emergency Service Water
HPCI	High Pressure Core Injection
IMC	Inspection Manual Chapter
IOD	Immediate Operability Determination
IP	Inspection Procedure
IR	Inspection Report
LCO	Limiting Condition for Operation
LER	Licensee Event Report
MSPI	Mitigating Systems Performance Index
NCAQ	Not Adverse to Quality
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
OCDM	Offsite Dose Calculation Manual
OI	Operating Instruction
OP	Operating Procedure
OSP	Outage Safety Plan
PARS	Publicly Available Records System
PFP	Pre-Fire Plan
PI	Performance Indicator
RCIC	Reactor Core Isolation Cooling
RHRSW	Residual Heat Removal Service Water
RWS	River Water Supply
SBDG	Standby Diesel Generator
SDP	Significance Determination Process
SSC	System, Structure, and Component
STP	Surveillance Test Procedure
TI	Temporary Instruction
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
WO	Work Order

T. Vehec

-2-

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records System (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

Karla Stoedter, Chief  
Branch 1  
Division of Reactor Projects

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