UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, ILLINOIS 60532-4352

April 18, 2019

Mr. Dean Curtland
Director of Site Operations
NextEra Energy Duane Arnold, LLC
3277 DAEC Road
Palo, IA 52324-9785

SUBJECT: DUANE ARNOLD ENERGY CENTER, UNIT 1—NRC BIENNIAL PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT 05000331/2019010

Dear Mr. Curtland:

On March 15, 2019, the U.S. Nuclear Regulatory Commission (NRC) completed a Problem Identification and Resolution inspection at your Duane Arnold Energy Center and discussed the results of this inspection with Mr. M. Davis and other members of your staff. The results of this inspection are documented in the enclosed report.

The NRC inspection team reviewed the station's corrective action program and the station's implementation of the program to evaluate its effectiveness in identifying, prioritizing, evaluating, and correcting problems, and to confirm that the station was complying with NRC regulations and licensee standards for corrective action programs. Based on the samples reviewed, the team determined that your staff's performance in each of these areas adequately supported nuclear safety.

The team also evaluated the station's processes for use of industry and NRC operating experience information and the effectiveness of the station's audits and self-assessments. Based on the samples reviewed, the team determined that your staff's performance in each of these areas adequately supported nuclear safety.

Finally the team reviewed the station's programs to establish and maintain a safety-conscious work environment, and interviewed station personnel to evaluate the effectiveness of these programs. Based on the team's observations and the results of these interviews the team found no evidence of challenges to your organization's safety-conscious work environment. Your employees appeared willing to raise nuclear safety concerns through at least one of the several means available.

The NRC inspectors did not identify any finding or violation of more than minor significance.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at http://www.nrc.gov/reading-rm/adams.html and at the NRC Public Document Room in accordance with 10 CFR 2.390, “Public Inspections, Exemptions, Requests for Withholding.”

Sincerely,

/RA/

Dariusz Szwarc, Acting Chief
Branch 2
Division of Reactor Projects

Docket No.: 05000331
License No.: DPR-49

Enclosure:
Inspection Report 05000331/2019010

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Letter to Dean Curtland from Dariusz Szwarc dated April 18, 2019

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Number:	05000331
License Number:	DPR-49
Report Number:	05000331/2019010
Enterprise Identifier:	I-2019-010-0042
Licensee:	NextEra Energy Duane Arnold, LLC
Facility:	Duane Arnold Energy Center
Location:	Palo, IA 52324
Inspection Dates:	February 25, 2019 to March 15, 2019
Inspectors:	J. Draper, Health Physicist V. Myers, Senior Health Physicist C. Norton, Senior Resident Inspector R. Ruiz, Project Engineer
Approved By:	Dariusz Szwarc, Acting Chief Branch 2 Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a Problem Identification and Resolution inspection at Duane Arnold Energy Center in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to https://www.nrc.gov/reactors/operating/oversight.html for more information. Findings and violations being considered in the NRC's assessment are summarized in the table below.

List of Findings and Violations

No findings or violations were identified.

Additional Tracking Items

None.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

OTHER ACTIVITIES – BASELINE

71152B - Problem Identification and Resolution

Biennial Team Inspection (IP Section 02.04) (1 Sample)

The inspectors performed a biennial assessment of the licensee's corrective action program, use of operating experience, self-assessments and audits, and safety conscious work environment.

- Corrective Action Program Effectiveness: The inspectors assessed the corrective action program's effectiveness in identifying, prioritizing, evaluating, and correcting problems.
- Operating Experience, Self-Assessments and Audits: The inspectors assessed the effectiveness of the station's processes for use of operating experience, audits and self-assessments.
- Safety Conscious Work Environment: The inspectors assessed the effectiveness of the station's programs to establish and maintain a safety-conscious work environment.

INSPECTION RESULTS

Observation	71152B
Corrective Action Program: Based on the samples reviewed, the team determined that your staff's performance in each of these areas adequately supported nuclear safety. Effectiveness of Problem Identification: Overall, the station was effective at identifying issues at a low threshold and was properly entering them into the CAP as required by station procedures. The team determined that the station was generally effective at identifying negative trends that could potentially impact nuclear safety. The team walked down various containment isolation valves, the emergency diesel generators, portions of the core spray system, off-gas radiation monitoring system, and various security-related areas. For the areas reviewed, the team did not identify any issues in the area of problem identification. Effectiveness of Prioritization and Evaluation of Issues: In-depth reviews of a risk-informed sampling of Action Requests (ARs), work orders (WOs), and cause evaluations were completed, including a 5-year time period for the Emergency Preparedness program and associated systems. The team determined that the licensee had established a low threshold for	

entering deficiencies into the CAP, that the issues were generally being appropriately prioritized and evaluated for resolution, and that CAs were implemented to mitigate the future risk of issues occurring that could affect overall system operability and/or reliability.

Through its review of the licensee's cause evaluations, the team did identify one example of a potential gap in the licensee's root cause analysis procedure, PI-AA-100-1005, Revisions 15-18. Specifically, the team noted in one instance that the licensee identified an issue that was screened under the licensee's CAP as a significant condition adverse to quality (SCAQ), but a cause was not determined and corrective actions to preclude repetition (CAPRs) were not taken.

In refueling outage (RFO) 25, Main Steam Isolation Valve CV4415 failed its local leak rate test (LLRT). Using the licensee's CAP screening process, the licensee screened this issue as an SCAQ, satisfying the criterion in place at the time of being considered a "significant condition that resulted in a Licensee Event Report (LER)." The licensee followed their process to perform a root cause evaluation; however, through that evaluation, the licensee failed to identify a root cause for the failure, and only identified a contributing cause. The licensee planned a corrective action to address the contributing cause but later cancelled that action as they later determined that the contributing cause was not applicable. While the licensee's CAP allowed for situations where a root cause evaluation failed to identify a cause for an SCAQ, 10 CFR Part 50, Appendix B, Criterion XVI, requires the licensee to establish measures that assure that the cause of SCAQs is determined and that corrective actions are taken to preclude repetition.

Upon further review, the licensee determined that although the issue resulted in an LER, it was not actually a "significant condition" because the other MISV in the steam line pathway had a satisfactory LLRT, and therefore was not an SCAQ. The licensee initiated condition report (CR) 02305539 and officially downgraded the previous classification of the issue above from an SCAQ to a condition adverse to quality. Additionally, this CR would also review whether there is actually a disparity between the licensee's CAP and the 10 CFR Part 50, Appendix B, Criterion XVI regulation.

Through its review of another root cause evaluation (RCE), the team identified one example of a missed opportunity where internal operating experience (OE) was not used to gain insights into an SCAQ. Specifically, RCE 2181838 reviewed the circumstances surrounding the drywell inboard and outboard vent valves failing their LLRTs after plant start up following RFO 25 in the Fall of 2016. The RCE identified that improper maintenance practices, which included the adjustment of a hex screw, resulted in the valves not sealing as designed. As part of the RCE, the licensee looked at internal OE to determine if the issue was considered a repeat event. Licensee procedures PI-AA-104-1000, "Condition Reporting", and PI-AA-100-1005, "Root Cause Analysis" limit the definition of a "repeat event" to similar events that have the same root cause. Although the licensee identified several examples of similar issues from recent outages during their internal OE review, since none of the previous issues had root cause evaluations performed, the licensee did not consider this a repeat event. The licensee also stated that since these previous issues were limited to an apparent cause evaluation, their evaluation team could not conclude that the previous corrective actions were inadequate to prevent this event.

Although the inspectors agree that the issue did not meet the definition of a "repeat event" as defined in the licensee's procedures, the inspectors concluded that the issues from the previous outages were very similar in nature. For example, the internal OE identified were all LLRT failures due to the improper setting or securing of the hex screw during maintenance on the

same type of valve. Additionally, the corrective actions from these previous issues included revising maintenance procedures for this type of valve to include more detail to ensure an appropriate seal; which is the same as the CAPRs for the most recent issue. Although these issues were similar to the issue reviewed in the RCE, since it did not meet the definition of a "repeat event," the licensee did not utilize the internal OE to gain insights into the issue, which was considered a missed opportunity.

Effectiveness of Corrective Actions: The team concluded that the licensee was generally effective in developing CAs that were appropriately focused to correct the identified problem and to address the root and contributing causes for significant conditions adverse to quality to preclude repetition. The licensee generally completed CAs in a timely manner and in accordance with procedural requirements commensurate with the safety significance of the issue. For NRC-identified issues, the team determined that the licensee generally assigned CAs that were effective and timely.

Regarding the licensee's utilization of effectiveness reviews, the team identified two minor examples where the effectiveness reviews for SCAQs were written in a manner that did not actually evaluate the effectiveness of the CAPRs. The first example involved inadequate maintenance practices where both the inboard and outboard drywell vent valves failed their post start up leakage integrity test. The two CAPRs established by the licensee involved revising the model work orders and the maintenance procedure (VALVE-F130-01) in order to provide more detail. The success criteria for the effectiveness reviews for both CAPRs was to verify that there were no LLRT failures after their first LLRT following the next outage for all valves of the same design. There were no LLRT failures following the next outage; therefore, the EFR was closed. Although the valves did pass their LLRT test following the next outage, the inspectors identified that maintenance on these valves had been cancelled and neither the model work orders nor all of the revised portions of VALVE-F130-01 were utilized during the next outage. Since the maintenance was cancelled, and therefore, CAPRs not utilized during the outage, the inspectors determined that the valves passing their LLRT did not validate the effectiveness of the CAPRs themselves.

Another example involved the failure of Main Steam Line Drain Valves MO4423 and MO4424 to satisfactorily pass LLRTs during RFO 25 in 2016. Through an RCE, the licensee identified the root cause of the failures as a less than optimal valve design. The licensee implemented a CAPR to replace the valves with a different valve design that the licensee expected to have better performance. The licensee implemented this CAPR during RFO 26 in 2018 by replacing the valves with a different design. The valves then passed their post-modification LLRTs. The licensee's EFR for this CAPR specified success criteria as "Main Steam Line Drain Valves replaced during RFO 26," and the licensee completed the effectiveness review after verifying that the valves were replaced and they passed their LLRTs. While this EFR verified that the CAPR was completed, the success criteria did not evaluate the effectiveness of the CAPR to preclude repetition of the valves failing their as-found LLRTs after operating between refueling outages.

Observation	71152B
Operating Experience and Self-Assessments and Audits: Based on the samples reviewed, the team determined that your staff's performance in each of these areas adequately supported nuclear safety.	

Observation	71152B
Safety Conscious Work Environment: The team found no evidence of challenges to your organization's safety-conscious work environment. Your employees appeared willing to raise nuclear safety concerns through at least one of the several means available. The team observed various station meetings, including those in which new ARs are reviewed, and interviewed a representative cross-section of station personnel, both individually and in focus groups. Additionally, the team assessed the overall health of the Employee Concerns Program. Specifically, the team interviewed the Employee Concerns Coordinator, reviewed recent case logs and case files, and considered statements received during interviews with station personnel. The inspectors noted the Employee Concerns Program as a strength at DAEC.	

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On March 15, 2019, the inspector presented the Biennial Problem Identification and Resolution inspection results to Mr. D. Curtland and other members of the licensee staff.

DOCUMENTS REVIEWED

Condition Reports
RCE 2181838; Containment Vent and Purge Valves CV4302 and CV4303 Leakage Integrity Test Failures; 03/02/2017
RCE 2161689; RFO 25 MSIV LLRT Failures; 12/01/2016
RCE 2231994; V16-0075 Packing Leak and Subsequent Plant Shutdown; 12/18/2017
RCE 2161689; RFO 25 MSIV LLRT Failures; 12/01/2016
ACE 1776321-05; LPCI Manual Realignment from S/D Cooling in Mode Three; 03/26/2014
ACE 02183134; Monthly SCBA Checks did not Meet Vendor Requirements; 02/28/2017
ACE 02211000; Control Building Envelope Assessment; 07/19/2017
ACE 02193481; MSIV LTS Valves not in IST Program; 06/1/2017 (Revision 1)
ACE 02183505; IOD Outcome Questioned for AR2181822; 05/24/2017
ER 2235284; 2017 A EDG CMM: PSV3221A Failed Initial Setpoint Test; 12/04/2017
ER 0230001; CV-4306 Exceeded ASME Stroke Time Requirement; 01/31/2019
ER 02281440; Multiple Kaman 10 Detector Failure and Low Flow Alarms; 10/16/2018
OR 02232776; RP Technician Improperly Applied HRA Controls to Steam Tunnel Entry; 10/26/2017
Effectiveness Review 2181838; CV 4303 Leakage Rate Exceeds LLRT Allowance; 11/29/2018
RCE 02286885; Automatic Scram Due to 'B' Feed Regulating Valve Failure; Revision 0
Pilgrim CR-PNP-2016-06635; Loose Connector Caused Severe Feed Reg Valve Instability and Manual Reactor Scram; Revision 0
AR 2179977; Level 1 Assessment of DEP-PI Self-Assessment; Revision 0
AR 2180294; Level 1 Assessment of IMP Patrol Efficiencies; Revision 0
AR 2180754; Level 1 Assessment of Recent Security Clock Resets; Revision 0
AR 2180773; Level 1 Assessment of Operations Procedure Use and Adherence; Revision 0
AR 2182389; Level 1 Assessment of ERO Drill Development; Revision 0
AR 2183627; Level 1 Assessment of Control Room Access; Revision 0
AR 2183983; Level 1 Assessment of Ops PMS Observations; Revision 0
AR 2184890; Level 1 Assessment of IOD Comments; Revision 0
AR 2187770; Level 1 Assessment of IOD Comments; Revision 0

AR 2189207; Level 1 Assessment of Secondary Containment Doors Corrective Actions; Revision 0
AR 2205982; Level 1 Assessment of RP Corrective Action Program Performance; Revision 0
AR 2223925; Level 1 Assessment of Environmental Program; Revision 0
AR 2228388; Level 1 Assessment of Clearance and Tagging; Revision 0
AR 2251629; Level 1 Assessment of Security CR/PMS Observation Review for January 2018; Revision 0
AR 2283776; PDA RFO 26 Post Outage Critique; Revision 0
AR 2293005; Nuclear Safety Culture Program NSC Level 1; Revision 0
AR 2295015; PIR Readiness-Self Assessment Program; Revision 0
AR 02161308; MO 4424 Failed LLRT (RFO 25); 10/10/2016
AR 02205409; 2017 DBAI – Reclassify RHRSW Strainer Bypass Valves; 05/16/2017
AR 02205957; 2017 DBAI – Failure to Evaluate Gas Transport; 05/18/2017
ACE 2205957; Failure to Evaluate Gas Transport for Core Spray Vent EC; 06/13/2017
AR 02192557; NRC PI&R – Corrective Actions for ACE 1776321-05; 03/20/2017
AR 01776321; LPCI Manual Realignment from S/D Cooling in Mode Three; 06/14/2012
AR 02161399; Requalification DEP-PI Failed/Incorrect EAL Call at EOF; 03/14/2017
AR 02261255; 2018 EQDBAI: Documentation Update to Qual-N007-01; 04/24/2018
AR 02188898; 17TD1EOF Cat 1 Facility Performance; 03/01/2017
AR 02264174; DEP PI Notification Failure during LOCT Evaluated Scenario; 05/15/2018
AR 02231847; Increase Trend in Unidentified Drywell Leakage; 10/22/2017
AR 01946058; 14DRTSC – NRC Reporting Requirements for 10CFR50.54(x); 03/06/2014
AR 02305539; 2019 PI&R – SCAQ Root Cause without Actions to Prevent Recur; 03/13/2019
AR 02279568; MO4423 Failed LLRT Testing RFO 26; 09/10/2018
AR 02161159; CV4415 Failed Local Leakage Rate Test; 10/8/2016
AR 02161689; Possible LLRT Reportability; 10/11/2016
AR 02303877; 2019 PI&R: ER 2279568-02 Did Not Complete Block “Repetitive”; 02/28/2019
AR 02181822; CV4303 T-Seal Pressure Is At 40 PSIG Versus 90 PSIG; 01/25/2017
AR 02181838; CV4303 Leakage Rate Exceeds LLRT Allowance; 01/26/2017
AR 02183134; NRC Identified All Aspects of Vendor Manual not in SCBA Proc; 02/01/2017
AR 02183505; NRC Identified – IOD Outcome Questioned for AR2181822; 02/02/2017
AR 02190115; M&TE Q966 Torque Wrench As Found Data Was OOT; 03/08/2017
AR 02203940; 1P081B Leak after Maintenance; 05/08/2017
AR 02207138; All Aspects of Vendor Manual not Included in HPP 3106.04; 05/25/2017
AR 02210090; HPP 3106.04 – Inspection, Maintenance, and Quality Assurance; 06/13/2017
AR 02249495; Outdated/Inaccurate Rad Survey Data for Self-Briefing Process; 02/14/2018
AR 02249834; Radiation Monitoring System Exceed Maintenance Rule Criteria; 02/15/2018
AR 02253202; Breathing Air Testing Deficiencies; 03/08/2018
AR 02253766; Discrepancies in HPP 3106.04 Regarding SCBAs; 03/12/2018
AR 02256378; NUC Assurance Finding – LHRA Process Deviations; 03/27/2018
AR 02281440; Multiple Kaman 10 Detector Failure and Low Flow Alarms; 09/21/2018
AR 02281588; MO2312 did not Auto Close as Expected during STP; 09/21/2018
AR 02284869; Kaman 9/10 Detector Failure; 10/09/2018
AR 02300001; CV4306 O/B Containment Purge Supply Valve Exceeded ASME Time; 01/31/2019
AR 02235548; ICES 424954, PT Fuses not Coordinated Impacting NFPA 805 Analysis; 02/19/2018
AR 02286733; GE SIL 681, R0 Prop Spring Kits ML-13, ML-13A; 12/19/2018
AR 02238147; ICES 407587, Relay Race Caused by Replacement Relay Characteristics; 02/16/2018
AR 02272028; GE BWROG TP18-1-231, CRD Performance; 08/13/2018

AR 02203788; NRC IN 2017-01, Reactor Coolant System Leakage from a Control Rod Drive Threaded Connection; 05/08/2017
AR 02210957; NRC IN 2017-03, Anchor/Darling Double Disc Gate Valve Wedge Pin and Stem/Disc Separation Failures; 06/28/2018
AR 02227317; NRC IN 2017-06, Battery and Battery Charger Short-Circuit Current Contributions to a Fault on the Direct Current Distribution System; 04/27/2018
AR 02251057; NRC IN 2018-01, Noble Fission Gas Releases during ISFSI Cask Loading Operations; 04/27/2018
AR 02269068; Regulatory OE - Diablo Canyon URI PI&R Re: EDG Mission Time; 06/19/2018
AR 02282432; NRC IN 2018-11: Kobe Steel QA Record Falsification Fleet ISC Review of NRC IN 2018-11: Kobe Steel Quality Assurance Record Falsification; 01/11/2019

Procedures
PI-AA-104-1000; Condition Reporting; Revision 13 & 20
PI-AA-100-1007; Apparent Cause Evaluation; Revision 17
PI-AA-100-1007; Issue Investigation; Revision 21
PI-AA-100-1005; Root Cause Analysis; Revision 15
PI-AA-101-1001; Level 1 Core Business Assessments; Revision 17
EPIP FORM NOTE-05; Duane Arnold Energy Center Emergency Notification; Revision 19
OM-AA-102-1000; Forced Outage Management; Revision 9
AD-AA-100-1006; Procedure and Work Instruction Use and Adherence; Revision 16
ACP 103.11; Invoking 10CFR50.54(x); Revision 6
ACP 1208.12; Control Room Envelope Habitability Program; Revision 2
VALVE-F130-01; Repair of 9200 Series T-Ring Butterfly Valves; Revisions 13 and 16
HPP 3106.04; Inspection, Maintenance and Quality Assurance of Respiratory Protection Equipment; Revision 39
WM-AA-201; Work Order Identification, Screening and Validation Process; Revision 30

Other Documents
PDA 17-001; Duane Arnold Energy Center Nuclear Oversight Report – Engineering; 03/30/2017
PDA 17-004; Duane Arnold Energy Center Nuclear Oversight Report – Emergency Preparedness; 07/20/2017
PDA 18-002; Radiological Protection and Radwaste Nuclear Assurance Report; 03/27/2018
PDA 18-005; Maintenance and Work Management Nuclear Assurance Report; 07/17/2018
PDA 18-006; Chemistry, Effluents, and Environmental Monitoring Nuclear Assurance Report; 08/29/2018
2017 PDA Mid-Cycle Evaluation Report; 07/2017
Duane Arnold Energy Center Nuclear Assurance Report Number 19-002; Security; Revision 0
PDA 18-008; Duane Arnold Energy Center Nuclear Oversight Report – QA Programs and Records Management; 12/19/2018
L1A 22393051; Regulatory OE Review in Prep for PDA NRC PI&R Inspection; 11/29/2018
MRC Packages for February 26 through March 14, 2019
WO 40618500-01; Verify No Leakage/Visually Inspect 18 Man Valves in DW; 09/17/2018
WO 40405348 01; STP 3.6.1.3-01 Containment Program and Vent Valve Leakage Integrity Test; 01/26/2017
WO 40405348 06; Contingency: Adjust Plunger to Engage Switch for T-Seal; 01/26/2017
WO 40525195 01; CV4303: Correct Alignment of Capscrew to Numatics Valve; 11/01/2018
WO 40575052-01; V19-0101 / Repack Valve for Root Cause Ranking 1; 09/06/2018
WO 40575057-01; V20-0060 / Repack Valve for Root Cause Ranking 1; 09/08/2018
WO 40501939-01; 2.10.1-01 Non-Nuclear Heat Class 1 Sys. Leakage Press. Test; 09/20/2018