

# UNITED STATES NUCLEAR REGULATORY COMMISSION

REGION III 2443 WARRENVILLE ROAD, SUITE 210 LISLE, ILLINOIS 60532-4352

May 3, 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 INTEGRATED

INSPECTION REPORT 05000331/2019001

Dear Mr. Curtland:

On March 31, 2019, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Duane Arnold Energy Center, Unit 1. On April 4, 2019, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

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 <a href="http://www.nrc.gov/reading-rm/adams.html">http://www.nrc.gov/reading-rm/adams.html</a> 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 05000331/2019001

cc: Distribution via LISTSERV®

Letter to Dean Curtland from Dariusz Szwarc dated May 3, 2019

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INSPECTION REPORT 05000331/2019001

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# ADAMS ACCESSION NUMBER: ML19123A149

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By: Dariusz Szwarc		⊠ Yes □	Availab	Available		Sensitive		NRC-002	
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# U.S. NUCLEAR REGULATORY COMMISSION Inspection Report

Docket Number: 05000331

License Number: DPR-49

Report Number: 05000331/2019001

Enterprise Identifier: I-2019-001-0055

Licensee: NextEra Energy Duane Arnold, LLC

Facility: Duane Arnold Energy Center, Unit 1

Location: Palo, IA 52324

Inspection Dates: January 01, 2019 to March 31, 2019

Inspectors: J. Beavers, Resident Inspector

V. Myers, Senior Health Physicist C. Norton, Senior Resident Inspector

T. Ospino, Reactor Engineer

Approved By: Dariusz Szwarc, Acting Chief

Branch 2

Division of Reactor Projects

### **SUMMARY**

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a quarterly inspection at Duane Arnold Energy Center, Unit 1 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 <a href="https://www.nrc.gov/reactors/operating/oversight.html">https://www.nrc.gov/reactors/operating/oversight.html</a> 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.

### **PLANT STATUS**

Duane Arnold Energy Center began the inspection period at rated thermal power. On January 5, 2019, the licensee reduced power to 50 percent of rated thermal power to perform a control rod sequence exchange and complete turbine testing. Following the control rod sequence exchange, the licensee gradually raised the power within the fuel preconditioning limits and achieved rated thermal power on January 9, 2019. The unit remained at or near rated thermal power for the remainder of the inspection period.

### **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 <a href="http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html">http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html</a>. 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 performed plant status activities described in IMC 2515 Appendix D, "Plant Status" and conducted routine reviews using IP 71152, "Problem Identification and Resolution." 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.

### **REACTOR SAFETY**

### 71111.01 - Adverse Weather Protection

### Impending Severe Weather Sample (IP Section 03.03) (1 Sample)

The inspectors evaluated readiness for impending adverse weather conditions for severe winter warning on January 22, 2019.

### 71111.04 - Equipment Alignment

### Partial Walkdown (IP Section 02.01) (3 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

- (1) Standby liquid control on February 21, 2019;
- (2) Reactor core isolation cooling system on February 27, 2019; and
- (3) Instrument air system on February 27, 2019.

### 71111.04S - Equipment Alignment

### Complete Walkdown (IP Section 02.02) (1 Sample)

The inspectors evaluated system configurations during a complete walkdown of the High Pressure Coolant Injection system on January 18, 2019.

# 71111.05A - Fire Protection (Annual)

# Annual Inspection (IP Section 03.02) (1 Sample)

The inspectors evaluated fire brigade performance on January 18, 2019.

### 71111.05Q - Fire Protection

# Quarterly Inspection (IP Section 03.01) (3 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

- (1) Reactor Building 716' and 786' on January 16, 2019;
- (2) Low Level Rad Processing Storage Facility and Radwaste Building on January 23, 2019; and
- (3) Low Level Pre Fire Plan Turbine Building Elevation 757' on February 8, 2019.

### 71111.11Q - Licensed Operator Requalification Program and Licensed Operator Performance

# <u>Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01)</u> (1 Sample)

The inspectors observed and evaluated licensed operator performance in the Control Room during a reactor plant down power evolution and rod sequence exchange on January 5, 2019.

### <u>Licensed Operator Requalification Training/Examinations (IP Section 03.02) (1 Sample)</u>

The inspectors observed and evaluated a re-qualification scenario on January 15, 2019.

### 71111.12 - Maintenance Effectiveness

### Routine Maintenance Effectiveness Inspection (IP Section 02.01) (2 Samples)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:

- (1) Belt replacement on the 'C' main steam line leakage temperature detector on February 7, 2019; and
- (2) Leading edge flow monitor boot failure on March 27, 2019.

### 71111.13 - Maintenance Risk Assessments and Emergent Work Control

### Risk Assessment and Management Sample (IP Section 03.01) (3 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

(1) 'A' control building chiller emergent work activities on January 22, 2019;

- (2) Risk assessments for instrument air discharge piping replacement on February 26, 2019; and
- (3) 'C' general service water pump replacement on March 26, 2019.

### 71111.15 - Operability Determinations and Functionality Assessments

### Operability Determinations and Functionality Assessments (IP Section 02.01) (5 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) Condition Report (CR) 02297095; 1P117C Differential Pressure Below ASME Action Level on January 9, 2019;
- (2) CR 02297195; Relay E21A-K004A Did Not Drop Out As Expected on January 15, 2019;
- (3) CR 02299053; 1BR7 tripped during trouble shooting on January 24, 2019;
- (4) CR 02299049; 'B' Standby Diesel Generator Momentary Jacket Coolant Lo Pressure Alarm on January 25, 2019; and
- (5) CR 02300324; Abnormal Trend on TE-4479B and CR 02300560; TE-4479B Declared Inoperable on February 5, 2019.

### 71111.18 - Plant Modifications

# <u>Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02)</u> (3 Samples)

The inspectors evaluated the following temporary or permanent modifications:

- (1) 'A' control building chiller temporary modification on January 18, 2019;
- (2) 'A' reactor feed pump lube oil cooler temporary modification on March 7, 2019; and
- (3) 1T-34 and 1T-35 fuel oil crosstie permanent modification on March 12, 2019.

### 71111.19 - Post Maintenance Testing

### Post Maintenance Test Sample (IP Section 03.01) (6 Samples)

The inspectors evaluated the following post maintenance tests:

- (1) Core spray power monitor relay on January 14, 2019;
- (2) 'A' control building chiller on January 24, 2019;
- (3) Functional test of the condensate storage tank level low instrumentation on February 1, 2019;
- (4) Repair of containment purge valve CV-4306 on February 7, 2019;
- (5) 'B' control building chiller post maintenance test on February 12, 2019; and
- (6) Reactor core isolation cooling system post maintenance test on February 26, 2019.

# 71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

### Containment Isolation Valve (ISO) (IP Section 03.01) (1 Sample)

Quarterly turbine valve testing on January 7, 2019.

### Surveillance Testing (IP Section 03.01) (3 Samples)

- (1) River water system vibration measurement and operability on January 15, 2019;
- (2) High pressure coolant injection on January 16, 2019; and
- (3) Control room operations associated with Surveillance Test Procedure 3.5.1-02; low pressure coolant injection operability test on February 1, 2019.

### 71114.06 - Drill Evaluation

# <u>Drill and/or Simulator-Based Licensed Operator Requalification Training (IP Section 02.01)</u> (1 Sample)

The inspectors evaluated:

Emergency response organization training drill on March 13, 2019.

### **RADIATION SAFETY**

### 71124.05 - Radiation Monitoring Instrumentation

# Calibration and Testing Program (IP Section 02.02) (1 Sample)

The inspectors evaluated the calibration and testing program implementation.

Alarm setpoint and calibration method check of personnel contamination monitors, portal monitors and small article monitors

- Canberra GEM-5; Serial Number 366
- Canberra CRONOS: Serial Number 1955
- Canberra ARGOS 5AB; Serial Number 307

Failure to meet calibration or source check acceptance criteria

• None were available during this inspection

### Walk Downs and Observations (IP Section 02.01) (1 Sample)

The inspectors evaluated radiation monitoring instrumentation during plant walkdowns.

Portable survey instruments

Ludlum RO-2; Serial Number 5732

- Ludlum 26; Serial Number PF007468
- Ludlum 3; Serial Number 324848
- Ludlum 9-3; Serial Number 299661
- Ludlum 12-4; Serial Number 326398
- Mirion Telepole; Serial Number 428016-033

#### Source check demonstration

- Mirion Telepole; Serial Number 428016-033
- Ludlum 26; Serial Number PF007468
- Ludlum 9-3; Serial Number 299661

### Area radiation monitors and continuous air monitors

- RE 9168
- RE 9167
- RE 9161
- RE 9177
- AMS 4; Serial Number 02778
- AMS 4; Serial Number 02696

### Personnel contamination monitors, portal monitors and small article monitors

- Canberra GEM-5; Serial Number 366
- Canberra CRONOS: Serial Number 1955
- Canberra ARGOS 5AB; Serial Number 307

### OTHER ACTIVITIES - BASELINE

### 71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

### IE01: Unplanned Scrams per 7000 Critical Hours Sample (IP Section 02.01) (1 Sample)

The inspectors compared the number of Scrams reported in the Licensee Event Reports to the number reported for the Performance Indictors and verified the accuracy of the number of critical hours between January 1, 2018 and December 31, 2018 as reported on March 19, 2019.

# <u>IE03: Unplanned Power Changes per 7000 Critical Hours Sample (IP Section 02.02)</u> (1 Sample)

The inspectors reviewed operating logs to verify that the Licensee counted power changes appropriately and verified the accuracy of the number of critical hours between January 1, 2018 and December 31, 2018, as reported on March 19, 2019.

### IE04: Unplanned Scrams with Complications (USwC) Sample (IP Section 02.03) (1 Sample)

The inspectors reviewed Licensee Event Reports and operating logs to confirm that there were no Scrams with complications between January 1, 2018 and December 31, 2018, as reported on March 19, 2019.

### **INSPECTION RESULTS**

No findings were identified.

### **EXIT MEETINGS AND DEBRIEFS**

The inspectors confirmed that proprietary information was controlled to protect from public disclosure.

• On April 4, 2019, the inspector presented the quarterly integrated inspection results to Mr. D. Curtland and other members of the licensee staff.

### **DOCUMENTS REVIEWED**

### 71111.01—Adverse Weather Protection

- Abnormal Operating Procedure 903: Severe Weather; Revision 59

### 71111.04Q—Equipment Alignment

- BECH-M103(3); P&ID Main Steam Moisture Separators and Reheaters; Revision 18
- BECH-M124: Reactor Core Isolation Cooling: Revision 64
- BECH-M126; PI&D Standby Liquid Control; Revision 26
- BEHC-M130(0); Instrument and Service Air Compressors 1K090A, B, C, Cooling System; Revision 17
- Condition Report (CR) 02302736; Standby Liquid Control Barrel Labeling
- OI 152A1; High Pressure Coolant Injection (HPCI) System Electrical Lineup; Revision 6
- OI 152A2; HPCI System Valve Lineup; Revision 20
- OI 152A4; HPCI System Control Panel Lineup; Revision 6
- OI 153; Standby Liquid Control System; Revision 45
- OI 153A1; Standby Liquid Control System Electrical Lineup; Revision 4
- OI-518.1A3; Compressed Air System Valve Lineup; Revision 1
- Operating Instruction (OI) 150A4; Control Panel Lineup; Revision 4
- STP 3.5.3-06; Duane Arnold Energy Center Surveillance Requirement Test Procedure, Reactor Core Isolation Cooling System Post-Startup Operability Test; Revision 14

# 71111.05A—Fire Protection Annual/Quarterly

- CR 02298113; PFP-RB-716; Pre Fire Plan Reactor Building Elevation 716 Discrepancy
- CR 0229512; Fire Drill Performance Issues
- Fire Drill Scenario dated January 17, 2019
- PFP-LL-757; Pre Fire Low Level Rad Processing Storage Facility; Revision 3
- PFP-RB-716; Pre Fire Plan Reactor Building Elevation 716; Revision 5
- PFP-RB-786; Pre Fire Plan Reactor Building Elevation 786; Revision 7
- PFP-RW-757; Pre Fire Plan Radwaste Building; Revision 1

- PFP-TB-757; Pre Fire Plan Turbine Building Elevation 757; Revision 5

### 71111.11- Licensed Operator Requalification Program and Licensed Operator Performance

- DAEC Emergency Notification Note 5; Revision 19
- EAL 01; Emergency Action Level Matrix; Revision 11
- ED; Emergency Depressurization; Revision 11
- Emergency Action Level Basis Document; Revision 10
- Emergency Operating Procedure (EOP) 1; RPV Control; Revision 20
- EOP-2; Primary Containment Control; Revision 18
- IPOI-3; Power Operations; Revision 160
- PDA OPS 2019A-O1E; Evaluation Scenario; Revision 0
- Reactivity Management Plant Down Power Sequence Exchange; Power Operations; Revision January 3, 2019

### 71111.12Q—Maintenance Effectiveness

- CR 02300324; Abnormal Trend on TE-4479B
- CR 02300560; TE-4479B Declared Inoperable
- CR 02306635; LEFM Abnormal Indications; Revision 0
- LEF-PCIS-14; Revision 2
- LFD-PCIS-14; Main Steam Line Isolation Turbine Building Temperature High Logic; Revision 2
- Shift Logs; March 20, 2019
- Work Order (WO) 94191485; LEFM Abnormal Indications; Revision 0

### 71111.13—Maintenance Risk Assessments and Emergent Work Control

- BECH-M169(3); Control Building Chillers; Revision 15
- CR 02297140; 'A' Chiller Low Oil Pressure
- CR 02302746; Temporary Diesel Air Compressor Faults
- CR 02307421; C General Service Water Pump on Cribbing; Revision 0
- WO 40435333; C General Service Water Pump
- WO 40493157; C General Service Water Pump
- WO 40565919; C General Service Water Pump
- WO 40607505-13; Instrument Air Discharge Piping Replacement
- WOs 40606071, 40606072, 40606079, 40594715-01/04, 40606070, 40606073, 40608062-02, 40645679-03, 40645680

### 71111.15—Operability Determinations and Functionality Assessments

- CR 02297095; 1P117C Differential Pressure below ASME Action Level
- CR 02297195; Relay E21A Did Not Drop Out As Expected
- CR 02299049; 'B' SBDG Momentary Jacket Coolant Lo Pressure Alarm
- CR 02299049; Prompt Operability Determination
- CR 02299053; 1BR7 Tripped during Trouble Shooting
- CR 02300324; Abnormal Trend on TE-4497B
- CR 02300560; TE-4479B Declared Inoperable
- LED-PCIS-14; Revision 2
- Surveillance Test Procedure (STP) 3.3.5.1-14A; 'A' Core Spray Logic System Functional Test; Revision 9

- Surveillance Test Procedure (STP) NS1001002A; 'A' River Water Supply and Screen Wash System Vibration Measurement and Operability Test
- WO 40645433002; CS Essential Bus 1A3 4016VAC Power Monitor Relay

# 71111.18—Plant Modifications

- CR 02299834; CST 1T05B Lo Level Alarm Locked in with Normal CST Level
- CR 02302761; Drawing not Reflecting Current Temporary Modification
- CR 02302761; Drawings not Reflective of Current Configuration
- EC 290380; Install Permanent Crosstie between 1T-34 and 1T-35; Revision 1
- EC 291658 10 CFR 50.59 Screening Form; Install Pressure Point Isolation Valve Downstream of 1P283A: Revision 0
- EC 292658 Design Change Package; Install Instrument Isolation Valve on 1P283A Downstream Pipe; Revision 0
- EC 292660 10 CFR 50.59 Screening Form; 'A' CB Chiller Temporary Recorder; Revision 0
- STP 3.5.5.1-23; Functional Test of the Condensate Storage Tank Level Low Instrumentation; Revision 15
- STP 3.7.5-01A; 'A' Control Building Chiller Operability; Revision 5
- WO 40517009-03; 'A' Reactor Feed Pump Lube Oil Coolers 1E041A and 1E041C
- WO 40597137-02: Install Permanent Crosstie between 1T-34 and 1T-35

### 71111.19—Post Maintenance Testing

- CR 02297195; E21A-K004A; Did Not Drop Out As Expected
- CR 02303523; Low RCIC Oil Level
- STP 3.3.5.1-14A; 'A' Core Spray Logic System Functional Test; Revision 9
- STP 3.5.3-02; RCIC System Operability Test; Revision 56
- STP 3.6.1.3-02CAC; CAC PCIS and ASME Valve Functional Test; Revision 4
- STP 3.7.5-01A; 'A' Control Building Chiller Operability; Revision 5
- STP 3.7.5-01B; 'B' Control Building Chiller Operability; Revision 6
- STP NS 500001; RCIC System Leakage Inspection Walkdown; Revision 5
- WO 40645433002; CS Essential Bus 1A3 4016VAC Power Monitor Relay

### 71111.22—Surveillance Testing

- CR 02297095; 1P117C Differential Pressure Below ASME Action Level
- STP 3.3.1.1-13; Turbine Control Valve EOC RPT Logic and RPS Instrument Functional Test;
   Revision 15
- STP 3.3.1.1-17; Main Steam Isolation Valve Functional Test; Revision 14
- STP 3.3.1.1-19; Functional Test of TSV Closure Input to RPS and RPT; Revision 23
- STP 3.3.5.1-30; HPCI System Logic System Functional Test; Revision 15
- STP 3.3.6.1-49; HPCI System Isolation Logic System Functional Test; Main Steam Isolation Valve Functional Test; Revision 14
- STP 3.5.1-02A; 'A' LPCI System Operability Tests; Revision 19
- STP 3.5.1-05; HPCI System Operability Test; Revision 81
- STP 3.7.7-01; Bypass Valves Test; Revision 8
- STP NS100102A; 'A' River Water Supply and Screen Wash System Vibration Measurement and Operability Test; Revision 26
- STP NS100102A; 'A' River Water Supply and Screen Wash System Vibration Measurement and Operability Test; Revision 26
- STP NS490003A; 'A' Residual Heat Removal (RHR) System Leakage Walkdown; Revision 7

- STP NS930002; Main Turbine Stop and Combined Intermediate Valves Test; Revision 5

### 71114.06—Drill Evaluation

- 2019 ERO Training Drill 1 Scenario
- 2019 ERO Training Drill 1 Scenario
- CR 02305581; 19TD1 EOF Failed RSPS
- CR 02305581; 19TD1 EOF Failed RSPS
- CR 02305612; 19TD1 CR Failed DEP PI Opportunity
- CR 02305612; 19TD1 CR Failed DEP PI Opportunity
- CR 02305628; 19TD1 TSC Nuclear Assurance Observations
- CR 02305628; 19TD1 TSC Nuclear Assurance Observations
- CR 02305631; 19TD1 TSC SBO Assessment Capability
- CR 02305631; 19TD1 TSC SBO Assessment Capability
- CR 02305636; 19TD1 TSC Roll Up of Issues
- CR 02305636; 19TD1 TSC Roll Up of Issues

### 71124.05—Radiation Monitoring Instrumentation

- Ametek Calibration Record for Fastscan; WBC 2017003 srs105696; October 3, 2017
- Exelon PowerLabs Certificate of Calibration 0011050986; RO-20 Serial Number 1196;
   August 28, 2017
- Exelon PowerLabs Certificate of Calibration 0011107142; Eberline 6112B Serial Number 10947; June 18, 2018
- Exelon PowerLabs Certificate of Calibration 0011107862; Eberline AMS-4 Serial Number 02778; June 27, 2018
- Exelon PowerLabs Certificate of Calibration 0011123550; MGP BAK-2283 Serial Number 228316-027; October 2, 2018
- HPP 3110.16 Attachment 1; Calibration Data Sheet for Instrument Serial Number 196;
   July 4, 2018
- HPP 3110.50 Attachment 1; GEM 5 Calibration Data Sheet for Serial Number 367;
   January 21, 2019
- NextEra Energy DAEC Metrology Lab Report; LVAS Serial Number 0990B; February 21, 2018
- NextEra Energy DAEC Metrology Lab Report; LVAS-AMS4 Serial Number 0784D;
   December 12, 2018
- WO 40458719; STP 3.3.3.1-03 PRIM CONT AREA RAD POST ACC MON INST CAL;
   April 8, 2017
- Eckert and Ziegler Source Certificate; 84524-70; April 26, 2011
- Eckert and Ziegler Source Certificate; AF-4385; March 23, 2015
- Eckert and Ziegler Source Certificate; 105696; April 1, 2017
- Calibration Record for ARGOS-5AB Serial Number 306; April 8, 2018
- Eckert and Ziegler Source Certificate; 110143; July 1, 2018
- CR 02216097; Questions to Address with WBC Calibration; October 18, 2017

### 71151—Performance Indicator Verification

 Licensee Event Report (LER) 2018-004; Automatic Reactor Scram due to Feedwater Regulating Valve Failure

# 71152—Problem Identification and Resolution

- CR 02232792; 'B' RWCU Pump Seal Leak
- CR 02249054; Block Heater
- CR 02293282; 'A' RWCU Pump Seal Leak
- CR 02294880; 'B' RWCU Pump Shaft Seal Leak
- CR 02302758; FLEX 480 VAC Generator Performance Issues
- CR 02306635; LEFM Abnormal Indications; Revision 0
- CR 02307689; 480VAC FLEX Diesel Generator Major Coolant Leak
- CR 94191485; LEFM Abnormal Indications; Revision 0
- Shift Logs; March 20, 2019