



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

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

January 29, 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—NRC INTEGRATED INSPECTION  
REPORT 05000331/2018004**

Dear Mr. Curtland:

On December 31, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Duane Arnold Energy Center. On January 3, 2019, the NRC inspectors discussed the results of this inspection with Mr. P. Hansen, and other members of your staff. The results of this inspection are documented in the enclosed report.

Based on the results of this inspection, no findings or violations were identified.

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. 50-331  
License No. DPR-49

Enclosure:  
Inspection Report 05000331/2018004

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Letter to Dean Curtland from Dariusz Szwarc dated January 29, 2019

SUBJECT: DUANE ARNOLD ENERGY CENTER—NRC INTEGRATED INSPECTION  
REPORT 05000331/2018004

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Number: 50–331

License Number: DPR–49

Report Number: 05000331/2018004

Enterprise Identifier: I–2018–004–0016

Licensee: NextEra Energy Duane Arnold, LLC

Facility: Duane Arnold Energy Center

Location: Palo, IA

Dates: October 1 through December 31, 2018

Inspectors: C. Norton, Senior Resident Inspector  
J. Beavers, Resident Inspector  
D. Tesar, Reactor Engineer  
J. Cassidy, Senior Health Physicist  
C. Zoia, Senior Operations Engineer

Approved by: D. Szwarc, Acting Chief  
Branch 2  
Division of Reactor Projects

Enclosure

## SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring licensee's performance by conducting an integrated quarterly 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.

### List of Findings and Violations

No findings or violations were identified.

### Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
Licensee Event Report	05000331/2018-003	Combined Maximum Main Steam Line Pathway Leakage Exceeded Technical Specification Limit	71153	Closed
Licensee Event Report	05000331/2018-004	Reactor Protection System Actuation	71153	Closed

## PLANT STATUS

Duane Arnold Energy Center began the inspection period at rated thermal power. On October 19, 2018, the unit scrambled on low reactor water level due to a failed feedwater regulating valve. The scram was without complications. The licensee repaired the feedwater regulating valve, commenced a reactor startup, and synchronized to the grid on October 21, 2018. The unit achieved rated thermal power on October 26, 2018, and 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 <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 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

#### Seasonal Extreme Weather (1 Sample)

The inspectors evaluated readiness for seasonal extreme weather conditions prior to the onset of seasonal cold temperatures on November 6, 2018.

### 71111.04—Equipment Alignment

#### Partial Walkdown (6 Samples)

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

- (1) Reactor Water Cleanup Heat Exchanger Room on October 2, 2018;
- (2) 250 Volts Direct Current Power Distribution System on October 12, 2018;
- (3) Secondary Containment System on October 19, 2018;
- (4) Well Water System on November 14, 2018;
- (5) Reactor Protection System on November 16, 2018; and
- (6) 'B' Standby Diesel Generator System on November 20, 2018.

#### 71111.05AQ—Fire Protection Annual/Quarterly

##### Quarterly Inspection (4 Samples)

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

- (1) North and South Emergency Response Building 757' on October 31, 2018;
- (2) Low Level Radiation Processing Storage Facility on November 7, 2018;
- (3) Reactor Building Elevation 757' on November 7, 2018; and
- (4) Turbine Building Elevation 780' on November 7, 2018.

#### 71111.06—Flood Protection Measures

##### Internal Flooding (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the turbine building on November 12, 2018.

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

##### Operator Performance (1 Sample)

The inspectors observed and evaluated activities associated with a reactor startup following a forced outage on October 21, 2018.

##### Operator Exams (1 Sample)

The inspectors reviewed and evaluated requalification examination results on December 17, 2018.

#### 71111.12—Maintenance Effectiveness

##### Routine Maintenance Effectiveness (1 Sample)

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

- (1) Belt replacement on the High Pressure Coolant Injection (HPCI) room exhaust fan on December 7, 2018.

#### 71111.13—Maintenance Risk Assessments and Emergent Work Control (2 Samples)

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

- (1) 'B' Recirculation Motor Generator Scoop Tube Lock Up Troubleshooting on October 2, 2018; and
- (2) 'B' Recirculating Pump Speed Regulation on October 9, 2018.

#### 71111.15—Operability Determinations and Functionality Assessments (1 Sample)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) Condition Report (CR) 0223334 'B' Exhaust Wire Screen was damaged on October 3, 2018.

#### 71111.18—Plant Modifications (1 Sample)

The inspectors evaluated the following temporary or permanent modifications:

- (1) Moisture Separator Drain Tank Level Control on October 4, 2018.

#### 71111.19—Post Maintenance Testing (1 Sample)

The inspectors evaluated the following post maintenance tests:

- (1) Reactor Water Cleanup 'B' Demineralizer Drain Valve on October 18, 2018.

### **RADIATION SAFETY**

#### 71124.03—In-Plant Airborne Radioactivity Control and Mitigation

##### Self-Contained Breathing Apparatus for Emergency Use (1 Sample)

The inspectors evaluated the licensee's self-contained breathing apparatus program.

#### 71124.04—Occupational Dose Assessment

##### Source Term Characterization (1 Sample)

The inspectors evaluated the licensee's source term characterization.

##### External Dosimetry (1 Sample)

The inspectors evaluated the licensee's external dosimetry program.

##### Special Dosimetric Situations (1 Sample)

The inspectors evaluated the licensee's performance for special dosimetric situations.

### **OTHER ACTIVITIES – BASELINE**

#### 71151—Performance Indicator Verification (6 Samples)

The inspectors verified licensee performance indicators submittals listed below:

- (1) MS05: Safety System Functional Failures—1 Sample (October 1, 2017 - September 30, 2018);

- (2) MS09: Residual Heat Removal Systems—1 Sample (October 1, 2017 - September 30, 2018);
- (3) MS10: Cooling Water Support Systems—1 Sample (October 1, 2017 - September 30, 2018);
- (4) BI01: RCS Specific Activity October 2017 through September 2018;
- (5) OR01: Occupational Exposure Control Effectiveness October 2017 through September 2018; and
- (6) PR01: RETS/ODCM Radiological Effluent Occurrences July 2017 through September 2018.

#### 71152—Problem Identification and Resolution

##### Annual Follow-Up of Selected Issues (2 Samples)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issues:

- (1) Electro Hydraulic Control System Pressure issues on October 25, 2018; and
- (2) Feedwater System Digital Controller programming issues on December 6, 2018.

##### Semiannual Trend Review (1 Sample)

- (1) Abnormal reactivity changes on November 27, 2018.

#### 71153—Follow-Up of Events and Notices of Enforcement Discretion

##### Licensee Event Reports (2 Samples)

The inspectors evaluated the following licensee event reports which can be accessed at <https://lersearch.inl.gov/LERSearchCriteria.aspx>:

- (1) Licensee Event Report 05000331/2018–003, "Combined Maximum Main Steam Line Pathway Leakage Exceeded Technical Specification Limit," issued on October 22, 2018; and
- (2) Licensee Event Report 05000331/2018–004, "Reactor Protection System Actuation," issued on December 17, 2018.

### **INSPECTION RESULTS**

#### 71153—Follow-Up of Events and Notices of Enforcement Discretion

Licensee Event Report 2018–003; Combined Maximum Main Steam Line Pathway Leakage Exceeded Technical Specification Limit	71153—Follow-Up of Events and Notices of Enforcement Discretion
The inspectors reviewed LER 2018–003 that documented failed local leak testing on the main steam line drain path in excess of technical specification limits. The plant was in cold shutdown at the time of discovery, not in a mode of applicability. There were no performance deficiencies associated with the event.	
This review closes LER 2018–003.	

Licensee Event Report 2018–004; Reactor Protection System Actuation	71153—Follow-Up of Events and Notices of Enforcement Discretion
<p>The inspectors reviewed LER 2018–004 that documented an uncomplicated SCRAM that occurred October 19, 2018. There were no performance deficiencies associated with the event.</p> <p>This review closes LER 2018–004.</p>	

## EXIT MEETINGS AND DEBRIEFS

The inspectors confirmed that proprietary information was controlled to protect from public disclosure. No proprietary information was documented in this report.

- On November 29, 2018, the inspector presented the radiation protection program inspection results to Mr. D. Curtland, Director of Site Operations, and other members of the licensee staff.
- On December 18, 2018, the inspector discussed the completed 2018 Licensed Operator Requalification Program annual operating test inspection results with Mr. E. Murray, Operations Training Supervisor.
- On January 3, 2019, the inspectors presented the quarterly integrated inspection results to Mr. P. Hansen, and other members of the licensee staff.

## DOCUMENTS REVIEWED

### 71111.01—Adverse Weather Protection

- 2017 Winter Challenges Lessons Learned
- OP-AA-102-1002; Seasonal Readiness; Revision 28

### 71111.04—Equipment Alignment

- Abnormal Operating Procedure (AOP) 408; Well Water System Abnormal Operation; Revision 34
- CR 2282032; Steam coming from PSV271 Reactor Water Cleanup (RWCU) RHX Tube Side PRV
- OI 324; Standby Diesel Generator System; Revision 123
- OI 324A3; Standby Diesel Generator System Valve Lineup; Revision 15
- OI 358; Reactor Protection System; Revision 70
- OI 388; 250 VDC Power Distribution System; Revision 30
- OI 388A1; 250 VDC Power Distribution System Electrical Lineup; Revision 3
- OI 408; Well Water System; Revision 96
- OI 408A2; Well Water System Valve Lineup; Revision 22
- OI 734; Reactor Building Heating Ventilation Air Conditioning (HVAC) System; Revision 64
- OI 734A2; Reactor Building HVAC System Lineup; Revision 10
- Operating Instruction (OI) 170; Standby Gas Treatment System; Revision 66
- Surveillance Test Procedure NS610001; RWCU System Leakage Inspection Walkdown; Revision 4

#### 71111.05AQ—Fire Protection Annual/Quarterly

- PFP-LL-757; Pre Fire Plan LLRPSF; Revision 3
- PFP-OC-757; Pre Fire Plan OAG-OCA El. 757; Revision 4
- PFP-RB-757; Pre Fire Plan Reactor Building 757; Revision 4
- PFP-TB-780; Pre Fire Plan Turbine Building 780; Revision 6

#### 71111.06—Flood Protection Measures

- AOP 905; Turbine Building Internal Flooding; Revision 3
- Mitigating Strategies Assessments for Hazard Reevaluation; November 2016
- SD-408; Well Water System; Revision 11

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

- AOP 264; Loss of Recirc Pumps; Revision 16
- IPOI 2; Reactor Startup; Revision 164

#### 71111.12—Maintenance Effectiveness

- Equipment-Specific Maintenance Procedure; Blower-B515-01; Buffalo Forge Axial Fans; Revision 5
- Work Order (WO) 40608038; HPCI Room Exhaust Fan

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

- CR 02283080; 'B' Recirc MG Scoop Tube Lock
- CR 02283080; Annunciator 1C04B (C-1) Recirc MG Scoop Tube Lock
- OI 264; Reactor Recirculation System; Revision 133
- OI 264; Reactor Recirculation System; Revision 143
- WO 50502310-01; Replace 'B' Scoop Tub Positioner Pots 90-9201B and 90-9202B
- WO 50502310-09; Lock Scoop Tube Positioner for Potentiometer Change Out

#### 71111.15—Operability Determinations and Functionality Assessments

- CR 0223334; 'B' SBDG Exhaust Wire Screen Damaged

#### 71111.18—Plant Modifications

- 1.LC-F130-01; Alternate Moisture Separator Drain Tank Level Control; Revision 3
- EN-AA-205-1102; Temporary Configuration Changes; Revision 11
- OI 646; Extraction Steam System; Revision 72
- WO 40625109; 1T92A 2<sup>nd</sup> State Moisture Separator Drain Tank Level Controller

#### 71111.19—Post Maintenance Testing

- CR 2286611; CV2855D Air Line Broke while Clearing Tags
- CR 2286680; RB Equipment Drain Sump Alarm during RWCPU Precoat
- WO 40626523-01; RWCPU F/D 1T-203B Main Drain Isolation

#### 71124.03—In-Plant Airborne Radioactivity Control and Mitigation

- ACP 1411.20; Respiratory Protection; Revision 41
- CR 2292366; Procedure Change Request; Add the NIOSH Graphic Showing Types/Styles of Facial Hair that Negatively Impact Respirator Sealing Surfaces to ACP 1411.20 - Respiratory Protection; November 28, 2018
- CR 2292369; Procedure Change Request; Add the NIOSH Graphic Showing Types/Styles of Facial Hair that Negatively Impact Respirator Sealing Surfaces to HPP 3109.84 – Operation of the Respirator Fit Test Equipment; November 28, 2018
- HPP 3106.03; Description and Issuance of Respiratory Protection Equipment; Revision 20
- HPP 3106.04; Inspection, Maintenance and Quality Assurance of Respiratory Protection Equipment; Revision 39
- Posi3 USB Test Results; Complete SCBA Test; Duane Arnold 21; August 15, 2017
- Posi3 USB Test Results; Complete SCBA Test; Duane Arnold 21; August 14, 2018
- Posi3 USB Test Results; Complete SCBA Test; Duane Arnold 22; August 15, 2017
- Posi3 USB Test Results; Complete SCBA Test; Duane Arnold 22; August 14, 2018
- Posi3 USB Test Results; Complete SCBA Test; Duane Arnold 24; August 15, 2017
- Posi3 USB Test Results; Complete SCBA Test; Duane Arnold 24; August 14, 2018

#### 71124.04—Occupational Dose Assessment

- Certificate of Accreditation to ISO/IEC 17025:2005; NVLAP Lab Code 100555-0; Mirion Technologies (GDS); July 1, 2017 through June 30, 2018
- Certification of Accreditation to ISO/IEC 17025:2005; NVLAP Lab Code 100555-0; Mirion Technologies (GDS); July 1, 2018 through June 30, 2019
- CR 2292659; Determine the Adequacy of Internal Dose Calculations, RFO 28; November 19, 2018
- HPP 3104.02; Personnel Contamination Monitoring, Whole Body Counting and Decontamination; Revision 50
- HPP 3105.02; Exposure Evaluation, Investigation, and Reporting; Revision 28
- HPP 3105.05; Administration of In-Vivo and In-Vitro Bioassay; Revision 28
- Radiological Engineering Calculation 02-001-A; Periodic Evaluation of the Passive Internal Monitoring Program at the Duane Arnold Energy Center; June 4, 2002
- RP-AA-100; Radiation Protection Administrative Program; Revision 8
- RP-AA-101; Personnel Monitoring Program; Revision 4
- RP-AA-101-1001; Personnel Monitoring Device Issue; Revision 3
- RP-AA-101-2004; Method for Monitoring and Assigning Effective Dose Equivalent for High Gradient Work; Revision 7
- RPM 01/2003; Prospective Evaluation; Revision 4

#### 71151—Performance Indicator Verification

- ACP 1402.4; NRC, WANO, & MOPR Performance Indicator Reporting; Revision 22
- ACP 1402.4; NRC, WANO, & MOPR Performance Indicator Reporting; Revision 22
- LI-AA-100-10003; NRC Performance Indicator; Revision 1
- LI-AA-100-10003; NRC Performance Indicator; Revision 1
- Maintained Rule Data Entry Sheets; October, 2017 through September 2018
- Reactor Oversight Process: NRC PI Data Calculation, Review and Approval; RCS Activity (RCSA); Various Dates
- Reactor Oversight Process: NRC PI Data Calculation, Review and Approval; Occupational Exposure Effectiveness; Various Dates

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- Reactor Oversight Process: NRC PI Data Calculation, Review and Approval; Occupational Exposure Effectiveness; Various Dates
- Reactor Oversight Process: NRC PI Data Calculation; RETS/ODCM Radiological Effluent; Various Dates
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#### 71152—Problem Identification and Resolution

- AOP 255.2; Power/Reactivity Abnormal Change; Revision 48
- CR 2267942; Moisture Separator Drain Tank Controller Malfunction
- CR 2272128; Feedwater Level Controller Malfunction
- CR 2280982; 1F-51D, Charge Pump 'B' Filter Change
- CR 2281086; EHC Pressure Dropping Low on Turbine Reset
- CR 2281097; Main Turbine did not Trip with Fuses Pulled
- CR 2281206; PS3672B, EHC Pump 'B' Low Pressure Auto Start Calibration
- CR 2283080; Scoop Tube Positioner Malfunction
- CR 2283317; Moisture Separator Drain Tank Controller Malfunction
- CR 2283744; P13699B, EHC Pump 'B' Discharge Pressure Indicator High
- CR 2284915; Moisture Separator Drain Tank Valve Malfunction
- CR 2287024; ZC1579 Controller Programming
- CR 2287622; EHC Pressure Fluctuating Below Normal Rated Power
- CR 2288859; RFO 26 AOV Review
- CR 2288989; EHC Header Discharge Pressure Lowered during Load Line Adjustment
- CR 2289116; Work Quality
- CR 2283316; ZC1611 Controller Programming
- Drawing 234T849; Turbine Control Diagram; Revision 21
- WO 40585866; IT042B; 'B' EHC Accumulator N2 Pressure
- WO 40605927; IT042A; 'A' EHC Accumulator N2 Pressure

#### 71153—Follow-Up of Events and Notices of Enforcement Discretion

- AOP 264; Loss of Recirc Pumps; Revision 017
- Corrective Action Program Review; December 19, 2018
- CR 2256885; Automatic Reactor Scram due to 'B' Feed Regulating Valve Failure
- CR 2279568; MO4423 Failed LLRT Testing
- CR 2279621; MO4423 Failed LLRT Testing Reportability
- EOP-1; RPV Level Control
- ER 2279568-04; Equipment Failure Investigation Checklist; Revision 13
- Event Notification 53676
- LER 2018-003; October 22, 2018
- LER 2018-004; December 19, 2018
- Organizational Effectiveness Investigation; MO4423 Failure