



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

May 1, 2019

Mr. Bryan C. Hanson  
Senior VP, Exelon Generation Company, LLC  
President and CNO, Exelon Nuclear  
4300 Winfield Road  
Warrenville, IL 60555

SUBJECT: BYRON STATION, UNITS 1 AND 2—NRC INTEGRATED INSPECTION  
REPORT 05000454/2019001 AND 05000455/2019001

Dear Mr. Hanson:

On March 31, 2019, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Byron Station, Units 1 and 2. On April 3, 2019, the NRC inspectors discussed the results of this inspection with Mr. M. Kanavos 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 <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/*

Hironori Peterson, Chief  
Branch 3  
Division of Reactor Projects

Docket Nos.: 05000454; 05000455  
License Nos.: NPF-37; NPF-66

Enclosure:  
IR 05000454/2019001; 05000455/2019001

cc: Distribution via LISTSERV®

Letter to Bryan Hanson from Hironori Peterson dated May 1, 2019

SUBJECT: BYRON STATION, UNITS 1 AND 2—NRC INTEGRATED INSPECTION  
REPORT 05000454/2019001 AND 05000455/2019001

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**U.S. NUCLEAR REGULATORY COMMISSION  
Inspection Report**

Docket Numbers: 05000454 and 05000455

License Numbers: NPF-37 and NPF-66

Report Numbers: 05000454/2019001 and 05000455/2019001

Enterprise Identifier: I-2019-001-0058

Licensee: Exelon Generation Co., LLC

Facility: Byron Station, Units 1 and 2

Location: Byron, IL

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

Inspectors: D. Betancourt-Roldan, Senior Resident Inspector  
C. Hunt, Resident Inspector  
J. McGhee, Senior Resident Inspector  
C. Thompson, Illinois Emergency Management Agency

Approved By: Hironori Peterson, Chief  
Branch 3  
Division of Reactor Projects

## **SUMMARY**

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a quarterly inspection at Byron Station, Units 1 and 2 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.

## **PLANT STATUS**

Unit 1 began the inspection period operating at full power. With the exception of minor reductions in power to support scheduled testing activities or small load changes requested by the transmission dispatcher, the unit remained at or near full power for the entire inspection period.

Unit 2 began the inspection period operating at full power. With the exception of minor reductions in power to support scheduled testing activities or small load changes requested by the transmission dispatcher, the unit remained at or near full power for the majority of the inspection period. At the conclusion of the inspection period, the unit was in coast down operations for a planned refueling outage.

## **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

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

The inspectors evaluated readiness for impending adverse weather conditions for extreme/extended cold temperatures for the period of January 20-30, 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) The Unit 1B Emergency Diesel Generator (EDG) and auxiliaries after surveillance and before expected snow, high wind and subzero temps on January 17, 2019
- (2) The 1B EDG during a scheduled 1A EDG work window on March 4, 2019
- (3) The 2A Essential Service Water (SX) train during the 2B SX pump maintenance work window on March 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) Fire Zone (FZ) 3.3A (B,C,D)-2, U-2 Upper Cable Spreading Room on January 8, 2019
- (2) FZ 18.5-2, Security Control Center on February 28, 2019
- (3) FZ 5.6-1, Division 11, Miscellaneous Electrical Equipment and Battery Room, 451' elevation on March 5, 2019

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

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

The inspectors observed and evaluated activities in the station's main control room, which included response to degrading Main Condenser Vacuum on January 8, 2019. Additionally, the inspectors observed a first time evolution on Unit 2 relating to a new system line up in the component cooling system with an emphasis on configuration control on February 11, 2019.

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

The inspectors observed and evaluated a crew of licensed operators during comprehensive crew simulator training on March 5, 2019.

## 71111.12 - Maintenance Effectiveness

### Quality Control (IP Section 02.02) (1 Sample)

The inspectors evaluated maintenance and quality control activities associated with the following equipment performance activities:

10 CFR Part 21 for AMTEC A voltage sensing boards on January 4, 2019

### Routine Maintenance Effectiveness Inspection (IP Section 02.01) (1 Sample)

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

Unit 1 and 2 Radiation Monitoring System

## 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) The 1A EDG maintenance work window and 2-year inspections as documented in multiple work orders (WOs) on March 4, 2019
- (2) Activities involving the installation of station auxiliary transformer (SAT) 242-2 during the weeks ending in March 16 through March 23, 2019
- (3) Troubleshooting and repairs of a leak on line 0SX03A-30" during the week ending on March 23, 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) The impact of a leak on the 2A auxiliary feedwater pump identified during surveillance run as documented in IR 4179107 on January 2, 2019
- (2) The slow stroke time of valve 1SD002B, 2B steam generator blowdown isolation valve, during a surveillance as documented in IR 4206230 on January 4, 2019
- (3) The low differential pressure during a scheduled 2A containment spray pump surveillance as documented in IR 4210938 on January 14, 2019
- (4) The Unit 1 source range and intermediate range nuclear Instrumentation loss of function as documented in IR 4665957 on January 28, 2019
- (5) The impact of a through wall leak on valve 0SX007, Unit 0 component cooling water heat exchanger outlet valve, as documented in IR 4665957 on March 9, 2019

#### 71111.18 - Plant Modifications

##### Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (1 Sample)

The inspectors evaluated the following temporary or permanent modifications:

Elimination of Rod Worth Testing (PR-19-006)

#### 71111.19 - Post Maintenance Testing

##### Post Maintenance Test Sample (IP Section 03.01) (3 Samples)

The inspectors evaluated the following post maintenance tests:

- (1) Unit 1 steam generator blowdown isolation valve, 1SD002B, stroke test and local position verification tests after rebuild as documented in work order (WO) 04833739 on January 4, 2019
- (2) Functional and operational testing of 0A SX make-up pump following a work window as documented in WO 4872076 on February 11, 2019
- (3) Functional and operational test on the 2B SX pump following truncated work on March 19, 2019

#### 71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

In Service Testing (IST) (IP Section 03.01) (1 Sample)

Unit 1 residual heat removal pump group A IST test as documented in 1BOSR 5.5.8.RH.5-1A on February 5, 2019

Reactor Coolant System (RCS) Leak Detection (IP Section 03.01) (1 Sample)

Unit 2 reactor coolant system unidentified leakage surveillance as documented in WO 124386 on February 22, 2019

Surveillance Testing (IP Section 03.01) (3 Samples)

- (1) Performance of the Anticipated Transient Without SCRAM Mitigation System (AMS) at power semiannual surveillance as documented on 1BOSR FW-SA1 on January 10, 2019
- (2) Use of the Surveillance Frequency Program Change Program for change in diesel generator 24 hour endurance run and hot restart surveillance as documented on BY-18-003 on January 11, 2019
- (3) Semi-annual operability surveillance of the 2B diesel generator as documented on 2BOSR 8.1.2-2 on February 20, 2019

71114.06 - Drill Evaluation

Emergency Preparedness (EP) Drill (IP Section 02.01) (2 Samples)

- (1) The inspectors evaluated a full-scale Emergency Planning Drill conducted on March 7, 2019
- (2) The inspectors evaluated a full-scale Emergency Planning Drill conducted on March 14, 2019

**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) (2 Samples)

- (1) Unit 1 Unplanned Scrams per 7000 Critical Hours (January 1, 2018 – December 31, 2018)
- (2) Unit 2 Unplanned Scrams per 7000 Critical Hours (January 1, 2018 – December 31, 2018)

IE03: Unplanned Power Changes per 7000 Critical Hours Sample (IP Section 02.02) (2 Samples)

- (1) Unit 1 Unplanned Power Changes per 7000 Critical Hours (January 1, 2018 – December 31, 2018)
- (2) Unit 2 Unplanned Power Changes per 7000 Critical Hours (January 1, 2018 – December 31, 2018)



IE04: Unplanned Scrams with Complications (USwC) Sample (IP Section 02.03)  
(2 Samples)

- (1) Unit 1 Unplanned Scrams with Complications (January 1, 2018 – December 31, 2018)
- (2) Unit 2 Unplanned Scrams with Complications (January 1, 2018 – December 31, 2018)

71152 - Problem Identification and Resolution

Annual Follow-Up of Selected Issues (IP Section 02.03) (1 Sample)

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

- (1) Review of actions taken to address a condition that caused the open phase relay for SAT 242-2 to not be able to detect all postulated open phase conditions.

**INSPECTION RESULTS**

Observation	71152
<p>The inspectors performed a review of plant issues, particularly those entered into the licensee's corrective action program, associated with the upcoming replacement of the failed Unit 2 SAT 242-2 transformer. During their review, the inspectors noted that IR 4218559 documented that the open phase relay for the new transformer would not be able to detect an open phase condition for all postulated cases once the work window to replace the transformer was completed. In particular, the calculations showed that for the B phase the open phase logic would be unable to detect the grounded open phase. The condition was described to be the result of the new transformer having a Shell-Type design instead of the current Core-Form of the original transformer.</p> <p>The inspectors reviewed the planned corrective actions and compensatory actions that the licensee planned to undertake to restore to open phase protection for the transformer. Upon installation of the new 242-2 transformer, the licensee established compensatory actions consistent to their response to NRC Bulletin 2012-01, Design Vulnerability in Electrical Power System. The inspectors reviewed the standing order, revised procedures, and talked with operations personnel to assess the actions. No concerns were identified.</p> <p>At the end of this inspection period, the licensee was proposing a two phase approach to address the issue described above. The first involved updating the pertinent calculations, which would be followed by a physical modification to the transformer so that the ratio of negative to positive voltages can be used for open phase detection.</p>	

**EXIT MEETINGS AND DEBRIEFS**

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

- On April 3, 2019, the inspector presented the quarterly integrated inspection results to Mr. M. Kanavos and other members of the licensee staff.

## **DOCUMENTS REVIEWED**

### 71111.01—Adverse Weather Protection

- AR 04216408, Protection of the Plant During a Cold Weather Unit Trip, 02/01/2019
- AR 04217573, Security – Check Suspended due to Inclement Weather, 02/05/2019
- AR 04215528, 2B DG Lube Oil Temp Degrading, 01/30/2019
- AR 04215466, RSH Local Area Heater Tripping Breaker, 01/30/2019
- AR 04215365, Sensing Line Froze, 01/30/2019

### 71111.04—Equipment Alignment

- BOP DG-M2A, Train 'A' Diesel Generator System Valve Lineup, Revision 10
- BOP DG-E1A, Diesel Generator Train 'A' Electrical Line up, Revision 3
- BOP DG-M1B, Train 'B' Diesel Generator System Valve Lineup, Revision 14

### 71111.05AQ—Fire Protection Annual/Quarterly

- Pre-Fire Plan #30, FZ 3.3A-2 Auxiliary Building 463'-0" Upper Cable Spreading Room, Revision 3
- Pre-Fire Plan #32, FZ 3.3B-2 Auxiliary Building 463'-0" Upper Cable Spreading Room, Revision 3
- Pre-Fire Plan #34, FZ 3.3C-2 Auxiliary Building 463'-0" Upper Cable Spreading Room, Revision 3
- Pre-Fire Plan #36, FZ 3.3D-2 Auxiliary Building 463'-0" Upper Cable Spreading Room, Revision 4
- Pre-Fire Plan #2431, FZ 18.5-2 Security Control Center, Revision 2

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

- AR 04179107, Leak on 2A AF Pump During Surveillance Run When Pressurized, 10/01/2018
- AR 04209128, Unexpected Main Control Room Alarms due to Degraded Main Condenser Vacuum, 01/08/2019
- 1BOA SEC-3, Loss of Condenser Vacuum Unit 1, Revision 107;
- AR 04209528, 4.0 Critique for Unit 1 Main Condenser Vacuum Degrading, 01/09/2019

### 71111.12—Maintenance Effectiveness

- EN 53816, AMTEC Solid State Controls, Part 21 –Components Provided as Safety-related Spare Parts Without Being Dedicated; 01/08/2019
- AR 04162360, Part 21 53529 AMTEC A Voltage Sense Board; 08/07/2018
- ER-AA-310, Implementation of the Maintenance Rule, Revision 11
- ER-AA-310-1001, Maintenance Rule – Scoping, Revision 4
- ER-AA-310-1002, Maintenance Rule Functions – Safety Significant Classification, Revision 3
- ER-AA-310-1003, Maintenance Rule – Performance Criteria Selection, Revision 5
- ER-AA-310-1004, Maintenance Rule – Performance Monitoring, Revision 14
- AR 04221808; Unexpected Alarm OPR05J Loss of Sample Flow, 02/20/2019
- AR 04221681; 2PR28J Vent Stack HI Gas Channel in High Alarm/Interlock, 02/19/2019
- AR 04215048; Trend on Check Sources Failure, 01/29/2019
- AR 04221410; IST Program Health Report, 02/19/2019
- AR 04218721; 2PR027J Loss of Sample Flow, 02/09/2019

- AR 04216838; OPS Focus – Radiological Monitor Issues, 02/03/2019

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

- 1BOL8.1, LCOAR AC Sources – Operating Tech Spec LCO #3.8.1; Revision 22
- OP-BY-108-117-1000, Byron Protected Equipment Worksheet, Revision 11
- BOP SX-21, Initiating And Terminating Alternate Cooling Flow to SX Pumps Oil Coolers and Cubicle Coolers; Revision 4
- AR 04230553, Potential Inactive Leak on 2SX03B Line, 03/18/2019
- AR 04228530, 2A DG Tripped During the Cooldown Cycle, 03/11/2019
- AR 04231438, Unexpected Alarm, 03/21/2019

#### 71111.15—Operability Determinations and Functionality Assessments

- AR 04179107, Leak on 2A AF Pump During Surveillance Run When Pressurized on October 01, 2018, dated 01/02/2019
- AR 04210938, 2A CS Pump DP Not Within Range for DG Frequency Uncertainties, 01/15/2019
- WO 4807795, 2CS01PA Comprehensive IST Requirements for Containment Spray, 10/11/2018
- EC 624019, Determine Interim IST Testing Admin Limits Considering Lower Frequency Admin Limits, Revision 1
- Calculation BYR06-029, SI/RHR/CS/CV System Hydraulic Analysis in Support of GSI-191, Revision 5b
- AR 04206230, 1SD002B Stroke Slow During Surveillance, 12/27/2018
- AR 04228044, SX Leak By 0SX007, 03/09/2019
- AR 04228044, Pinhole Leak on a Weld on 0SX03A-30", 03/20/2019

#### 71111.18—Plant Modifications

- NF-BY-510, Low Power Physics Test Program, Revision 15
- PR-19-006, Rod Worth Testing Optimization, Revision 0
- NF-AP-100-7080, Rod Worth Testing – Scope Selection Process, Revision 0

#### 71111.19—Post Maintenance Testing

- AR 04209032, Gaps in Documentation of STT Of 1SD002B During B1R22, 01/08/2019
- WO 04833739, Rebuild Actuator, Replace Elastomers Set Stroke, 09/23/2018
- WO 04801879, STT for 1SD002A-H and SD005A-D, 09/19/2018
- M-42, Diagram of Essential Service Water, Sheet 6
- WO 04872076, 2BOST 5.5.8.SX.5-2C 2B SX Comprehensive, 03/18/2019
- AR 04231041, Failed PMT 2B SX Pump Minor Oil Leak, 03/19/2019
- AR 04230570, 2SX01AB HX Failed GL 89-13 Acceptance Criteria, 03/18/2019

#### 71111.20—Refueling and Other Outage Activities

- 2 Month Readiness Report, 01/29/2019

#### 71111.22—Surveillance Testing

- BY-18-003, Surveillance Test Interval Evaluation: Revise the Diesel Generator 24 Hour Endurance Run and Hot Restart Surveillance from Once per 18 Months to Once per 36 Months, Revision 000
- BB-STI-029, Risk Evaluation of Surveillance Interval Extension for EDG Endurance Test, Revision 0
- AR 04217336, 1A RH ASME Surveillance Issues, 02/05/2019
- WO 00124386-01, 2BOSR 4.13.1-1 Unit 2 Reactor Coolant System Water Inventory Balance Surveillance Computer Calculation, 03/03/2019

#### 71114.06—Drill Evaluation

- Drill Scenario Information, 03/07/2019
- Drill Scenario Information, 03/14/2019

#### 71151—Performance Indicator Verification

- Unit 1 and Unit 2 Unplanned Scrams per 7000 Critical Hours (01/01/2018-12/31/2018)
- Unit 1 and Unit 2 Unplanned Power Changes per 7000 Critical Hours (01/01/2018-12/31/2018)
- Unit 1 and Unit 2 Unplanned Scrams with Complications per 7000 Critical Hours (01/01/2018-12/31/2018)

#### 71152—Problem Identification and Resolution

- AR 04226197, Corrective Action Out of Process with PI-AA-125, 03/04/2019
- AR 04217533, Calculation Error in DGDO9301, 02/05/2019
- AR 04217336; 1A RH ASME Surveillance Issues, 02/05/2019
- AR 04216459, Cold Weather Lessons Learned, 02/01/2019
- AR 04220197, Oil Temperature Elevated, 02/14/2019
- 2BOI AP1, Unit 2 SAT Low Load or Trouble Condition Loss of Phase Monitoring, Revision 3