



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION I  
2100 RENAISSANCE BOULEVARD, SUITE 100  
KING OF PRUSSIA, PA 19406-2713

October 31, 2018

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

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT – INTEGRATED INSPECTION  
REPORT 05000317/2018003 AND 05000318/2018003

Dear Mr. Hanson:

On September 30, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2. On October 17, 2018, the NRC inspectors discussed the results of this inspection with Mr. Todd Tierney, Plant Manager, 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 the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR), Part 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Erin Carfang, Chief  
Reactor Projects Branch 1  
Division of Reactor Projects

Docket Nos. 50-317 and 50-318  
License Nos. DPR-53 and DPR-69

Enclosure:  
Inspection Report 05000317/2018003 and  
05000318/2018003

cc w/encl: Distribution via ListServ

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT – INTEGRATED INSPECTION  
 REPORT 05000317/2018003 AND 05000318/2018003 DATED  
 OCTOBER 31, 2018

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## U.S. NUCLEAR REGULATORY COMMISSION

## REGION I

Docket Numbers: 50-317 and 50-318

License Numbers: DPR-53 and DPR-69

Report Numbers: 05000317/2018003 and 05000318/2018003

Enterprise Identifier: I-2018-003-0062

Licensee: Exelon Generation Company, LLC

Facility: Calvert Cliffs Nuclear Power Plant, Units 1 and 2

Location: Lusby, MD

Inspection Dates: July 1, 2018 to September 30, 2018

Inspectors: R. Clagg, Senior Resident Inspector  
C. Roettgen, Resident Inspector  
J. Ambrosini, Senior Emergency Preparedness Inspector  
J. Brand, Reactor Inspector  
G. Callaway, Senior Reactor Technology Instructor  
A. Rosebrook, Senior Project Engineer

Approved by: Erin Carfang, Chief  
Reactor Projects Branch 1  
Division of Reactor Projects

## SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring Exelon Generation Company's, LLC (Exelon) performance at Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2 by conducting the baseline inspections described in this report 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. No findings or more-than-minor violations were identified.

## REPORT DETAILS

### PLANT STATUS

Unit 1 began the inspection period at rated thermal power. On September 9, 2018, the unit was down powered to 77 percent to support waterbox cleaning and main turbine valve testing maintenance. The unit was returned to rated thermal power on September 11, 2018, and remained at or near rated thermal power for the remainder of the inspection period.

Unit 2 began the inspection period at rated thermal power. On August 3, 2018, the unit was down powered to 80 percent for waterbox cleaning. The unit was returned to rated thermal power on August 5, 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 (IP) 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 Exelon's performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

### REACTOR SAFETY

#### 71111.01 – Adverse Weather Protection

##### External Flooding (1 sample)

The inspectors evaluated readiness to cope with external flooding, July 13, 2018.

#### 71111.04 - Equipment Alignment

##### Partial Walkdown (4 samples)

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

- (1) 21 service water train during 22 service water heat exchanger out of service for maintenance, August 9, 2018
- (2) 1A, 1B, and 2A emergency diesel generator during 2B emergency diesel generator out of service for exhaust leak repair, August 15, 2018
- (3) 21 component cooling train during 22 component cooling heat exchanger out of service for maintenance, September 12, 2018
- (4) 1B, 2A, and 2B emergency diesel generator during 1A emergency diesel generator out of service for maintenance, September 19, 2018

Complete Walkdown (1 sample)

The inspectors evaluated system configurations during a complete walkdown of the accessible portions of the Unit 2 emergency diesel generators, July 10, 2018.

71111.05Q – Fire Protection Quarterly

Quarterly Inspection (5 samples)

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

- (1) 1A emergency diesel generator building, fire area EDG1A, July 11, 2018
- (2) 0C (station blackout) diesel generator building, fire area EDG0C, July 11, 2018
- (3) Unit 1, 69' electrical room and horizontal cable chase, fire areas 36 and 37, August 17, 2018
- (4) Unit 2, 69' electrical room and horizontal cable chase, fire areas 35 and 38, August 17, 2018
- (5) Intake structure, intake structure outside and intake structure pump room, fire area IS, August 25, 2018

71111.06 – Flood Protection Measures

Internal Flooding (1 sample)

The inspectors evaluated internal flooding mitigation protections in Units 1 and 2, east piping penetration room, August 10, 2018.

Cables (1 sample)

The inspectors evaluated cable submergence protection in manhole 1MH21 which contains safety related cables for the 1A emergency diesel generator, July 11, 2018

71111.11 – Licensed Operator Requalification Program and Licensed Operator Performance

Operator Requalification (1 sample)

The inspectors observed and evaluated a training event involving a control element assembly ejection and fuel failure resulting in a General Emergency declaration, August 21, 2018.

Operator Performance (1 sample)

The inspectors observed and evaluated licensed operator activities during conduct of Operating Instruction 30, "Nuclear Instrumentation Calibration," Revision 25, September 11, 2018.

71111.12 – Maintenance Effectiveness

Routine Maintenance Effectiveness (2 samples)

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

- (1) AR04167709, out of tolerance review found multiple field equipment challenges for Unit 1 reactor protection system instrumentation August 29, 2018
- (2) AR04156793, a Maintenance Rule (a)(1) determination is needed for system 103, emergency diesel building heating, ventilation, and air conditioning, September 28, 2018

#### 71111.13 – Maintenance Risk Assessments and Emergent Work Control (5 samples)

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

- (1) Units 1 and 2, updated risk assessment for forecasted high winds, July 17, 2018
- (2) Units 1 and 2, maintenance risk assessment for 21 charging pump out of service for maintenance, August 30, 2018
- (3) Units 1 and 2, maintenance risk assessment for week of September 3, 2018
- (4) Units 1 and 2, maintenance risk assessment for Hurricane Florence for week of September 10, 2018
- (5) Units 1 and 2, maintenance risk assessment for 1A emergency diesel generator out of service for maintenance, September 18, 2018

#### 71111.15 – Operability Determination and Functionality Assessments (6 samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) AR04137474, Units 1 and 2 saltwater subsystems non-conforming condition identified during a tornado missile hazard assessment, comprehensive compensatory measures, and permanent corrective action review, July 6, 2018
- (2) AR04156075, 1-LI-1114 A & B, 11 feedwater steam generator wide range level indication, showing 20 inch deviation on 1C43, July 17, 2018
- (3) AR04162735, cooling fan on upper bank not rotating, U-4000-22 service transformer, August 8, 2018
- (4) AR04167709, out of tolerance review found multiple field equipment challenges for Unit 1 reactor protection system instrumentation, August 29, 2018
- (5) AR04165175, IRE5421A, 11 N-16 monitor, settings out of tolerance, September 4, 2018
- (6) AR04165153, 2B emergency diesel generator exhaust fire, September 7, 2018

#### 71111.18 – Plant Modifications (1 sample)

The inspectors evaluated the following temporary or permanent modifications:

- (1) Engineering Change Package-17-000029, electrical distribution reliability improvement project

#### 71111.19 – Post-Maintenance Testing (5 samples)

The inspectors evaluated post-maintenance testing for the following maintenance/repair activities:

- (1) Work Order (WO) C93495517, modify the control circuit for refueling water tank outlet motor operated valves to provide auto closure, July 6, 2018

- (2) WO C93629589 and WO C93664487, retest for Unit 1 boric acid storage tank gravity feed motor operated valve, 1MOV508 after breaker or actuator maintenance, August 1, 2018
- (3) WO C93632402, inspect and lube 21 charging pump coupling, August 30, 2018
- (4) WO C93637587, perform replacement of 22 component cooling heat exchanger saltwater outlet solenoid valve, 2SV5208, September 12, 2018
- (5) WO C93644687, remove 12 of the identified 1A2 cylinder heads that need to be replaced, September 20, 2018

#### 71111.22 – Surveillance Testing

The inspectors evaluated the following surveillance tests:

##### Routine (5 samples)

- (1) STP-O-5A11-1, “11 Auxiliary Feedwater Pump Quarterly Surveillance Test,” Revision 006, July 12, 2018
- (2) STP-O-73CA-1, “A Train Component Cooling Pump Quarterly Test,” Revision 0, July 23, 2018
- (3) STP-O-8A-1, “Test of 1A DG and 11 4kV Bus Undervoltage,” Revision 30, July 24, 2018
- (4) PE-0-24-8-O-M, “0C DG,” Revision 3, August 9, 2018
- (5) STP-O-8B-2, “Test of 2B DG and 4kV Bus 24 UV,” Revision 32, September 10, 2018

##### In-service (1 sample)

- (1) STP-O-0731B-2, “B-Train HPSI Pump and Check Valve Operability Test,” Revision 2, July 18, 2018

#### 71114.06 – Drill Evaluation

##### Drill/Training Evolution (1 sample)

The inspectors observed and evaluated the conduct of an emergency drill involving high turbine vibrations, loss of a vital switchgear, and a loss of coolant accident resulting in a General Emergency declaration, July 31, 2018.

### **EMERGENCY PREPAREDNESS**

#### 71114.02 – Alert and Notification System Evaluation (1 Sample)

The Inspectors evaluated Exelon’s maintenance and testing of the alert and notification system from September 2016 to July 2018.

#### 71114.03 – Emergency Response Organization Staffing and Augmentation System (1 Sample)

The inspectors conducted a review of Exelon’s Emergency Response Organization augmentation staffing requirements and the process for notifying and augmenting the Emergency Response Organization.



71114.05 – Maintaining Emergency Preparedness (1 Sample)

The inspectors reviewed a number of activities to evaluate the efficacy of Exelon's efforts to maintain emergency preparedness programs.

**OTHER ACTIVITIES – BASELINE**71151 – Performance Indicator Verification

The inspectors verified Exelon performance indicators submittals listed below for the period July 1, 2017 through June 30, 2018. (13 samples)

- (1) Units 1 and 2 emergency AC power system mitigating system performance index
- (2) Units 1 and 2 high pressure safety injection system mitigating system performance index
- (3) Units 1 and 2 heat removal system mitigating system performance index
- (4) Units 1 and 2 residual heat removal system mitigating system performance index
- (5) Units 1 and 2 cooling water system mitigating system performance index
- (6) Alert and notification reliability
- (7) Drill and exercise performance
- (8) Emergency response organization drill participation

71152 – Problem Identification and ResolutionAnnual Follow-up of Selected Issues (1 sample)

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

- (1) AR03964494, Exelon's evaluation, review and corrective actions for Non-Cited Violation (NCV) 05000317,318/2016-004-01, Inadequate Inspection of Caulking, Seals, and Expansion Barriers in the Auxiliary Building

**INSPECTION RESULTS**

Observation	71152 Annual Follow-up of Selected Issues
<p>The inspectors reviewed Exelon staff actions in response to NCV 05000317, 318/2016004-01, which documented a finding of very low safety significance for failure to identify several degraded safety related auxiliary building caulking, seals, expansion joints, and penetration barriers. In response, Exelon staff conducted an Apparent Cause Evaluation (AR 03964494) and used task analysis and performance analysis investigative techniques to review the different caulk and seal barriers inspection programs and criteria used. Exelon staff determined the caulk and seal barriers program was conducted by different groups including operations and engineering personnel using three different procedures, that the inspection criteria was not consistent, and that the purpose of the inspections to assure the multiple functions of the barriers (fire, flood) was not properly conveyed in the procedures. To correct these issues, Exelon staff completed just in time awareness training, revised applicable inspection procedures, developed a staggered inspection process to verify current conditions of safety related barriers, and hired an independent structural engineering firm to perform inspection, repairs, and replacements of safety related and non-safety related roofs. The inspectors determined that Exelon's evaluations, extent of condition reviews, and</p>	

corrective actions were adequate to address this issue and were commensurate with its safety significance.
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## **EXIT MEETINGS AND DEBRIEFS**

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

- On August 17, 2018, the inspectors presented the inspection results associated with IP 71114.02, IP 7114.03, and IP 7114.05 to Mr. Todd Tierney, Plant Manager, and other members of the Exelon staff.
- On October 17, 2018, the inspectors presented the quarterly resident inspector inspection results to Mr. Todd Tierney, Plant Manager, and other members of the Exelon staff.

## List of Documents Reviewed

### Section 71152 – Problem Identification and Resolution

#### Procedures

AMBD-0026, Caulk and Seal Program, Revision 3  
 AMBD-0026, Caulk and Seal Program, Revision 5  
 ES-001, Flooding, Revision 5  
 NO-AA-21, Nuclear Oversight Audit Process Descriptions, Revision 9  
 OP-3 Appendix F, Reactor Specific Controls, Revision 06900  
 OP-3, Normal Power Operations Revision 06900  
 OP-AA-100, Description of the Exelon Nuclear Conduct of Operations Manual, Revision 0  
 OP-AA-108-115, Operability Determinations, Revision 20  
 OP-AA-108-115-1002, Supplemental Consideration for on-shift Immediate Operability  
 Determination, Revision 3  
 OP-AA-112-101, Shift Turnover and Relief, Rev 13  
 OU-AA-630-1000 R007, Spent Fuel Loading Campaign Management  
 PES-S-002, Shelf Life, Revision 8  
 PI-AA-1012, Safety Culture Monitoring, Revision 1  
 PI-AA-115, Operating Experience Program, Revision 2  
 PI-AA-115-1001, Processing of Level 1 OPEX Evaluations, Revision 2  
 PI-AA-115-1002, Processing of Level 2 OPEX Evaluations, Revision 3  
 PI-AA-115-1003, Processing of Level 3 OPEX Evaluations, Revision 3  
 PI-AA-120, Issue Identification and Screening Process, Revision 8  
 PI-AA-125, Corrective Action Program (CAP) Procedure, Revision 6  
 PI-AA-125-0004, Effectiveness Review Manual, Revision 2  
 PI-AA-125-001-F-01, CAPCO Indoctrination Guide, Revision 1  
 PI-AA-125-1001, Root Cause Analysis Manual, Revision 3  
 PI-AA-125-1003, Corrective Action Program Evaluation Manual, Revision 4  
 PI-AA-125-1006, Investigation Techniques Manual, Revision 3  
 PI-AA-126, Self-Assessment and Benchmark Program, Revision 2  
 PI-AA-126-1001, Self-Assessments, Revision 2  
 PI-AA-126-1006, Benchmark Program, Revision 2  
 PI-AA-127, Passport Action Tracking Management Procedure, Revision 2

#### Action Requests

02564655	03964207	04103163
02715188	03964494	04164293 *
02715199	04043033	04164299 *
02716543	04047134	04164934 *
02725901	04067297	

(\*initiated in response to inspection)

#### Drawings

61406SEC108. 1SH0001, Fire Barrier Stops, Revision 4  
 62043SH0002, Auxiliary Building Roof Plan, Revision 1  
 62148SH0001, Mechanical Seal Details-Appendix R Fire Barriers, Revision 9  
 62148SH0002, Mechanical Seal Details-Appendix R Fire Barriers and HELB Areas, Revision 4  
 62153SH001, Barrier Segment Drawing for Plant Elevation 69'-0, Revision 0  
 C-489 61-989-E, Auxiliary Building Overhead Cable Chase Section & Details, Sheet 2,  
 Revision 5

Miscellaneous

0-013-49-O-18M, Barriers for Non-Fire Event Fire Compartments, completed 12/13/17  
2017 Annual Roof Inspection Report, completed May 8<sup>th</sup>-May 11<sup>th</sup>, 2017-Structural  
Technologies, Calvert Cliffs Nuclear Power Plant

Apparent Cause Evaluation 019884, Potential Green NCV-Degraded Caulk and Seal Barriers,  
dated 4/25/18

WOC92125799

WOC93597693

WOC93614531

WOC93614532

WOC93616152

WOC93616159

WOC93616160

WOC93616163

WOC93657237

Exelon Power Labs Report CCN-46499, "Failure of an Electric Actuator," Revision1, dated  
October 2017

STP-F-592-2, Penetration Fire Barrier Inspection, completed 1/31/18