



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

February 8, 2018

EA-18-011

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 05000317/2017004 AND 05000318/2017004 AND EXERCISE OF  
ENFORCEMENT DISCRETION**

Dear Mr. Hanson:

On December 31, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2. On January 17, 2018, the NRC inspectors discussed the results of this inspection with Mr. Mark Flaherty, Site Vice President, and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented one finding of very low safety significance (Green) in this report. This finding involved a violation of NRC requirements. The NRC is treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2.a of the NRC Enforcement Policy.

The inspectors also reviewed Licensee Event Report (LER) 50-318/2017-001-00, which described the details associated with as found values for pressurizer safety valve lift setpoint exceeding the technical specification allowable limit. Although this constituted a violation of technical specifications involving a pressurizer safety valve, the NRC concluded that the issue was not within Exelon's ability to foresee and correct, Exelon's actions did not contribute to the degraded condition, and the actions taken were reasonable to address the issue. As a result, the NRC did not identify a performance deficiency. A risk evaluation was performed, and the issue was determined to be of very low safety significance (Green). Based on the results of NRC's inspection and assessment of this issue, I have been authorized, after consultation with the Director, Office of Enforcement, and the Regional Administrator to exercise enforcement discretion in accordance with NRC's Enforcement Policy Section 2.2.4, "Using Traditional Enforcement of Disposition Violations Identified at Power Reactors," and Section 3.10, "Reactor Violations with No Performance Deficiencies."

If you contest the violation or significance of this NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC Resident Inspector at CCNPP. In addition, if you disagree with the cross-cutting aspect or a finding not associated with a regulatory requirement in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your

B. Hanson

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disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I, and the NRC Resident Inspector at CCNPP.

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) 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

**/RA/**

Michelle Catts, Acting 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 05000317/2017004 and  
05000318/2017004  
w/Attachment: Supplementary Information

cc w/encl: Distribution via ListServ

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SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT – INTEGRATED INSPECTION  
REPORT 05000317/2017004 AND 05000318/2017004 AND EXERCISE OF  
ENFORCEMENT DISCRETION DATED FEBRUARY 8, 2018

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## U.S. NUCLEAR REGULATORY COMMISSION

## REGION I

Docket Nos. 50-317 and 50-318

License Nos. DPR-53 and DPR-69

Report Nos. 05000317/2017004 and 05000318/2017004

Licensee: Exelon Generation Company, LLC (Exelon)

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

Location: Lusby, MD

Dates: October 1, 2017, through December 31, 2017

Inspectors: R. Clagg, Senior Resident Inspector  
C. Roettgen, Resident Inspector  
H. Anagnostopoulos, Senior Health Physicist  
J. DeBoer, Emergency Preparedness Inspector  
M. Orr, Reactor Inspector  
B. Pinson, Resident Inspector (Pilgrim)  
D. Silk, Senior Operations Engineer

Approved by: Michelle Catts, Acting Chief  
Reactor Projects Branch 1  
Division of Reactor Projects

Enclosure

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## SUMMARY

Inspection Report 05000317/2017004, 05000318/2017004; 10/01/2017 – 12/31/2017; Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2; Fire Protection and Follow-Up of Events and Notices of Enforcement Discretion.

This report covered a three-month period of inspection by resident inspectors and announced baseline inspections performed by regional inspectors. The inspectors identified one non-cited violation (NCV) of very low safety significance (Green). The significance of most findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects Within the Cross-Cutting Areas," dated December 4, 2014. All violations of U.S. Nuclear Regulatory Commission (NRC) requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated November 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

### Cornerstone: Mitigating Systems

- Green. An NRC-identified Green non-cited violation (NCV) of Calvert Cliffs Nuclear Power Plant Renewed Facility Operating License DPR-53, DRP-69, Condition E, was identified for Exelon's failure to adequately assess the performance of the fire brigade during an announced fire drill. Specifically, Exelon failed to properly assess the command and control performance of the fire brigade leader (FBL) which resulted in the fire drill being improperly evaluated as having met the assessment criteria. The inspectors determined that Exelon's failure to properly assess fire brigade performance in accordance with OP-AA-201-003, "Fire Drill Performance," Revision 16, was a performance deficiency. Exelon has entered this issue into their corrective action program (CAP) as action request (AR) 04094397

The inspectors reviewed IMC 0612, Appendix B, "Issue Screening," issued on September 7, 2012, and determined the issue is more than minor because it was associated with the protection against external events (fire) attribute of the Mitigating Systems cornerstone and adversely affected its objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, failure to properly evaluate the performance of the fire brigade and correct identified deficiencies adversely affects the fire brigade's ability to protect against the effects of a fire. In accordance with IMC 0609, Attachment 4, "Initial Characterization of Findings," issued on October 7, 2016, and IMC 0609, Appendix A, "The Significance Determination Process for Findings at Power" issued on June 19, 2012, the inspectors determined that this finding is of very low safety significance (Green) since it involved fire brigade training requirements, the fire brigade demonstrated the ability to meet the required times for fire extinguishment for the fire drill scenario, and the finding did not significantly affect the fire brigade's ability to respond to a fire. The inspectors determined that the finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Self-Assessment, because Exelon did not conduct a self-critical and objective assessment of the fire brigade's performance. Specifically, Exelon failed to conduct a self-critical and objective assessment of the FBL's performance during the fire drill described above. [P.6] (Section 1R05)

## REPORT DETAILS

### Summary of Plant Status

Unit 1 began the inspection period at 100 percent power. On October 27, 2017, operators reduced power to 95 percent for main turbine valve testing and heater drain pump maintenance. On October 28, the unit was restored to 100 percent power. On December 2, operators reduced power to 83 percent for main turbine valve testing and waterbox cleaning. The unit was restored to 100 percent power on the same day. The unit remained at or near 100 percent power for the remainder of the inspection period.

Unit 2 began the inspection period at 100 percent power. The unit remained at or near 100 percent power for the remainder of the inspection period.

### 1. REACTOR SAFETY

#### **Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity**

#### 1R01 Adverse Weather Protection (71111.01 – 1 sample)

##### Readiness for Seasonal Extreme Weather Conditions

##### a. Inspection Scope

The inspectors reviewed Exelon's readiness for the onset of seasonal low temperatures. The review focused on Units 1 and 2 emergency diesel generators (EDG), Units 1 and 2 refueling water storage tanks, and the 12 condensate storage tank. The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR), technical specifications (TS), control room logs, and the CAP to determine what temperatures or other seasonal weather could challenge these systems, and to ensure Exelon personnel had adequately prepared for these challenges. The inspectors reviewed station procedures, including Exelon's seasonal weather preparation procedure and applicable operating procedures. The inspectors performed walkdowns of the selected systems to ensure station personnel identified issues that could challenge the operability of the systems during cold weather conditions. Documents reviewed for each section of this inspection report are listed in the Attachment.

##### b. Findings

No findings were identified.

#### 1R04 Equipment Alignment

#### .1 Partial System Walkdowns (71111.04Q – 3 samples)

##### a. Inspection Scope

The inspectors performed partial walkdowns of the systems listed below. The inspectors selected these systems based on their risk-significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors reviewed applicable procedures, system diagrams, the UFSAR, TSs, work orders (WO), ARs, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted the system's performance of its intended safety functions. The inspectors also performed field walkdowns of accessible portions of the systems to verify

that system components and support equipment were properly aligned and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. The inspectors also reviewed whether staff had properly identified equipment issues and entered them into the CAP for resolution with the appropriate significance characterization.

- 12 component cooling water system during 11 component cooling water heat exchanger (HX) maintenance, October 3, 2017
- 2B EDG during 2A EDG out of service for maintenance, October 25, 2017
- Unit 2 'A' emergency core cooling system train during 13 high-pressure safety injection (HPSI) pump out of service for maintenance, November 6, 2017

b. Findings

No findings were identified.

.2 Full System Walkdowns (71111.04S – 1 sample)

a. Inspection Scope

On December 13, 2017, the inspectors performed a complete system walkdown of accessible safety related portions of the Unit 1 instrument air system during normal operation, to verify the existing equipment lineup was correct. The inspectors reviewed operating procedures, surveillance tests, drawings, equipment line-up check-off lists, and the UFSAR to verify the system was aligned to perform its required safety functions. The inspectors also reviewed electrical power availability, component lubrication and equipment cooling, hanger and support functionality, and operability of support systems. The inspectors performed field walkdowns of accessible portions of the systems to verify as-built system configuration matched plant documentation, and that system components and support equipment remained operable. The inspectors confirmed that systems and components were aligned correctly, free from interference from temporary services or isolation boundaries, environmentally qualified, and protected from external threats. The inspectors also examined the material condition of the components for degradation and observed operating parameters of equipment to verify that there were no deficiencies. Additionally, the inspectors reviewed a sample of related condition reports and WOs to ensure Exelon appropriately evaluated and resolved any deficiencies

b. Findings

No findings were identified.

1R05 Fire Protection

.1 Resident Inspector Quarterly Walkdowns (71111.05Q – 3 samples)

a. Inspection Scope

The inspectors conducted a tour of the areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that Exelon controlled combustible materials and ignition sources in accordance with administrative procedures. The inspectors verified that fire protection and suppression equipment was available for use as specified in the area pre-fire plan, and passive fire



barriers were maintained in good material condition. The inspectors also verified that station personnel implemented compensatory measures for out of service, degraded, or inoperable fire protection equipment, as applicable, in accordance with procedures.

- Units 1 and 2, Charging Pump Room, Fire Areas 5-9, October 13, 2017
- Unit 1, Service Water (SRW) Pump Room, Fire Area 39, October 19, 2017
- Unit 2, SRW Pump Room, Fire Area 40, November 20, 2017

b. Findings

No findings were identified.

.2 Fire Protection – Drill Observation (71111.05A – 2 samples)

a. Inspection Scope

The inspectors observed a fire brigade drill scenario conducted on October 17, 2017, that involved a fire in the kitchenette, in the 45' elevation North Service building, weld shop break room. The inspectors also observed a fire brigade drill scenario on December 13, 2017, involving a flammable liquid fire at the Unit 1 main turbine electro-hydraulic control skid. The inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that Exelon personnel identified most deficiencies, openly discussed them in a self-critical manner at the debriefing, and took appropriate corrective actions as required. The inspectors evaluated the following specific attributes of the drill:

- Proper wearing of turnout gear and self-contained breathing apparatus
- Proper use and layout of fire hoses
- Employment of appropriate fire-fighting techniques
- Sufficient fire-fighting equipment brought to the scene
- Effectiveness of command and control
- Search for victims and propagation of the fire into other plant areas
- Smoke removal operations
- Utilization of pre-planned strategies
- Adherence to the pre-planned drill scenario
- Drill objectives met

The inspectors also evaluated the fire brigade's actions to determine whether these actions were in accordance with Exelon's fire-fighting strategies.

b. Findings

Introduction. An NRC-identified Green NCV of CCNPP Renewed Facility Operating License DPR-53, DRP-69, Condition E, was identified for Exelon's failure to adequately assess the performance of the fire brigade during an announced fire drill. Specifically, Exelon failed to properly assess the command and control performance of the FBL which resulted in the fire drill being improperly evaluated as having met the assessment criteria.

Description. On December 13, 2017, the inspectors observed an announced fire drill involving a simulated fire on the west side of the Unit 1 main turbine electro-hydraulic control (EHC) skid which is located on the 12' elevation of the Unit 1 turbine building. Fire drills are conducted and evaluated using the guidance in Exelon procedure

OP-AA-201-003, "Fire Drill Performance," Revision 16. The inspectors observed the fire drill in and around the fire area and noted the following:

- Upon the FBL's arrival at the scene, the drill controller presented him a fire drill simulation (photo) showing the fire viewed from the 'west' side of the Unit 1 main turbine EHC skid. The drill controller also verbally indicated to the FBL that the FBL was observing an "oil fed" fire. Using this information, the FBL established a command post on the 'east' side of the Unit 1 main turbine EHC skid.
- The FBL setting up the command post on the 'east' side of the Unit 1 main turbine EHC skid was not optimal. Having the command post on the 'east' side resulted in fire brigade members (FBM) being staged closer to the fire, presented limits on maneuverability of fire suppression efforts, and provided the FBL an obstructed view of the fire and fire brigade suppression actions.
- The FBL did not adjust the location of the command post once it was identified that the initial location provided an obstructed view of the fire and fire brigade suppression actions.
- The FBMs who initially attacked the fire as the attack team were presented, by a drill assistant, with a fire drill simulation (photo) showing that the fire had progressed to an oil pool fire contained within the berm surrounding the Unit 1 main turbine EHC skid.
- The attack team employed a rolling cart style, dry chemical fire extinguisher against the fire. The attack team utilized improper techniques for this type of extinguishing agent and were provided with verbal indication by a drill assistant that their attempt at extinguishment was ineffective. The attack team then retreated to the command post.
- The initial attack team did not communicate to the FBL their observations that the fire had progressed to an oil pool fire contained within the berm surrounding the Unit 1 main turbine EHC skid.
- The fire drill simulation (photo) showing the fire progression was not presented to the FBL by the drill controller. The FBL did not inquire with the initial attack team as to their observations or assessment of the fire even though his view was obstructed.
- The FBL did not recognize that firefighting foam had not been brought to the scene and did not request and then employ firefighting foam as an extinguishing agent after the first extinguishing agent, dry chemical fire extinguisher, had been determined to be ineffective.
- The FBL instructed an additional attack team to employ a water hose line on the fire. This method of extinguishment was simulated as effective by a drill assistant and the fire was subsequently declared out.

The inspectors observed the post fire drill critique conducted by Exelon and reviewed the OP-AA-201-003, Attachment 1, completed for the December 13, 2017, drill and noted the following:

- Using OP-AA-201-003, Attachment 1, Section 3.0, Fire Brigade Response, Strategy, and Tactics, the drill controller evaluated the FBMs demonstration of the proper selection of fire extinguishing agents for the given scenario as unsatisfactory (a score of 1) for failure to respond to the scene with and employ firefighting foam.
- Using OP-AA-201-003, Attachment 1, Section 3.0, Fire Brigade Response, Strategy, and Tactics, the drill controller evaluated the FBMs demonstration of the proper techniques for fire extinguishment as unsatisfactory (a score of 1) for improper techniques used during the employment of the dry chemical fire extinguisher.

- Using OP-AA-201-003, Attachment 1, Section 4.0, Command and Control, the drill controller evaluated the FBLs demonstration of proper adjustments in strategies as marginally accomplished (a score of 2).

The inspectors reviewed OP-AA-201-003 and noted that fire brigade performance attributes are scored on a scale of 0-3 where a score of 0 would indicate that a task was not performed, a score of 1 indicates unsatisfactory performance, a score of 2 indicates a task was marginally accomplished, and a score of 3 indicates that the attribute is a strength. The inspectors reviewed OP-AA-201-003, Attachment 1, and noted it documents nine assessment criteria/tasks as being critical. The inspectors also noted that OP-AA-201-003, Attachment 1, Section 7.0, establishes three acceptance criteria, all of which must be met for the fire drill to be evaluated as satisfactory. One of these acceptance criteria is that no more than two critical tasks are scored at 1 or less. The inspectors noted that the above described two assessment criteria/tasks where FBM performance was evaluated as unsatisfactory (a score of 1) were identified as critical tasks. The inspectors also noted that the above described assessment criteria/task that was evaluated as satisfactory (a score of 2) was also identified as a critical task.

The inspectors discussed the post drill critique results with the drill controller and drill assistants and determined that Exelon's standard, established through training, for 'oil fed' fires is for the FBMs to respond to the scene with firefighting foam and employ it as an extinguishing agent. The inspectors also determined that Exelon's standard, established through training, for proper adjustments in strategy with regard to extinguishing agents is to employ an extinguishing agent that is more effective (better) than the one initially employed. The inspectors inquired about the reasoning for the drill controller and drill assistants determination that a water hose line was a more effective than the dry chemical fire extinguisher which was a rationale used to evaluate the proper adjustments in strategies described above as marginally accomplished. Exelon provided the inspectors with a verbal explanation that in situations where oil is combusting as an atomized mist a water hose line would be considered a more effective extinguishing agent. The inspectors noted that the fire drill scenario did not indicate that the fire was a combusting as a mist. The inspectors did not observe verbal indications of this information being presented to the fire brigade. The inspectors noted that the fire drill scenario relied on the use of drill simulations (photos and verbal indications) to provide information to the FBL and FBMs. The inspectors noted that these simulations provided indication to the FBL and FBMs that the fire was oil fed and progressed to an oil pool fire contained within the berm surrounding the Unit 1 main turbine EHC skid.

The inspectors reviewed Exelon's training materials for plant operator initial and continuing fire brigade training and determined the following:

- Plant operator initial fire brigade training provides training to FBMs that flammable liquid fires, in the form of oil pool fires, are controlled with appropriate firefighting foam.
- Plant operator initial fire brigade training provides training to FBMs that flammable liquid fires, in the form of oil spray fires, are difficult to control with foam extinguishing agents. The training specifies dry chemical or gaseous extinguishing agents as more effective against oil spray fires.
- Plant operator continuing fire brigade training provides training to FBMs that flammable liquid fires may be controlled with water in "special circumstances," using the "right techniques," with the "right situation."

- Plant operator initial or continuing fire brigade training did not provide amplification or additional training to FBMs regarding the circumstances, techniques, or situations where water may be used to control a flammable liquid fire.

The inspectors concluded that the FBL failed to recognize that firefighting foam had not been brought to the scene and subsequently did not request and then employ firefighting foam as an extinguishing agent after the first extinguishing agent had been determined to be ineffective. The inspectors concluded that the FBL had the appropriate information available to determine the status of the fire as having progressed into a type of fire, where firefighting foam would be an effective extinguishing agent. The inspectors concluded that the FBL failed to elicit this information from the FBM or adjust his position to determine this information which would have reinforced the need to employ firefighting foam as an extinguishing agent. The inspectors concluded that this resulted in the FBLs failure to make proper adjustments in strategy. The inspectors concluded that Exelon failed to properly evaluate the FBLs performance under this assessment criteria/task and as a result it was graded as marginally accomplished (a score of 2) which resulted in the fire drill improperly being assessed as satisfactory.

Analysis. The inspectors determined that Exelon's failure to properly assess fire brigade performance in accordance with OP-AA-201-003, "Fire Drill Performance," Revision 16, was a performance deficiency. The inspectors reviewed IMC 0612, Appendix B, "Issue Screening," issued on September 7, 2012, and determined the issue is more than minor because it was associated with the protection against external events (fire) attribute of the Mitigating Systems cornerstone and adversely affected its objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, failure to properly evaluate the performance of the fire brigade and correct identified deficiencies adversely affects the fire brigade's ability to protect against the effects of a fire. In accordance with IMC 0609, Attachment 4, "Initial Characterization of Findings," issued on October 7, 2016, and IMC 0609, Appendix A, "The Significance Determination Process for Findings at Power," issued on June 19, 2012, the inspectors determined that this finding is of very low safety significance (Green) since it involved fire brigade training requirements, the fire brigade demonstrated the ability to meet the required times for fire extinguishment for the fire drill scenario, and the finding did not significantly affect the fire brigade's ability to respond to a fire.

The inspectors determined that the finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Self-Assessment, because Exelon did not conduct a self-critical and objective assessment of the fire brigade's performance. Specifically, Exelon failed to conduct a self-critical and objective assessment of the FBL's performance during the fire drill described above. [P.6]

Enforcement. CCNPP Renewed Facility Operating License DPR-53, DRP-69, Condition E, requires, in part, that Exelon shall implement and maintain in effect all provisions of the approved Fire Protection Program. The Fire Protection Program at CCNPP is described in the UFSAR, Section 9.9, and is controlled through a variety of Exelon procedures, including OP-AA-201-003, "Fire Drill Performance," Revision 16. OP-AA-201-003 requires, in part, that deficiencies of the fire brigade shall be identified, addressed, and documented. Contrary to the above, during the announced fire drill on December 13, 2017, Exelon failed to identify, address, and document deficiencies

associated with the performance of the fire brigade which resulted in the failure to adequately assess the fire brigade's performance. Specifically, Exelon failed to properly identify, address, and document deficiencies associated with the command and control performance of the fire brigade leader which resulted in the fire drill being improperly evaluated as having met the assessment criteria. Exelon's immediate corrective actions included bench marking the fire drill program against fleet programs, and initiating a corrective action program evaluation of the issue. Because this violation is of very low safety significance (Green) and has been entered into Exelon's CAP as AR 04094397, this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000317,318/2017004-01, Inadequate Assessment of Fire Brigade Performance During an Announced Fire Drill).**

1R07 Heat Sink Performance (71111.07A – 1 sample)

a. Inspection Scope

The inspectors reviewed the 11 component cooling water (CCW) heat exchanger's (HX) readiness and availability to perform its safety functions. The inspectors reviewed the design basis for the component and verified Exelon's commitments to NRC Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment." The inspectors observed actual performance tests for the HX and/or reviewed the results of previous inspections. The inspectors discussed the results of the most recent inspection with engineering staff and reviewed pictures of the as-found and as-left conditions. The inspectors verified that Exelon initiated appropriate corrective actions for identified deficiencies. The inspectors also verified that the number of tubes plugged within the HX did not exceed the maximum amount allowed.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program and Licensed Operator Performance (71111.11Q – 2 samples; 71111.11A – 1 sample; 71111.11B – 1 sample)

.1 Quarterly Review of Licensed Operator Regualification Testing and Training

a. Inspection Scope

The inspectors observed licensed operator simulator training on October 18, 2017, which involved elevated ultimate heat sink temperatures, an overload of the 12 instrument air compressor motor, a failure of the 11 instrument air compressor to automatically start, and a SRW leak causing low SRW head tank levels. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager and the TS action statements entered by the shift technical advisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

.2 Quarterly Review of Licensed Operator Performance in the Main Control Room

a. Inspection Scope

The inspectors observed and reviewed the Unit 1 main control room licensed operator performance in response to a loss of automatic speed control for 11 main feedwater pump on November 8, 2017. The inspectors observed infrequently performed test or evolution briefings, pre-shift briefings, and reactivity control briefings to verify that the briefings met the criteria specified in Exelon procedures, OP-AA-103-102, "Watch Standing Practices," Revision 16, and HU-AA-1211, "Pre-Job Briefings," Revision 11. Additionally, the inspectors observed evolution performance to verify that procedure use, crew communications, and coordination of activities between work groups similarly met established expectations and standards.

b. Findings

No findings were identified.

.3 Licensed Operator Regualification Program (71111.11A – 1 sample)

a. Inspection Scope

The following inspection activities were performed using NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 11, and Inspection Procedure Attachment 71111.11, "Licensed Operator Regualification Program."

Examination Results

On December 8, 2017, the results of the annual operating tests and biennial written examinations were reviewed to determine if pass/fail rates were consistent with the guidance of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 11, and NRC IMC 0609, Appendix I, "Operator Regualification Human Performance Significance Determination Process (SDP)." The review verified that the failure rate (individual or crew) did not exceed 20 percent.

- One out of 69 operators failed at least one portion of regualification examination (written, job performance measures (JPM) or individual scenario failures). The overall individual failure rate was 1.4 percent.
- Zero out of 14 crews failed the simulator test. The crew failure rate was 0.0 percent.

b. Findings

No findings were identified.

.4 Licensed Operator Requalification Program (71111.11B – 1 sample)

a. Inspection Scope

The following inspection activities were performed using NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 11, and Inspection Procedure Attachment 71111.11, "Licensed Operator Requalification Program."

Written Examination Quality

The inspectors reviewed the written examinations (reactor operator (RO) and senior reactor operator (SRO)) administered during the week of November 27, 2017, for qualitative and quantitative attributes as specified in Appendix B of Attachment 71111.11, "Licensed Operator Requalification."

Operating Test Quality

Twelve JPMs and four scenarios were reviewed for qualitative and quantitative attributes as specified in Appendix C of 71111.11, "Licensed Operator Requalification Program."

Licensee Administration of Operating Tests

Observations were made of the dynamic simulator exams and JPMs administered during the week of November 27, 2017. These observations included facility evaluations of crew and individual performance during the dynamic simulator exams and individual performance of JPMs.

Examination Security

The inspectors assessed whether facility staff properly safeguarded exam material. JPMs, scenarios, and written examinations were checked for excessive overlap of test items.

Remedial Training and Re-Examinations

No remediation plans or examinations were reviewed because there were no recent failures.

Conformance with Operator License Conditions

Medical records for four SRO licenses and four RO licenses were reviewed to assess conformance with license conditions. All records reviewed were satisfactory.

Proficiency watch standing records for licensed operators were reviewed for the first three quarters of 2017. All active licensed operators met the watch standing requirements to maintain an active license.

The reactivation plan for three RO and two SRO licensed operators were reviewed to assess the effectiveness of the reactivation process. The reactivation was successfully processed in accordance with site procedures.

Records for the participation of licensed operators in the requalification program for the first three quarters in 2017 were reviewed.

### Simulator Performance

Simulator performance and fidelity was reviewed for conformance to the reference plant control room. A sample of simulator deficiency reports was also reviewed to ensure facility staff addressed identified modeling problems. Simulator test documentation was also reviewed.

### Problem Identification and Resolution

A review was conducted of recent operating history documentation found in inspection reports, Exelon's CAP, and the most recent NRC plant issues matrix. The inspectors also reviewed specific events from Exelon's CAP which indicated possible training deficiencies, to verify that they had been appropriately addressed. These reviews did not detect any operational events that were indicative of possible training deficiencies.

#### b. Findings

No findings were identified.

### 1R12 Maintenance Effectiveness (71111.12Q – 2 samples)

#### a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on structure, system, and component (SSC) performance and reliability. The inspectors reviewed system health reports, CAP documents, maintenance WOs, and maintenance rule basis documents to ensure that Exelon was identifying and properly evaluating performance problems within the scope of the maintenance rule. For each sample selected, the inspectors verified that the SSC was properly scoped into the maintenance rule in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.65 and verified that the (a)(2) performance criteria established by Exelon staff was reasonable. As applicable, for SSCs classified as (a)(1), the inspectors assessed the adequacy of goals and corrective actions to return these SSCs to (a)(2). The inspectors ensured that Exelon staff was identifying and addressing common cause failures that occurred within and across maintenance rule system boundaries. Additionally, inspectors verified quality control verifications are properly specified in accordance with the Quality Assurance Program, and are implemented as specified.

- 2-SW-5171, 21 Emergency Core Cooling System pump room air cooler outlet, fails to fully open (AR04033503)
- A Maintenance Rule (A)(1) determination is required for feedwater system (AR04065194)

#### b. Findings

No findings were identified.

### 1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 2 samples)

#### a. Inspection Scope

The inspectors reviewed station evaluation and management of plant risk for the maintenance and emergent work activities listed below to verify that Exelon performed



the appropriate risk assessments prior to removing equipment for work. The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors determined that Exelon performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When Exelon performed emergent work, the inspectors verified that operations personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work and discussed the results of the assessment with the station's probabilistic risk analyst to verify that plant conditions were consistent with the risk assessment. The inspectors also reviewed the TS requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

- Unit 1 maintenance risk assessment for Yellow risk condition for 11 component cooling water HX out of service for maintenance, October 4, 2017
- Unit 2 maintenance risk assessment for Yellow risk condition for 12 HPSI pump out of service for maintenance, November 4, 2017

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 4 samples)

a. Inspection Scope

The inspectors reviewed operability determinations for the degraded or non-conforming conditions listed below based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the operability determinations to assess whether TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TS and UFSAR to Exelon staff's evaluations to determine whether the components or systems were operable. The inspectors confirmed, where appropriate, compliance with bounding limitations associated with the evaluations. Where compensatory measures were required to maintain operability, such as in the case of operator work arounds, the inspectors evaluated whether the measures in place would function as intended and were properly controlled by Exelon staff.

- Through wall leak casting of 2-SW-103 check valve 21 saltwater (SW) pump, October 2, 2017 (AR04058303)
- Degraded flow 11A SRW HX following SW pump shift, October 23, 2017 (AR040660228)
- Unit 2, 45' switchgear room rolling door has ¾" gap at bottom, November 4, 2017 (AR04071099)
- 2B EDG lube oil temperature high alarm switch out of service, November 14, 2017 (AR04074728)

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 1 sample)Temporary Modificationsa. Inspection Scope

The inspectors evaluated the temporary modification for placement of angle steel in front of the Unit 2, 45' switchgear room roll up door to determine whether the modifications affected the safety functions of systems that are important to safety. The inspectors reviewed 10 CFR 50.59 documentation and post-modification testing results, and conducted field walkdowns of the modifications to verify that the temporary modifications did not degrade the design bases, licensing bases, and performance capability of the affected systems.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 2 samples)a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure were consistent with the information in the applicable licensing basis and/or design basis documents, and that the test results were properly reviewed and accepted and problems were appropriately documented. The inspectors also walked down the affected job site, observed the pre-job brief and post-job critique where possible, and confirmed work site cleanliness was maintained. Additionally, the inspectors witnessed the test or reviewed test data to verify quality control hold points were performed and checked, and ensured that results demonstrated adequate restoration of the affected safety functions.

- Work Order (WO) C93507681, 2A EDG exhaust collector removal and replacement, October 26, 2017
- WO C93235615, Replace 2B EDG engine driven fuel oil pump, November 16, 2017

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 2 samples)a. Inspection Scope

The inspectors observed performance of a surveillance test and reviewed test data of selected risk-significant SSCs to assess whether test results satisfied TS, the UFSAR, and Exelon procedure requirements. The inspectors verified that test acceptance criteria were clear, the test demonstrated operational readiness, and was consistent with design documentation. Additionally, the inspectors ensured that the test instrumentation had current calibrations and the range and accuracy for the application, the test was performed as written, and applicable test prerequisites were satisfied. Upon test completion, the inspectors considered whether the test results supported that the

equipment was capable of performing the required safety functions. The inspectors reviewed the following surveillance tests:

- STP-O-65-A1-1, "A Train CVCS Valve Quarterly Operability Test," Revision 0, October 2, 2017 (in-service testing)
- STP-O-27-1, "Reactor Coolant System Leakage Evaluation," Revision 20, November 27, 2017 (RCS leak)

b. Findings

No findings were identified.

**Cornerstone: Emergency Preparedness**

1EP4 Emergency Action Level and Emergency Plan Changes (IP 71114.04 – 1 Sample)

a. Inspection Scope

Exelon implemented various changes to the Calvert Cliffs Emergency Action Levels (EAL), Emergency Plan, and Implementing Procedures. Exelon had determined that, in accordance with 10 CFR 50.54(q)(3), any change made to the EALs, Emergency Plan, and its lower-tier implementing procedures, had not resulted in any reduction in effectiveness of the Plan, and that the revised Plan continued to meet the standards in 50.47(b) and the requirements of 10 CFR Part 50, Appendix E.

The inspectors performed an in-office review of all EAL and Emergency Plan changes submitted by Exelon as required by 10 CFR 50.54(q)(5), including the changes to lower-tier emergency plan implementing procedures, to evaluate for any potential reductions in effectiveness of the Emergency Plan. This review by the inspectors was not documented in an NRC Safety Evaluation Report and does not constitute formal NRC approval of the changes. Therefore, these changes remain subject to future NRC inspection in their entirety. The requirements in 10 CFR 50.54(q) were used as reference criteria. The specific documents reviewed during this inspection are listed in the Attachment.

b. Findings

No findings were identified.

**2. RADIATION SAFETY**

**Cornerstone: Public Radiation Safety**

2RS7 Radiological Environmental Monitoring Program (71124.07) (3 samples)

a. Inspection Scope

The inspectors reviewed the Radiological Environmental Monitoring Program (REMP) to validate the effectiveness of the radioactive gaseous and liquid effluent release program and implementation of the Groundwater Protection Initiative (GPI). The inspectors used the requirements in 10 CFR Part 20, "Standards for Protection Against Radiation," 40 CFR 190, "Environmental Radiation Protection Standards for Nuclear Power Operations," 10 CFR Part 50 Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion "As Low as is Reasonably

Achievable” for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents,” and the site’s TS, Offsite Dose Calculation Manual (ODCM), Nuclear Energy Institute (NEI) 07-07, “Industry Groundwater Protection Initiative,” and procedures required by TS as criteria for determining compliance.

#### Inspection Planning

The inspectors reviewed Calvert Cliffs 2015 and 2016 annual radiological environmental and effluent monitoring reports, REMP program audits, ODCM changes, land use census, UFSAR, and inter-laboratory comparison program results.

#### Site Inspection (1 sample)

The inspectors walked down various thermoluminescent dosimeter and air and water sampling locations and reviewed associated calibration and maintenance records. The inspectors observed the sampling of various environmental media as specified in the ODCM and reviewed any anomalous environmental sampling events including assessment of any positive radioactivity results. The inspectors reviewed any changes to the ODCM. The inspectors verified the operability and calibration of the meteorological tower instruments and meteorological data readouts. The inspectors reviewed environmental sample laboratory analysis results, laboratory instrument measurement detection sensitivities; and results of the laboratory quality control program audit, and the inter- and intra-laboratory comparison program results. The inspectors reviewed the groundwater monitoring program as it applies to selected potential leaking SSCs, and 10 CFR 50.75(g) records of leaks, spills, and remediation since the previous inspection.

#### Groundwater Protection Initiative Implementation (1 sample)

The inspectors reviewed groundwater monitoring results, changes to the GPI program since the last inspection, anomalous results or missed groundwater samples, leakage or spill events including entries made into the decommissioning files (10 CFR 50.75(g)); evaluations of surface water discharges; and Exelon’s evaluation of any positive groundwater sample results including appropriate stakeholder notifications and effluent reporting requirements, if applicable.

#### Problem Identification and Resolution (1 sample)

The inspectors evaluated whether problems associated with the REMP were identified at an appropriate threshold and properly addressed in Exelon’s CAP.

#### b. Findings

No findings were identified.

#### 4. OTHER ACTIVITIES

##### 4OA1 Performance Indicator Verification (71151)

##### .1 Unplanned Scrams, Unplanned Power Changes, and Unplanned Scrams with Complications (6 samples)

###### a. Inspection Scope

The inspectors reviewed Exelon's submittals for the following Initiating Events Cornerstone performance indicators for the period of October 1, 2016, through September 30, 2017.

- Unit 1 Unplanned Scrams (IE01)
- Unit 2 Unplanned Scrams (IE01)
- Unit 1 Unplanned Power Changes (IE03)
- Unit 2 Unplanned Power Changes (IE03)
- Unit 1 Unplanned Scrams with Complications (IE04)
- Unit 2 Unplanned Scrams with Complications (IE04)

To determine the accuracy of the performance indicator (PI) data reported during those periods, inspectors used definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7. The inspectors reviewed Exelon's operator narrative logs, maintenance planning schedules, condition reports, event reports, and NRC integrated inspection reports to validate the accuracy of the submittals.

###### b. Findings

No findings were identified.

##### .2 Occupational Exposure Control Effectiveness (1 sample)

###### a. Inspection Scope

The inspectors reviewed licensee submittals for the occupational radiological occurrences PI for the third quarter 2016 through the third quarter 2017. The inspectors used PI definitions and guidance contained in NEI 99-02, Revision 7, to determine the accuracy of the PI data reported. The inspectors reviewed electronic personal dosimetry accumulated dose alarms, dose reports, and dose assignments for any intakes that occurred during the time period reviewed to determine if there were potentially unrecognized PI occurrences. The inspectors conducted walk-downs of various Locked High and Very High Radiation Area entrances to determine the adequacy of the controls in place for these areas.

###### b. Findings

No findings were identified.

### .3 Radiological Effluent TS/ODCM Radiological Effluent Occurrences (1 sample)

#### a. Inspection Scope

The inspectors reviewed Exelon submittals for the radiological effluent TS/ODCM radiological effluent occurrences PI for the third quarter 2016 through the third quarter 2017. The inspectors used PI definitions and guidance contained in the NEI 99-02, Revision 7, to determine if the PI data was reported properly. The inspectors reviewed the public dose assessments for the PI for public radiation safety to determine if related data was accurately calculated and reported.

The inspectors reviewed the CAP database to identify any potential occurrences such as unmonitored, uncontrolled, or improperly calculated effluent releases that may have impacted offsite dose. The inspectors reviewed gaseous and liquid effluent summary data and the results of associated offsite dose calculations to determine if indicator results were accurately reported.

#### b. Findings

No findings were identified.

### 4OA2 Problem Identification and Resolution (71152 – 2 samples)

#### .1 Routine Review of Problem Identification and Resolution Activities

##### a. Inspection Scope

As required by Inspection Procedure 71152, "Problem Identification and Resolution," the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to determine if Exelon entered issues into the CAP at an appropriate threshold, gave adequate attention to timely corrective actions, and identified and addressed adverse trends. In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the CAP and periodically attended AR screening meetings. The inspectors also confirmed, on a sampling basis, that, as applicable, for identified defects and non-conformances, Exelon staff performed an evaluation in accordance with 10 CFR Part 21.

##### b. Findings

No findings were identified.

#### .2 Semi-Annual Trend Review

##### a. Inspection Scope

The inspectors performed a semi-annual review of site issues, as required by Inspection Procedure 71152, "Problem Identification and Resolution," to identify trends that might indicate the existence of more significant safety issues. In this review, the inspectors included repetitive or closely-related issues that may have been documented by Exelon personnel outside of the CAP, such as trend reports, performance indicators, major equipment problem lists, system health reports, maintenance rule assessments, and maintenance or CAP backlogs. The inspectors also reviewed Exelon's CAP database for the third and fourth quarters of 2017 to assess action requests written in various subject areas (equipment problems, human performance issues, etc.), as well as

individual issues identified during the NRC's daily action request review (Section 4OA2.1). The inspectors reviewed Exelon's quarterly trend report for the third and fourth quarters of 2017 to verify that Exelon personnel were appropriately evaluating and trending adverse conditions in accordance with applicable procedures.

The inspectors evaluated a sample of action requests generated by departments that provide input to the quarterly trend reports. The inspectors assessed whether the issues were appropriately evaluated by Exelon staff for potential trends and resolved within the scope of the CAP. The inspectors reviewed self-assessments performed by Exelon outside of the CAP, including quarterly performance assessment reports and Nuclear Oversight Audits, and verified that trends identified were input into the CAP and appropriately evaluated.

b. Findings and Observations

No findings were identified.

.3 Annual Sample:

a. Inspection Scope

The inspectors reviewed Exelon's identification, evaluation and corrective actions associated with NCV 05000317/2016003-01, Deficient Design Control of Air Pressure Available for Unit 1 Component Cooling Water Air Operated Valves. Specifically, when implementing a design change to allow operators to isolate flow to one CCW HX during specific accident conditions, Exelon staff did not verify that air pressure supplied to air operated valves (AOV) in the Unit 1 CCW system was sufficient to ensure the valves would perform their safety function to completely close under the bounding performance conditions. Subsequent analysis documented that the Unit 2 AOVs were not subject to the issue. See Section 1R18 of NRC inspection report 05000317,318/2016003 (ML16305A253) for additional information.

The inspectors assessed Exelon's planned and implemented corrective actions to evaluate whether Exelon staff appropriately identified, characterized, prioritized, and corrected issues associated with the NCV. The inspectors compared the actions taken to the requirements of Exelon's CAP and 10 CFR Part 50, Appendix B. The inspectors reviewed relevant procedures, calculations and corrective action documents, and assessed Exelon's causal analysis, evaluations, and extent-of-condition reviews. The inspectors interviewed engineering personnel to gain an understanding of the planned and implemented modifications associated with this issue and to assess the acceptability and effectiveness of the corrective actions. The inspectors also performed field walkdowns of the CCW systems and equipment to assess material condition.

b. Findings and Observations

No findings were identified.

The inspectors determined that Exelon staff appropriately evaluated the problems, including the causes and contributing factors in accordance with their CAP. The inspectors reviewed several of the related ARs, calculations and evaluations, and concluded Exelon staff had identified the necessary corrective actions. Specifically, Exelon's immediate corrective actions for the issue included conducting an engineering evaluation that demonstrated the operability of the CCW system in the degraded condition. Additional follow-up actions included evaluating and revising the CCW HX outlet valve setup parameters to ensure positive margin throughout the full open and full

close stroke. The inspectors noted that Exelon's evaluations included re-performing the limiting case analysis from the design change package. This analysis demonstrated that even with the CCW isolation valve providing only half its flow to the functioning CCW HX, the required decay heat removal would have been obtained, and this analysis bounded the degraded condition.

The inspectors determined that those corrective actions were reasonable and addressed the apparent and contributing causes.

The inspectors further noted Exelon's actions included the following:

- Revising technical evaluation (ECP-16-000448) to conservatively consider a maximum bay temperature of 85 degrees F to bound the identified temperature experienced since implementation of the design change (the original revision used 80 degrees F);
- Identifying, correcting an error/conservatism, and re-analyzing an incorrect linkage configuration in design calculations; and
- Determining, through extent-of-condition reviews, that design engineering's technical rigor and threshold for involving AOV/motor-operated valve program owners of potential impacts to program valves during design changes was too low (addressed via procedure change).

The inspectors concluded that Exelon's overall response was commensurate with the safety significance, was timely, and the issues identified had been accurately and thoroughly documented within the CAP, including reasonable follow-up actions such as communicating learnings during various engineering section meetings.

#### 4OA3 Follow-Up Events and Notices of Enforcement Discretion (71153 - 1 sample)

##### (Closed) LER 05000318/2017-001-00: Pressurizer Safety Valve As-Found Settings Outside Technical Specification Limits Due To Set Point Drift

###### a. Inspection Scope.

On February 20, 2017, at the offsite testing facility, the as-found lift setting for the pressurizer safety valve (Serial Number BN04375) previously installed in Unit 2 at the 2RV200 location was measured outside the TS allowable values (valve lifted low). The valve had been installed during the 2015 Unit 2 refueling outage and was removed during the 2017 Unit 2 refueling outage for scheduled testing and maintenance. Exelon determined that the valve had likely been inoperable for greater than the TS 3.4.10, "Pressurizer Safety Valves," allowed outage time and reported this failure as a condition prohibited by technical specifications. The inspectors reviewed Exelon's technical evaluations, reviewed documents, and interviewed Exelon staff to evaluate the causes and corrective actions associated with this deficiency. This licensee event report (LER) is closed.



b. Findings

Description. During scheduled testing, on February 20, 2017, at the offsite testing facility, the as-found lift setting for the pressurizer safety valve (Serial Number BN04375) previously installed in Unit 2 at the 2RV200 location was measured outside the TS allowable values (valve lifted low). The valve had been installed during the 2015 Unit 2 refueling outage and was removed during the 2017 Unit 2 refueling outage for scheduled testing and maintenance. There are two pressurizer safety valves for each unit, and each valve is replaced with a spare valve and is tested and refurbished after being installed for a two year operating cycle.

The valve was replaced as scheduled with a tested, operable valve prior to discovery of the as-found condition. Exelon concluded that the valve had been inoperable for a period of time greater than the allowed TS outage times specified in TS 3.4.10. Technical Specification 3.4.10, "Pressurizer Safety Valves," requires two pressurizer safety valves to be operable during Modes 1 and 2, and in Mode 3 when all reactor coolant system (RCS) cold leg temperatures are greater than 301°F for Unit 2. With one pressurizer safety valve inoperable, TS 3.4.10, Condition A, requires the inoperable valve to be restored within 15 minutes. If this is unable to be completed or if two pressurizer safety valves are inoperable, then TS 3.4.10, Condition B, is entered which requires the unit to be in Mode 3 within 6 hours AND the unit to be cooled down to below 365°F for Unit 1 or 301°F for Unit 2 within 12 hours. Exelon entered the issues into their CAP as AR 03976328. Exelon determined that the cause of the pressurizer safety valve failure is due to set point drift. Based on previous operating experience with these types of valves, the valve was set in the lower range of the allowable as-left set point criteria to account for positive set point drift in 2015. The valve set point drifted low instead of the previously trended high set point drift. Since it was initially set at the low end of the allowable as-left range, set point drift in the low direction caused it to drift beyond the TS as-found allowable limits.

The inspectors' review concluded that it was likely and reasonable that the valves became inoperable at some indeterminate time during the operating cycle. However, based on a review of the surveillance test results of the previous pressurizer safety valve setpoint tests, the inspectors concluded that a pressurizer safety valve lifting slightly outside the acceptance tolerance did not indicate a problem with the valve, as-left testing, or surveillance test errors. Therefore, the inspectors determined that the existence of an inoperable pressurizer safety valve was not reasonably within Exelon's ability to foresee and correct, and therefore, was not a performance deficiency.

The safety function of the pressurizer safety valve system to depressurize the RCS to maintain pressure within design limits was determined to have been maintained despite one of the two pressurizer safety valves having been inoperable. This is because the second installed pressurizer safety valve remained operable throughout the 2015 to 2017 Unit 2 operating cycle, and the inoperable valve may have lifted at a lower than design pressure, but would still have depressurized the RCS if needed.

Enforcement. Technical Specification 3.4.10 "Pressurizer Safety Valves," requires two pressurizer safety valves to be operable during Modes 1 and 2, and in Mode 3 when all RCS cold leg temperatures are greater than 365°F for Unit 1 or 301°F for Unit 2. With one pressurizer safety valve inoperable, TS 3.4.10, Condition A, requires the inoperable valve to be restored within 15 minutes. If this is not able to be completed or if two pressurizer safety valves are inoperable, then TS 3.4.10, Condition B, is entered which requires the unit to be in Mode 3 within 6 hours AND the unit to be cooled down to below 365°F for Unit 1 or 301°F for Unit 2 within 12 hours. Contrary to the above, on February 20, 2017, Unit 2 pressurizer safety valve BNO4375, which had been installed in position

2RV200 during the previous operating cycle, was measured lower than its TS allowable value during as-found lift point testing. The valve had been replaced with a tested, operable valve prior to discovery of the as-found condition. Exelon concluded that the valve had been inoperable for a period of time greater than the allowed TS outage times specified in TS 3.4.10. Exelon entered the issue into their CAP as AR 03976328.

This issue is considered within the traditional enforcement process because there was no performance deficiency associated with the violation of NRC requirements. Inspection Manual Chapter 0612, "Power Reactor Inspection Reports," Section 03.22 states, in part, that traditional enforcement is used to disposition violations receiving enforcement discretion or violations without a performance deficiency. The NRC Enforcement Policy, Section 2.2.1 states, in part, that, whenever possible, the NRC uses risk information in assessing the safety significance of violations. Accordingly, after considering that the condition represented very low safety significance, the inspectors concluded that the violation would be best characterized as Severity Level IV under the traditional enforcement process. However, the NRC is exercising enforcement discretion (EA-18-011) in accordance with Section 3.10 of the NRC Enforcement Policy, which states that the NRC may exercise discretion for violations of NRC requirements by reactor licensees for which there are no associated performance deficiencies. In reaching this decision, the NRC determined that the issue was not within Exelon's ability to foresee and correct; Exelon's actions did not contribute to the degraded condition; and the actions taken were reasonable to identify and address the condition. Furthermore, because Exelon's actions did not contribute to this violation, it will not be considered in the assessment process or the NRC's Action Matrix.

#### 4OA5 Other Activities

##### Institute of Nuclear Power Operations (INPO) Report Review

##### a. Inspection Scope

The inspectors reviewed the final report for the INPO plant assessment of Calvert Cliffs conducted in November 2016. The inspectors evaluated these reports to ensure that NRC perspectives of Exelon performance were consistent with any issues identified during the assessments. The inspectors also reviewed these reports to determine whether INPO identified any significant safety issues that required further NRC follow-up.

##### b. Findings

No findings were identified.

#### 4OA6 Meetings, Including Exit

##### Exit Meeting Summary

On January 17, 2018, the inspectors presented the overall inspection results to Mr. Mark Flaherty, Site Vice President, and other members of the Exelon staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

On October 6, 2017, the inspectors presented the inspection results documented in Section 2RS7 to Mr. Mark Flaherty, Site Vice President, and other members of the

Calvert Cliffs staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

On October 13, 2017, the inspectors discussed the results of the PI&R sample documented in section 4OA2.3 were with Mr. Michael Fick, Licensing and members of the NMPNS staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in the report.

On December 1, 2017, the inspectors presented the inspection results of the operating licensee operator requalification inspection documented in section 1R11.03 and 1R11.04 to Mr. A. Kelly, Operations Training Manager, and other members of licensee staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in the report.

#### **ATTACHMENT: SUPPLEMENTARY INFORMATION**

**SUPPLEMENTARY INFORMATION****KEY POINTS OF CONTACT**Licensee Personnel

M. Flaherty, Site Vice President  
 T. Tierney, Plant General Manager  
 A. Barnette, Senior Chemist, EIS  
 A. Drake, Design Engineer  
 A. Kelly, Manager, Operations Training  
 B. Dorsey, Radwaste/Environmental Supervisor  
 B. Erdman, Manager, RP Technical Support  
 B. Larrabee, Senior Maintenance Specialist  
 B. Lynch, System Engineer  
 B. Mahoney, Mechanical Design Engineer  
 C. Jackson, Engineering Manager  
 C. Shinafelt, AOV Program Manager  
 D. Nelson, License Coordinator  
 D. Schrumppf, CMO Manager  
 D. Waters, Chemistry Unit Sampler, EIS  
 J. Barton, Lead Examination Author  
 J. Cohen, NOS Audit Manager  
 J. Haydin, Simulator Coordinator  
 J. Norris, Radiation Protection  
 J. Prowinski, Environmental Chemist  
 K. Greene, Principal Engineer, Regulatory Assurance  
 K. Thompson, Site Nurse  
 M. Fick, Principal Engineer, Regulatory Assurance  
 N. Smith, System Engineer  
 P. Amos, Director, Emergency Preparedness  
 R. Ihnacik, REMP Program Owner  
 S. Stillings, Licensed Operator Requalification Program Lead

**LIST OF ITEMS OPENED, CLOSED AND DISCUSSED**Opened/Closed

05000317, 318/2017004-001	NCV	Inadequate Assessment of Fire Brigade Performance During an Announced Fire Drill (Section 1R05)
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Closed

05000318/2017001-00	LER	Pressurizer Safety Valve As-Found Settings Outside Technical Specification Limits Due to Set Point Drift (Section 4OA3)
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**LIST OF DOCUMENTS REVIEWED****Section 1R01: Adverse Weather Protection**Procedures

OP-AA-108-107-1001, Station Response to Grid Capacity Conditions, Revision 7  
 OP-AA-108-111-1001, Weather and natural Disaster Guidelines, Revision 16

WC-AA-107, Seasonal Readiness, Revision 19

Miscellaneous

CCNPP Seasonal Readiness Report

**Section 1R04: Equipment Alignment**

Procedures

OI-19-1 Compressed Air Systems, Revision 03500

Action Request

04073527

04083817

Drawings

60712SH0003, Compressed Air System Instrument Air and Plant Air, Revision 116

60712SH0005, Compressed Air System Instrument Air and Plant Air, Revision 9

60712SH0006, Compressed Air System Instrument Air and Plant Air, Revision 11

Miscellaneous

ECP-17-000754, Evaluation of Instrument Air Line Temperature Concern, Revision 000

**Section 1R05: Fire Protection**

Procedures

OP-AA-201-003, Fire Drill Performance, Revision 16

SA-FFSM-PA12, Fire Fighting Strategies for 12 Foot Areas of the Turbine Building, Revision 0200

SA-FFSM-AB-10, Fire Fighting Strategies for -10 Foot Areas of the Auxiliary Building, Revision 0200

Miscellaneous

CA02243, Combustible Loading Analysis, Revision 3

**Section 1R07: Heat Sink Performance**

Miscellaneous

Weekly Saltwater Heat Exchanger trending data covering the period beginning October 4, 2016 and ending October 3, 2017.

WO C93618204

**Section 1R11: Licensed Operator Regualification Program**

Procedures

AOP-7A, Loss of Saltwater Cooling, Revision 15

AOP-7B, Loss of Service Water Cooling, Revision 13

AOP-7C, Loss of Component Cooling Water, Revision 5

AOP-7D, Loss of Instrument Air, Revision 16

TQ-AA-306, Simulator Management, Revision 8

Action Requests

2714912	3989413	4079466
2725172	4032720	

Miscellaneous

ANS 1C, Steady State 75% Heat / Mass Balance, Performed 9/26/16  
 ANS 1E, Steady State Data Comparison, Performed 2/4/17  
 ANS 2A, Reactor Trip, Performed 10/8/16  
 ANS 2C, Simultaneous Closure of Both MSIVs, Performed 10/8/16  
 ANS 2D, Simultaneous Trip of all RCPs, Performed 10/8/16  
 ANS 2H, DBA LOCA with Loss of Offsite Power, Performed 10/10/16  
 ANS 2I, Main Steam Line Break in Containment, Performed 10/8/16

**Section 1R12: Maintenance Effectiveness**

Procedures

ER-AA-310, Implementation of the Maintenance Rule, Revision 10

Miscellaneous

2-TCC-17-0056  
 Control Room Temporary Note 16-50  
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**Section 1R13: Maintenance Risk Assessments and Emergent Work Control**

Procedures

WC-AA-101, Online Work Control Process, Revision 27

**Section 1R15: Operability Determinations and Functionality Assessments**

Procedures

ER-AA-520, Instrument Performance Trending, Revision 4  
 CC-AA-201, Plant Barrier Control Program, Revision 11  
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Action Requests

04074728  
 04078305

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## **Section 1R18: Plant Modifications**

### Procedures

CC-AA-103, Configuration Change Control, Revision 30

### Action Requests

04076918

### Drawings

62134, Door Schedule Plant Security and Controlled Doors, Revision 28

### Miscellaneous

WO C93646478

## **Section 1R19: Post-Maintenance Testing**

### Procedures

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## **Section 1R22: Surveillance Testing**

### Action Requests

04076504

## **IEP4: Emergency Action Level and Emergency Plan Changes**

### Miscellaneous

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Revision 3

## **Section 2RS7 Radiological Environmental Monitoring Program**

### Procedures

CP-234, Specification and Surveillance for the Radiological Environmental Monitoring Program,  
Revision 00800

CP-509, Land Use Census, Revision 00400

CY-AA-170-000, Radioactive Effluent and Environmental Monitoring Programs, Revision 6

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CY-AA-170-1100, Quality Assurance for Radiological Monitoring Programs, Revision 4

CY-AA-170-300, Offsite Dose Calculation Manual Administration, Revision 3

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AR02515504	AR02651765	AR03985056
AR02528250	AR02682176	AR04036383
AR02566409	AR02690077	AR04047943
AR02601131	AR02699418	
AR02623701	AR02699419	

Documents

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**Section 40A1 Performance Indicator Verification**Procedures

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 LS-AA-2030, Monthly Data Elements for NRC Unplanned Power Changes per 7000 Critical hours, Revision 5



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**Section 40A2: Problem Identification and Resolution**

Procedure

ER-AA-410, Air-Operated Valve Program Implementing Procedure, Revision 2

Action Requests

02680281, Component Cooling HX Outlet CV Valve Margin Review

02682392, Error Found in Design Calculation CA07065

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02741322, 3Q16 – Green NCV: Deficient Design Control for U1 CC HX CVs

04006171, Gap Identified in sending form 10S to AOV/MOV Program Owners

Drawings

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NRC Letter: Comments on Joint Owners' Group Air-Operated Valve Program Document, dated October 8, 1999

**Section 40A3: Follow-Up Events and Notices of Enforcement Discretion**

Procedures

NWS-T-106 Revision 1

NWS-T-106 Revision 2

NWS-T-106 Revision 3

Miscellaneous

Purchase Order 00543176 Revision 002

Purchase Order 00599874 Revision 000

**LIST OF ACRONYMS**

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
AOV	air-operated valve
AR	action request
CAP	corrective action program
CCNPP	Calvert Cliffs Nuclear Power Plant
CCW	component cooling water
EAL	emergency action level
ECCS	emergency core cooling
EDG	emergency diesel generator
EHC	electro-hydraulic control
Exelon	Exelon Generation Company, LLC
FBL	fire brigade leader
FBM	fire brigade members
GPI	groundwater protection initiative
HPSI	high pressure safety injection
HX	heat exchanger
IMC	Inspection Manual Chapter
INPO	Institute of Nuclear Power Operations
JPM	job performance measures
LER	licensee event report
NCV	non-cited violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
ODCM	offsite dose calculation manual
PI	Performance Indicator
RCS	reactor coolant system
REMP	radiological environmental monitoring program
RO	reactor operator
SRO	senior reactor operator
SRW	service water
SSC	structure, system, and component
SW	saltwater
TS	technical specification
UFSAR	Updated Final Safety Analysis Report
WO	work order