



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

July 27, 2015

Mr. George H. Gellrich, Site Vice President  
Calvert Cliffs Nuclear Power Plant, LLC  
Exelon Generation Company, LLC  
1650 Calvert Cliffs Parkway  
Lusby, MD 20657-4702

**SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT – INTEGRATED INSPECTION  
REPORT 05000317/2015002 AND 05000318/2015002**

Dear Mr. Gellrich:

On June 30, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on July 8, 2015, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

This report documents two NRC-identified findings of very low safety significance (Green), which were determined to involve violations of NRC requirements. However, because of the very low safety significance and because they are entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs), consistent with Section 2.3.2.a of the NRC Enforcement Policy.

If you contest any NCVs in this report, 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, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at CCNPP. In addition, if you disagree with the cross-cutting aspect assigned to any finding, 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 disagreement, to the Regional Administrator, Region I, and the NRC Resident Inspector at CCNPP.

G. Gellrich

-2-

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records component of the NRC's Agency-wide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

Daniel L. Schroeder, 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 05000317/2015002 and 05000318/2015002  
w/Attachment: Supplementary Information

cc w/encl: Distribution via ListServ

G. Gellrich

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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. 05000317/2015002 and 05000318/2015002

Licensee: Exelon Generation Company, LLC (Exelon)

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

Location: Lusby, MD

Dates: April 1, 2015 through June 30, 2015

Inspectors: R. Clagg, Senior Resident Inspector  
C. Roettgen, Resident Inspector  
A. Siwy, Resident Inspector (Acting)  
H. Anagnostopoulos, Health Physicist  
J. Furia, Senior Health Physicist  
D. Orr, Senior Reactor Inspector

Approved by: Daniel L. Schroeder, Chief  
Reactor Projects Branch 1  
Division of Reactor Projects

Enclosure

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## SUMMARY

Inspection Report 05000317/2015002, 05000318/2015002; 04/01/2015 – 06/30/2015; Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2; Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation, Problem Identification and Resolution.

This report covered a three-month period of inspection by resident inspectors and announced baseline inspections performed by regional inspectors. The inspectors identified two non-cited violations (NCVs), all of which were 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 February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

### Cornerstone: Mitigating Systems

- Green. The inspectors identified a Green NCV of Title 10 of the *Code of Federal Regulations* (10 CFR) 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for failure to include appropriate quantitative acceptance criteria for determining the auxiliary contacts and mechanical interlocks were properly installed and adjusted when the Units 1 and 2 containment air coolers (CAC) starters and contactors were replaced during plant modifications. The starter and contactors with associated mechanical interlocks and auxiliary contacts provide the necessary electrical coordination to shift the CACs from fast to slow speed during a safety injection actuation signal (SIAS). The starter and contactor replacements occurred from July 2002 to July 2004. The inspectors determined that Exelon's failure to include appropriate quantitative acceptance criteria for determining the auxiliary contacts and mechanical interlocks were properly installed and adjusted when the Units 1 and 2 CAC starters and contactors were replaced during plant modifications is a performance deficiency. Exelon entered this issue into their corrective action program (CAP) as IR02408755, completed an apparent cause evaluation (ACE), and completed corrective action work orders (WO) to adjust all associated starters and contactors auxiliary contacts.

The inspectors reviewed IMC 0612, Appendix B, "Issue Screening," and determined the issue is more than minor because it is associated with the Mitigating Systems cornerstone attribute of design control and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors evaluated the finding using IMC 0609, Attachment 4, "Initial Characterization of Findings," issued on June 19, 2012, and IMC 0609, Appendix A, "The Significance Determination Process for Findings At Power," Exhibit 2, "Mitigating Systems Screenings Questions," issued on June 19, 2012, and determined a detailed risk evaluation was required for the actual loss of function of the 13 CAC for greater than its technical specification (TS) allowed outage time. A regional Senior Reactor Analyst performed a detailed risk evaluation using the Calvert Cliffs Standardized Plant Analysis Risk (SPAR) Model for Calvert Cliffs Unit 1, Version 8.27, for internal events and determined

the finding to be of very low safety significance (Green). The inspectors determined that the finding did not have a cross-cutting aspect because the issue was not indicative of current licensee performance. (Section 4OA2.1)

### **Cornerstone: Public Radiation Safety and Occupational Radiation Safety**

- Green. The inspectors identified a Green NCV of 10 CFR 71.5, "Transportation of Licensed Material," and CFR 172, Subpart I, "Safety and Security Plans." Specifically, Exelon personnel shipped a Category 2 radioactive material quantity of concern (RAM-QC) on public highways to a waste processor without adhering to a transportation security plan. Prior to shipment, Exelon's staff failed to recognize that the quantity of radioactive material met the definition RAM-QC. The inspectors determined that Exelon's failure to ship material as a Category 2 RAM-QC was a performance deficiency. Exelon entered this issue into their CAP as IR02481678 and corrective actions included revising the shipping procedure to reflect the appropriate Department of Transportation requirements for shipment of Category 2 radioactive material. Additionally, Exelon implemented a formal process for reviewing pending regulatory changes for impacts to operations and support activities by the implementation of Exelon Procedure LS-AA-110, "Commitment Management," Revision 10, in September 2014.

The inspectors reviewed IMC 0612, Appendix B, "Issue Screening," and determined the issue is more than minor because it is associated with the program and process attribute of the Public Radiation Safety cornerstone and adversely affected the cornerstone objective to ensure adequate protection of public health and safety from exposure to radioactive materials released into the public domain as a result of routine civilian nuclear reactor operation. In accordance with IMC 0609, Appendix D, "Public Radiation Safety Significance Determination Process," issued on February 12, 2008, the inspectors determined the finding to be of very low safety significance (Green) because Exelon had an issue involving transportation of radioactive material, but it did not involve: (1) a radiation limit that was exceeded; (2) a breach of package during transport; (3) a certificate of compliance issue; (4) a low level burial ground nonconformance; or (5) a failure to make notifications or provide emergency information. The inspectors determined that the finding did not have a cross-cutting aspect because the issue was not indicative of current licensee performance because Exelon successfully implemented its transportation security plan in shipping three Category 2 RAM-QC packages in 2014. (Section 2RS8)

## REPORT DETAILS

### Summary of Plant Status

Unit 1 began the inspection period at 100 percent power. On April 7, 2015, the unit experienced an automatic reactor trip due to a loss of offsite power. Unit startup began on April 9 and the unit reached 100 percent power later that same day. On May 29, operators reduced power to 80 percent to perform main turbine valve testing; and on May 30, operators further reduced power to 62 percent to perform maintenance on a steam generator main feed pump. On May 31, operators returned the unit to full power. On June 28, operators reduced power to 95 percent to perform variable average reactor coolant temperature testing. The operators returned the unit to full power on June 29. 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. On April 7, 2015, the unit experienced an automatic reactor trip due to a loss of offsite power. Unit startup began on April 9 and the unit reached 100 percent power on April 10. 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 – 2 samples)

.1 Readiness for Seasonal Extreme Weather Conditions

a. Inspection Scope

The inspectors performed a review of Exelon's readiness for the onset of seasonal high temperatures. The review focused on emergency diesel generators (EDG) and saltwater (SW) systems. The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR), 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 hot weather conditions. Documents reviewed for each section of this inspection report are listed in the Attachment.

b. Findings

No findings were identified.



## .2 Summer Readiness of Offsite and Alternate Alternating Current Power Systems

### a. Inspection Scope

The inspectors performed a review of plant features and procedures for the operation and continued availability of the offsite alternating current (AC) power system and the onsite alternate alternating current (AAC) power system to evaluate readiness of the systems prior to seasonal high grid loading. The inspectors reviewed Exelon's procedures affecting these areas and the communications protocols between the transmission system operator and Exelon. This review focused on changes to the established program and material condition of the offsite AC and onsite AAC power equipment. The inspectors assessed whether Exelon established and implemented appropriate procedures and protocols to monitor and maintain availability and reliability of both the offsite AC and the onsite AAC power system. The inspectors evaluated the material condition of the associated equipment by interviewing the responsible system manager, reviewing condition reports (CRs) and open WOs, and walking down portions of the offsite AC and onsite AAC power systems including the 500 kilovolt (kV) and 220 kV switchyards.

### b. Findings

No findings were identified.

## 1R04 Equipment Alignment

### .1 Partial System Walkdowns (71111.04Q – 5 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, TS, WOs, CRs, 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 system components and support equipment were aligned correctly and were 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 the Exelon staff had properly identified equipment issues and entered them into the CAP for resolution with the appropriate significance characterization.

- 2A EDG and 0C AAC diesel generator (DG) during 2B EDG out of service for maintenance, April 8, 2015
- 13 Auxiliary Feedwater (AFW) pump and 23 AFW pump during 11 AFW pump and 12 AFW pump out of service for maintenance, April 24, 2015
- 12 SW train during 1A EDG out of service for maintenance, May 19, 2015
- 21 and 22 Component Cooling Heat Exchanger (CCHX) after engineering change package (ECP)-15-000213, May 28, 2015

- 1B EDG and 0C AAC DG during 1A EDG out of service for maintenance, June 19, 2015

b. Findings

No findings were identified.

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

a. Inspection Scope

On June 29–30, 2015, the inspectors performed a complete system walkdown of accessible portions of the Unit 1 EDGs. 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, hangar 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 and observed operating parameters of equipment to verify that there were no deficiencies. Additionally, the inspectors reviewed a sample of related CRs 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 – 6 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.

- Unit 2, East Electrical Penetration Room, Fire Area 26, April 22, 2015
- Unit 2, West Electrical Penetration Room, Fire Area 27, April 22, 2015
- Unit 1, Service Water (SRW) Pump Room, Fire Area 39, May 1, 2015
- Unit 2, SRW Pump Room, Fire Area 40, May 1, 2015

- Unit 1, Charging Pump Room, Fire Areas 5, 6, and 7, June 10, 2015
- Unit 2, Charging Pump Room, Fire Areas 8 and 9, June 10, 2015

b. Findings

No findings were identified.

.2 Fire Protection – Drill Observation (71111.05A – 1 sample)

a. Inspection Scope

The inspectors observed an unannounced fire drill conducted on May 6, 2015, that involved a fire in the P-13000-1 transformer. The inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that Exelon personnel identified deficiencies, openly discussed them in a self-critical manner during the drill debrief, and took appropriate corrective actions as required. The inspectors also evaluated the fire brigade's actions to determine whether these actions were in accordance with Exelon's fire-fighting strategies. The inspectors evaluated specific attributes as follows:

- 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

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 2 samples)

Internal Flooding Review

a. Inspection Scope

The inspectors evaluated the areas listed below for internal flooding. The inspectors reviewed the UFSAR, the site flooding analysis, and plant procedures to assess susceptibilities involving internal flooding. The inspectors also reviewed the CAP to determine if Exelon identified and corrected flooding problems and whether operator actions for coping with flooding were adequate. The inspectors focused on the adequacy of equipment seals located below the flood line, floor and water penetration

seals, watertight door seals, common drain lines and sumps, sump pumps, level alarms, control circuits, and temporary or removable flood barriers.

- Unit 1, SRW Pump Room
- Unit 2, SRW Pump Room

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program and Licensed Operator Performance  
(71111.11Q – 2 samples)

.1 Quarterly Review of Licensed Operator Regualification Testing and Training

a. Inspection Scope

The inspectors observed licensed operator simulator training on June 9, 2015, which involved a locked reactor coolant pump (RCP) rotor, stuck control element assembly, steam generator tube rupture, and main steam safety valve failure resulting in a General Emergency declaration. 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 degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classifications made by the shift manager and the TS action statements entered by the shift manager. 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 licensed operators in the main control room on April 9, 2015, performing Units 1 and 2 plant heatup and reactor startup activities, including rod withdrawal, reactivity management, and steam generator feed pump manipulations. The inspectors observed procedure use and adherence, crew communications, and coordination of activities between work groups to verify that established expectations and standards were met.

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 10 CFR 50.65 and verified that the (a)(2) performance criteria established by the 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). Additionally, the inspectors ensured that the Exelon staff was identifying and addressing common cause failures that occurred within and across maintenance rule system boundaries.

- Review of 10 CFR 50.65(a)(3) maintenance rule program periodic assessment
- Corrosion on 1A EDG cylinder liners (IR02517505)

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 7 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 verified that Exelon personnel 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 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.

- Updated maintenance risk assessment for Unit 2 Yellow risk activities associated with 2B EDG out of service for maintenance, April 8, 2015
- Updated maintenance risk assessment for Unit 1 Yellow risk activities associated with 1A EDG out of service for maintenance, May 19, 2015
- Updated maintenance risk assessment for Unit 2 Yellow risk activities associated with 12 CCHX modification, May 26, 2015
- Updated maintenance risk assessment for Unit 1 Yellow risk activities associated with 21 and 22 CCHX modification, May 28, 2015

- Maintenance risk assessment for Units 1 and 2 for the week of June 8, 2015
- Updated maintenance risk assessment for Unit 1 Yellow risk activities associated with 1A EDG out of service for maintenance, June 17, 2015
- Updated maintenance risk assessment for Unit 1 Yellow risk activities associated with 1A EDG out of service for maintenance and severe thunderstorms/high winds in area, June 20, 2015

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 9 samples)

a. Inspection Scope

The inspectors reviewed the operability determinations for the degraded or non-conforming conditions listed below. The inspectors selected these issues 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'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, the inspectors determined whether the measures in place would function as intended and were properly controlled by Exelon.

- Clicking noise heard at 1C62A, 1B EDG annunciator panel (IR02406671)
- 21 SW pump did not auto start after loss of power (IR02481449)
- 21 Charging pump desurger found at 0 pounds per square inch gauge (IR02483738)
- 12 SW pump installed pump bearing shows signs of looseness (IR02483285)
- 23 AFW pump start time exceeded (IR02464488)
- Cables from 0SH301 site power breaker from SMECO failed tan delta tests (IR02492636)
- Unit 1, Wide range noble gas monitor (WRNGM) show signs of failing power supply (IR0250520)
- Unit 2, WRNGM giving frequent critical low alarms (IR02505403)
- 2-SRW-5154CV, 21 SRW heat exchanger bypass stuck at 10 percent open (IR02507192)

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 2 samples)Permanent Modificationsa. Inspection Scope

The inspectors evaluated the modifications listed below and verified that the design bases, licensing bases, and performance capability of the affected systems were not degraded by the modifications. In addition, the inspectors reviewed modification documents associated with the upgrade and design change. The inspectors also reviewed revisions to the UFSAR and system design basis documents to ensure the modifications were incorporated into these documents.

- ECP-14-000089, "Unit 2 Implementation of Steam Generator Makeup Strategy for FLEX"
- ECP-15-000213, "Provide Safety-Related Air to Component Cooling Water Heat Exchanger Isolation Valves 1(2)-CV-3824 and 1(2)-CV-3826"

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 7 samples)a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities ensured system operability and functional capability. The inspectors reviewed the test procedure to verify that the procedure adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure were consistent with information in the applicable licensing basis and/or design basis documents, and that the procedure had been properly reviewed and approved. The inspectors also witnessed the test or reviewed test data to verify that the test results adequately demonstrated restoration of the affected safety functions.

- WO C93022812, 2B EDG speed switch replacement, April 14, 2015
- WO C92634832, Test and inspect relay 1RY1V4071/X1 using Maintenance Procedure E-10, April 24, 2015
- WO C92514139, 13 SW pump handswitch is difficult to place in pull-to-lock, 1-HS-5201, May 7, 2015
- WO C92695191, Replace 1A EDG overspeed/speed field flash switches, May 20, 2015
- WO C91905051, Replace relay 2RY2B414/SIB824, June 8, 2015
- WO C93102167, Unit 2 WRNGM repair, June 12, 2015
- WO C93108933, Boroscope 1A2 engine cylinder liners, June 16, 2015

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 3 samples)a. Inspection Scope

The inspectors reviewed the surveillance tests listed below. The inspectors observed performance of surveillance tests and/or 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, tests demonstrated operational readiness and were consistent with design documentation, test instrumentation had current calibrations and the range and accuracy for the application, tests were performed as written, and applicable test prerequisites were satisfied. Upon test completion, the inspectors considered whether the test results supported that equipment was capable of performing the required safety functions.

- STP-O-5A21-2, “21 AFW Pump Quarterly Surveillance Test,” Revision 0, April 28, 2015 (in-service test)
- STP-O-8B-1, “Test of 1B DG and 14 4kV Bus LOCI Sequencer,” Revision 30, June 3, 2015
- PE-0-024-08-O-M, “0C Diesel Generator,” Revision 3, June 13, 2015

b. Findings

No findings were identified.

**Cornerstone: Emergency Preparedness**1EP6 Drill Evaluation (71114.06 – 1 sample)Emergency Preparedness Drill Observationa. Inspection Scope

On May 20, 2015, the inspectors observed the performance of an Emergency Planning Drill that involved a loss of AFW, tornado strike/loss of offsite power, loss of normal heat removal, and loss of containment, CAL-EP-ID-15-3, “Emergency Preparedness Exercise,” Revision 0. The inspectors evaluated the conduct of the drill to identify any weaknesses and deficiencies in the classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the simulator and technical support center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the station drill critique to compare inspector observations with those identified by the Exelon staff in order to evaluate Exelon’s critique and to verify whether the Exelon staff was properly identifying weaknesses and entering them into the CAP. Drill issues were captured by Exelon in the CAP as IR02504369, and were reviewed by the inspectors.

b. Findings

No findings were identified.



## 2. RADIATION SAFETY

### **Cornerstone: Public Radiation Safety and Occupational Radiation Safety**

#### 2RS7 Radiological Environmental Monitoring Program (71124.07 – 1 sample)

##### 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. The inspectors used the requirements in 10 CFR 20; 40 CFR 190; 10 CFR 50, Appendix I; TS; Offsite Dose Calculation Manual (ODCM); and procedures required by TS as criteria for determining compliance.

##### Inspection Planning

The inspectors reviewed the CCNPP 2013 and 2014 annual radiological environmental and effluent monitoring reports, REMP program audits, ODCM changes, land use census, and inter-laboratory comparison program results.

##### Onsite Inspection

The inspectors reviewed and/or observed the following items:

- Sample collection, monitoring, and dose measurement stations (e.g., thermoluminescent dosimeter, air monitoring, vegetation, milk)
- Calibration and maintenance records for air sample and dosimetry measurement equipment
- Environmental sampling of the effluent release pathways specified in the ODCM
- Meteorological tower and meteorological data readouts
- Meteorological instrument operability status and calibration results
- Missed and/or anomalous environmental samples identified, resolved, and reported in the annual radioactive environmental monitoring report
- Positive environmental sample assessment results
- The groundwater monitoring program as it applies to selected potential leaking SSCs
- 10 CFR 50.75(g) records of leaks, spills, and remediation since the previous inspection
- Changes to the ODCM due to changes to the land use census, long-term meteorological conditions, and/or modifications to the environmental sample stations
- Environmental sample laboratory analysis results, and measurement detection sensitivities
- Results of the laboratory quality control program audit, and the inter-and intra-laboratory comparison program results

##### Identification and Resolution of Problems

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.

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08 – 1 sample)

a. Inspection Scope

The inspectors verified the effectiveness of Exelon's programs for processing, handling, storage, and transportation of radioactive material. The inspectors used the requirements of 49 CFR 170–177; 10 CFR 20, 37, 61, and 71; applicable industry standards; regulatory guides; and procedures required by TSs as criteria for determining compliance.

Inspection Planning

The inspectors conducted an in-office review of the solid radioactive waste system description in the UFSAR, the process control program, and the recent radiological effluent release report for information on the types, amounts, and processing of radioactive waste disposed. The inspectors reviewed the scope of quality assurance audits performed for this area since the last inspection.

Radioactive Material Storage

The inspectors observed radioactive waste container storage areas and verified that Exelon had established a process for monitoring the impact of long-term storage of the waste. Areas reviewed included: materials processing facility, West Road storage area, Lake Davies storage area, and the steam generator storage building.

Radioactive Waste System Walk-down

The inspectors walked down the following items and areas:

- Accessible portions of liquid and solid radioactive waste processing systems to verify current system alignment and material condition
- Abandoned in place radioactive waste processing equipment to review the controls in place to ensure protection of personnel
- Changes made to the radioactive waste processing systems since the last inspection
- Processes for transferring radioactive waste resin and/or sludge discharges into shipping/disposal containers
- Current methods and procedures for dewatering waste

Waste Characterization and Classification

The inspectors identified radioactive waste streams and reviewed radiochemical sample analysis results to support radioactive waste characterization. The inspectors reviewed the use of scaling factors and calculations to account for difficult-to-measure radionuclides.

### Shipment Preparation

The inspectors reviewed the records of shipment packaging, surveying, labeling, marking, placarding, vehicle checks, emergency instructions, disposal manifest, shipping papers provided to the driver, and Exelon verification of shipment readiness.

### Shipping Records

The inspectors reviewed selected non-excepted package shipment records.

### Identification and Resolution of Problems

The inspectors assessed whether problems associated with radioactive waste processing, handling, storage, and transportation, were identified at an appropriate threshold and properly addressed in Exelon's CAP.

#### b. Findings

Introduction. The inspectors identified a Green NCV of 10 CFR 71.5, "Transportation of Licensed Material," and 49 CFR 172, Subpart I, "Safety and Security Plans." Specifically, Exelon personnel shipped a Category 2 RAM-QC on public highways to a waste processor without adhering to a transportation security plan. Prior to shipment, Exelon's staff failed to recognize that the quantity of radioactive material met the definition RAM-QC.

Description. Exelon's staff prepared a radioactive waste liner for shipment to a radioactive waste processor. The liner, containing spent resin, was determined to have a total activity of 132 curies including 9.63 curies of cobalt as indicated on the Uniform Low-Level Radioactive Waste Manifest (NRC Form 541) which Exelon had generated. The liner was shipped on December 18, 2012. The inspectors reviewed the shipment and determined that it met the definition of Category 2 RAM-QC since it contained more than 8.1 curies of cobalt. The liner was shipped without Exelon implementing the required transportation security plan.

Exelon entered this issue into their CAP as IR02481678 and corrective actions included revising the shipping procedure to reflect the appropriate Department of Transportation requirements for shipment of Category 2 radioactive material. Additionally, Exelon implemented a formal process for reviewing pending regulatory changes for impacts to operations and support activities by the implementation of Exelon Procedure LS-AA-110, "Commitment Management," Revision 10, in September 2014.

Analysis. The inspectors determined that Exelon's failure to ship material as a Category 2 RAM-QC was a performance deficiency. The inspectors reviewed IMC 0612, Appendix B, "Issue Screening," and determined the issue is more than minor because it is associated with the program and process attribute of the Public Radiation Safety cornerstone and adversely affected the cornerstone objective to ensure adequate protection of public health and safety from exposure to radioactive materials released into the public domain as a result of routine civilian nuclear reactor operation. Specifically, the station failed to ensure the safe transport of radioactive material on public highways in accordance with regulations. In accordance with IMC 0609, Appendix D, "Public Radiation Safety Significance Determination Process," issued on

February 12, 2008, the inspectors determined the finding to be of very low safety significance (Green) because Exelon had an issue involving transportation of radioactive material, but it did not involve: (1) a radiation limit that was exceeded; (2) a breach of package during transport; (3) a certificate of compliance issue; (4) a low level burial ground nonconformance; or (5) a failure to make notifications or provide emergency information.

The inspectors determined that the finding did not have a cross-cutting aspect because the issue was not indicative of current licensee performance. Specifically, Exelon implemented changes to the radioactive waste shipment procedure that addressed applicable requirements and implemented a formal process for reviewing pending regulatory changes for impacts to Exelon's radioactive material shipment program and support activities. Exelon successfully implemented its transportation security plan in shipping three Category 2 RAM-QC packages in 2014.

Enforcement. 10 CFR 71.5, "Transportation of Licensed Material," requires compliance with the applicable requirements of Department of Transportation regulations in 49 CFR 171-180. 49 CFR 172, Subpart I, "Safety and Security Plans," [49 CFR 172.800(b)] requires that known radionuclides in forms listed as Category 2 RAM-QC must adhere to a transportation security plan. Contrary to this, on December 18, 2012, Exelon made a Category 2 shipment of RAM-QC, (Shipment ID 12-080) without implementing the required transportation security plan. Corrective actions included entering this issue into their CAP as IR02481678 and revising the shipping procedure to reflect the appropriate Department of Transportation requirements for shipment of Category 2 radioactive material. Because this violation is of very low safety significance (Green) and has been entered into Exelon's CAP (IR02481678), this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000317, 318/2015002-01: Failure to Properly Ship Category 2 Radioactive Material – Quantity of Concern)**

#### 4. OTHER ACTIVITIES

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

##### .1 Safety System Functional Failures (2 samples)

##### a. Inspection Scope

The inspectors reviewed Exelon's submittals for the Safety Systems Functional Failures performance indicator for both Units 1 and 2 for the period of April 1, 2014, through March 31, 2015. To determine the accuracy of the performance indicator data reported during those periods, inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 10 CFR 50.73," Revision 3. The inspectors reviewed Exelon's operator narrative logs, operability assessments, maintenance rule records, maintenance WOs, CRs, event reports, and NRC integrated inspection reports to validate the accuracy of the submittals.

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 verify that 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 CR screening meetings.

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 first and second quarter of 2015 to assess CRs written in various subject areas (equipment problems, human performance issues, etc.), as well as individual issues identified during the NRC’s daily CR review (Section 4OA2.1). The inspectors reviewed Exelon’s quarterly trend report for the first quarter of 2015, conducted under PI-AA-125-1005, “Coding and Analysis Manual,” Revision 0, to verify that Exelon personnel were appropriately evaluating and trending adverse conditions in accordance with applicable procedures.

b. Findings and Observations

No findings were identified.

The inspectors evaluated a sample of departments that are required to provide input into the quarterly trend reports, which included maintenance and engineering departments. This review included a sample of issues and events that occurred over the course of the past two quarters to objectively determine whether issues were appropriately considered or ruled as emerging or adverse trends, and in some cases, verified the appropriate

disposition of resolved trends. The inspectors verified that these issues were addressed within the scope of the CAP, or through department review and documentation in the quarterly trend report for overall assessment. All trends noted by the inspectors were previously identified by Exelon and addressed in their CAP.

### .3 Annual Sample: CAC Failures to Shift to Slow Speed

#### a. Inspection Scope

The inspectors performed an in-depth review of Exelon's ACEs and corrective actions associated with CR 2014-000506 and IR02408755 related to CAC failures to shift to slow speed operation.

The inspectors assessed Exelon's problem identification threshold, causal analyses, technical analyses, extent of condition reviews, and the prioritization and timeliness of corrective actions to determine whether Exelon was appropriately identifying, characterizing, and correcting problems associated with this issue. The inspectors reviewed the circumstances of these and a 2011 CAC issue to ascertain the appropriateness of corrective actions. The inspectors also assessed Exelon's corrective actions to prevent recurrence. The inspectors compared the actions taken to the requirements of Exelon's CAP and 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action." In addition, the inspectors reviewed documentation associated with this issue, including incident reports, and interviewed engineering personnel to assess the effectiveness of planned and implemented corrective actions.

#### b. Findings

Introduction: The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for failure to include appropriate quantitative acceptance criteria for determining the auxiliary contacts and mechanical interlocks were properly installed and adjusted when the Units 1 and 2 CAC starters and contactors were replaced during plant modifications. The starter and contactors with associated mechanical interlocks and auxiliary contacts provide the necessary electrical coordination to shift the CACs from fast to slow speed during a SIAS. The starter and contactor replacements occurred from July 2002 to July 2004.

Description: For normal containment atmosphere cooling, the CACs operate in fast fan speed with low SRW flow. A SIAS will shift the CACs to slow fan speed operation and high SRW flow. A quarterly TS surveillance verifies the functionality of the shift to slow speed from fast speed operation. Two speed fan operation is provided by a six terminal consequent pole motor. In fast speed, starter F1 energizes three terminals to the motor winding and the terminals for slow speed are shorted by contactor F2. In slow speed, starter S energizes the other three terminals and F1 and F2 are deenergized, i.e. contacts open from the 480 volts alternating current (Vac) power supply. Proper coordination of F1, F2, and S is required to prevent a phase to phase short from occurring. If S and F2 are energized at the same time, i.e. their contacts closed, a phase to phase 480Vac short will occur between the slow speed terminals. Coordination of the F1, F2, and S starters and contactors is achieved with a mechanical interlock between the F1 and S starters and an electrical interlock that involves auxiliary 'B'

contacts for each starter and the contactor. F1 and S are identical make and model starters. F2 is similar in design and construction but does not have a mechanical interlock or electric overload heater.

The F1 and S starters and F2 contactors for all four CACs on Units 1 and 2 were the subject of plant modification ES200101002, "Containment Air Cooler Starter Replacements," Revision 0, to replace all starters and contactors with an equivalent make and model due to obsolescence issues. The plant modifications for all CACs occurred from 2002 to 2004.

CR 2014-000506 documented that on January 19, 2014, the 23 CAC failed to shift to slow speed from fast speed operation during surveillance testing. Its associated 480Vac breaker tripped on overload. Exelon determined the apparent cause was maladjusted auxiliary contacts on the fast and slow speed starters and shorting contactor in the control circuit of the consequent pole motor for the 23 CAC. The auxiliary contactors were never adjusted consistent with vendor installation requirements when the starters and contactor were replaced during plant modification in 2002. Exelon replaced the starters and contactor for the 23 CAC and properly adjusted the mechanical and electrical interlocks as an immediate corrective action. Exelon initiated corrective action WOs to measure and adjust the auxiliary contacts for the remaining CACs on Units 1 and 2 as an extent of condition item. The WOs were intended to be completed in the 24th week of 2015.

IR02408755 documented that on November 8, 2014, the 13 CAC failed to shift to slow speed from fast speed operation during surveillance testing. Identical to the 23 CAC on January 19, 2014, the 13 CAC tripped on electrical overload. Exelon completed an ACE and determined that its communication of plant vulnerabilities for work prioritization needed improvement. The corrective action WOs to adjust all associated starters and contactors auxiliary contacts were expedited and completed November 26, 2014.

The inspectors noted that in 2011 Exelon completed an ACE 2011-003714, for a similar event when the 24 CAC failed to shift to slow speed during quarterly SIAS testing. Exelon determined a phase to phase short across the motor supply power occurred. The short was caused by the slow speed starter and shorting contactor closed at the same time. Exelon determined the failure mechanism was the mechanical interlock between the fast speed and slow speed starters was maladjusted and contributed to the lack of coordination that allowed the slow speed starter and shorting contactor to be closed concurrently. The apparent cause determined the mechanical interlocks were known to require adjustment since 2004 but extent of condition inspections did not complete earlier and resulted in the 24 CAC trip. Vendor Technical Manual (VTM) 12095-138, "Instruction Manual for Cutler Hammer A200 Line Size 5 Starter Assembly," Installation Step 4.2.1 stated: CCNPP to install the NLI supplied starter assembly using CCNPP plant procedures in conjunction with this manual. Documents attached in VTM 12095-138 included: I.L. 17054C, instructions for A200, A201, A250 Size 5, 2, or 3 Pole Motor Controller Nonreversing or Reversing, Revision C and I.L. 17049D, Instructions for V201, V202, A211, A251 Size 5, 2, and 3 Pole Contactors Nonreversing, Reversing and Lighting, Revision D both stated in Installation step b), auxiliary contacts and mechanical interlocks must be properly installed and adjusted. Exelon entered this issue into their CAP as IR02408755 and initiated an ACE.

Analysis: The inspectors determined that Exelon's failure to include appropriate quantitative acceptance criteria for determining the auxiliary contacts and mechanical interlocks were properly installed and adjusted when the Units 1 and 2 CAC starters and contactors were replaced during plant modifications is a performance deficiency. The inspectors reviewed IMC 0612, Appendix B, "Issue Screening," and determined the issue is more than minor because it is associated with the Mitigating Systems cornerstone attribute of design control and adversely affected the cornerstone objective to ensure the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure of the CAC fans to operate properly impacted the CAC system which provides a mitigating function, along with containment spray, in the cooling of containment sump water during the post-accident recirculation mode of operation. The inspectors evaluated the finding using IMC 0609, Attachment 4, "Initial Characterization of Findings," issued on June 19, 2012, and IMC 0609, Appendix A, "The Significance Determination Process for Findings At Power," Exhibit 2, "Mitigating Systems Screenings Questions," issued on June 19, 2012, and determined a detailed risk evaluation was required for the actual loss of function of the 13 CAC for greater than its TS allowed outage time.

A regional Senior Reactor Analyst performed a detailed risk evaluation using the Calvert Cliffs SPAR Model for Calvert Cliffs Unit 1, Version 8.27, for internal events. The analysis of internal and external events conservatively determined a risk increase in core damage frequency in the mid to upper E-7 range, a finding of very low safety significance (Green). The failure of the 13 CAC fan to transfer on a SIAS to slow speed was evaluated as a failure to start and determined to bound the risk associated with the failure of the CAC fans previously discussed. An exposure time of 46 days was assumed which was T/2 since the last successful surveillance test performed 92 days before the failure. This is consistent with guidance provided in the Risk Assessment of Operational Events Handbook for Internal Events. The SPAR model also calculated an increased conditional revised common cause failure probability for the remaining CAC fans based on the failure mode. A SPAR-H, human reliability model calculation, was performed which determined a nominal probability of 1 in 100 for a failure to recover the loss of the 13 CAC fan. This is in part based on the time available to diagnose and take recovery action. However, a failure to recover rate of 1 in 10 was used for conservatism. The dominant internal core damage sequence was an inadvertent opening of a power operated relief valve with failure to isolate, failure of shutdown cooling, and failure of containment cooling.

The Senior Reactor Analyst reviewed information relative to Exelon's external event risk information, which indicated a delta core damage frequency contribution in the mid E-7 range. This was dominated by RCP seal loss of coolant accident scenarios due to postulated fire events impacting direct current control power. Other external event considerations included component cooling water room spray flooding events resulting in the assumed complete loss of the component cooling water system and resultant RCP seal loss of coolant accident. There was no impact on large early release frequency for this finding.

The inspectors determined that the finding did not have a cross-cutting aspect because the issue was not indicative of current licensee performance. Specifically, the Units 1 and 2 CAC starters and contactors were replaced from 2002 to 2004.



**Enforcement:** 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," state, in part, that instructions or procedures shall include appropriate quantitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Starter and contactor replacements with proper auxiliary contact and mechanical interlock adjustments were important to ensure the successful operation of the CACs. Contrary to the above, WOs for the Units 1 and 2 CAC starters and contactors replacements did not include appropriate quantitative acceptance criteria for the adjustment of the mechanical interlocks and auxiliary contacts. The starter and contactor replacements and violations occurred on July 24, 2002, for the 23 CAC; August 2, 2002, for the 21 CAC; August 5, 2002, for the 11 CAC; August 20, 2002, for the 13 CAC; June 4, 2003, for the 12 CAC; June 11, 2003, for the 24 CAC; June 18, 2003, for the 24 CAC; and July 1, 2004, for the 22 CAC. Corrective actions included completing an ACE and completing corrective action WOs to adjust all associated starters and contactors auxiliary contacts. Because this violation was of very low safety significance (Green) and was entered into Exelon's CAP (IR02408755), this violation is being treated as a NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000317, 318/2015002-02: Inadequate Maintenance Instructions for Replacement of the Units 1 and 2 Containment Air Cooler Starters)**

### Observations

The inspectors noted that when the mechanical interlocks were identified by Exelon in ACE 2011-003714 as being installed without proper adjustment, that was an earlier opportunity through extent of condition to identify that the electrical interlocks, i.e. the auxiliary contacts, were not adjusted consistent with vendor instructions. Exelon in the same ACE, 2011-003714, stated a contributing cause was a potential for arcing due to the electrical interlock not being a robust barrier to prevent the arcing. The inspectors noted that corrective actions were not initiated to determine if the electrical interlocks, provided by the starter and contactor auxiliary contacts, should be a robust redundant barrier to prevent arcing.

The inspectors also noted that the administrative review and processing of CR 2011-003714, CR 2014-000506, and IR02408755 were opportunities to have identified the lack of quality installation as a nonconforming condition and to subsequently have performed an operability evaluation that documented, detailed, and evaluated the impact of the nonconforming condition upon the CACs. Exelon, in procedure OP-AA-108-115, "Operability Determinations (CM-1)," Revision 15, has defined a nonconforming condition, in part, as a condition of a SSC in which there is a situation in which quality has been reduced because of modification. Quality was reduced during the modifications in 2002 through 2004 because vendor installation instructions were not followed to properly adjust the mechanical and electrical interlocks and ensure proper coordination existed to reliably shift the CACs from fast to slow speed. Step 4.1.10 of OP-AA-108-115 required an Operability Evaluation for nonconforming conditions.

CR 2014-006940 was initiated on August 12, 2014, when an analyst believed a vulnerability in equipment reliability existed with scheduling the remaining CAC controller inspections out into the second quarter of 2015. The analyst recommended scheduling the inspection sooner. The CAC controller inspections were scheduled sooner, for the first month in 2015, but not before the 13 CAC tripped during surveillance testing on November 8, 2014. Exelon in ACE 02408755 was self-critical of its missed opportunities to apply increased urgency for CAC extent of condition actions. However, Exelon did

not identify that these issues should have been identified as nonconforming conditions requiring a detailed operability evaluation.

Finally, the inspectors noted that Exelon failed to identify an additional failure mechanism in its ACEs: insufficient time delay provided by the mechanical interlock. If the mechanical interlock did not provide sufficient time delay, the identical F1 and S starter and similar F2 contactor would change states at nearly the same instant. If S closes while F2 is opening, a phase to phase short could occur. Exelon did not consult the starter and contactor vendor during its ACEs to ascertain the validity of this or other failure mechanisms.

Exelon entered these observations into its CAP as IR02497625, IR02499301, and IR02499303.

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

##### Plant Events

##### a. Inspection Scope

For the plant event listed below, the inspectors reviewed and/or observed plant parameters, reviewed personnel performance, and evaluated performance of mitigating systems. The inspectors communicated the plant event to appropriate regional personnel, and compared the event details with criteria contained in IMC 0309, "Reactive Inspection Decision Basis for Reactors," for consideration of potential reactive inspection activities. As applicable, the inspectors verified that Exelon made appropriate emergency classification assessments and properly reported the event in accordance with 10 CFR 50.72 and 50.73. The inspectors reviewed Exelon's follow-up actions related to the event to assure that Exelon implemented appropriate corrective actions commensurate with their safety significance.

- Units 1 and 2, Loss of offsite power and automatic reactor trip, April 7, 2015

##### b. Findings

No findings were identified

#### 4OA5 Other Activities

##### Institute of Nuclear Power Operations Report Review

##### a. Inspection Scope

The inspectors reviewed the final report for the Institute of Nuclear Power (INPO) plant assessment of CCNPP conducted in November 2014. The inspectors evaluated this report to ensure that NRC perspectives of Exelon's performance were consistent with any issues identified during the INPO's assessment. The inspectors also reviewed this report to determine whether INPO identified any significant safety issues that required further NRC review.

b. Findings

No findings were identified

4OA6 Meetings, Including Exit

Exit Meeting Summary

On July 8, 2015, the inspectors presented the inspection results to Mr. George Gellrich, 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.

**ATTACHMENT: SUPPLEMENTARY INFORMATION**

## SUPPLEMENTARY INFORMATION

### KEY POINTS OF CONTACT

#### Licensee Personnel

G. Gellrich, Site Vice President  
 M. Flaherty, Plant General Manager  
 D. Baker, Engineering Manager  
 D. Burdin, Systems Analyst 3  
 J. Cabral, Engineer 3  
 R. Courtney, Supervisor, Radiation Protection  
 M. Fick, Principal Engineer, Regulatory Assurance  
 P. Furio, Principal Engineer, Regulatory Assurance  
 K. Greene, Engineer, Regulatory Assurance  
 R. Haley, Fire Marshall, Operations Support  
 S. Reichard, Regulatory Specialist, Regulatory Assurance  
 B. Rickett, Supervisor, Maintenance  
 L. Smith, Manager, Regulatory Assurance  
 J. York, Manager, Site Radiation Protection

### LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

#### Opened and Closed

05000317,318/2015002-01	NCV	Failure to Properly Ship Category 2 Radioactive Material – Quantity of Concern (Section 2RS8)
05000317,318/2015002-02	NCV	Inadequate Maintenance Instructions for Replacement of the Units 1 and 2 Containment Air Cooler Starters (Section 4OA2.3)

### LIST OF DOCUMENTS REVIEWED

#### **Section 1R01: Adverse Weather Protection**

##### Procedures

OP-AA-101-101, "Management of Nuclear Generation," Revision 10  
 OP-AA-108-107-1001, "Station Response to grid Capacity Conditions,": Revision 4  
 WC-AA-107, "Seasonal Readiness," Revision 15

##### Miscellaneous

Letter dated May 15, 2015, "Certification of 2015 CCNPP Summer Readiness"

## **Section 1R04: Equipment Alignment**

### Procedures

OI-21A, "1A Diesel Generator," Revision 22

OI-21B, "1B Diesel Generator," Revision 22

### Condition Reports

IR01700430

IR02503961

### Work Orders

C020060375

### Drawings

60727SH0002, Diesel Generator Cooling Water, Starting Air, Fuel, & Lube Oil Diesel No. 1B, Revision 64

62467SH0001, Piping and Instrumentation Diagram Starting Air System Diesel Generator Building 1, Revision 3

62467SH0002, Piping and Instrumentation Diagram Starting Air System Diesel Generator Building 1, Revision 3

62437SH0001, Piping and Instrumentation Diagram Fuel Oil Storage & Transfer System Diesel Generator Building 1, Revision 5

62471SH0001, Piping and Instrumentation Diagram Fuel Oil System Diesel Generator Building 1, Revision 3

62471SH0002, Piping and Instrumentation Diagram Fuel Oil System Diesel Generator Building 1, Revision 3

## **Section 1R05: Fire Protection**

### Procedures

Fire Fighting Strategies Manual, Revision 00300

OP-AA-201-009, "Control of Transient Combustible Material," Revision 16

MA-AA-716-026, "Station Housekeeping / Material Condition Program," Revision 12

### Miscellaneous

CA02243, "Combustible Loading Analysis," Revision 3

## **Section 1R06: Flood Protection Measures**

### Procedures

2-53-3-O-D, "Operations Performance Evaluation Requirements – U-2 SRW PP Room Floor Drains," Revision 1

ES-001, "Flooding," Revision 4

### Engineering Calculation

DCALC No: M-90-169, Revision 0; Maximum Flood Height Resulting From a Pipe Break in the Service Water Pump Rooms 4/16/91

### Condition Reports

IR02477244

## **Section 1R12: Maintenance Effectiveness**

### Miscellaneous

10CFR 50.65 (a)(3) Maintenance Rule Program Periodic Assessment, dated January 2015

## **Section 1R13: Maintenance Risk Assessments and Emergent Work Control**

### Procedures

WC-AA-104, "Integrated Risk Management," Revision 22

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

### Procedures

OP-AA-108-115, "Operability Determinations," Revision 15

### Condition Reports

IR02406671	IR02481449	IR02483738
IR02483285	IR02464488	IR02492636
IR02505020	IR02507192	

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

### Procedures

OI-32A-2, "Auxiliary Feedwater System," Revision 23

### Work Orders

C92672325

### Condition Reports

IR02478790

### Miscellaneous

ECP-14-000089, Unit 2 Implementation of Steam Generator Makeup Strategy for FLEX

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

### Procedures

ER-AA-321, "Administrative Requirements for In-service Testing," Revision 12  
 O-067B-1, "Auxiliary Feed Water/Main Steam Check Valve Test," Revision 10  
 MN-1-314, "Conduct of Electrical and Controls Maintenance," Revision 00800  
 NO-1-208, "Calvert Cliffs Operability and Maintenance Testing," Revision 02100

### Work Orders

C93022812	C92634832	C92514139	C92695191
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### Drawings

61080SH0009, Schematic Diagram Salt Water Pump 13, Revision 27  
 61080SH0009A, Schematic Diagram Salt Water Pump 13, Revision 2  
 87213SH0003, Electrical Wiring Diagram Service Water and Misc. Station Service Control  
 Panel 1C13, Revision 15

**Section 1R22: Surveillance Testing**Procedures

STP-O-5A21-2, "21 Auxiliary Feedwater Pump Quarterly Surveillance Test," Revision 0

**Section 2RS1: Radiological Hazard Assessment & Exposure Controls**Procedures

CNG-QL-1.01-1004, "Quality Audit Process," Revision 00800

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

CY-AA-170-1000, "Radiological Environmental Monitoring Program and Meteorological Program Implementation," Revision 8

CY-AA-170-300, "Offsite Dose Calculation Manual Administration," Revision 2

CY-AA-170-3100, "Offsite Dose Calculation Manual Revisions," Revision 6

CY-ES-201, "Air Iodine and Air Particulate Sampling," Revision 0

CY-ES-203, "Sample Collection for Gamma Counting: Soil, Vegetation, and Water," Revision 0

CY-ES-204, "Sample Preparation for Gamma and Beta Counting," Revision 0

EN-AA-408, "Radiological Groundwater Protection Program", Revision 0

EN-AA-408-4000, "Radiological Groundwater Protection Program Implementation," Revision 5

QA-ES-200, "EIS Quality Assurance Program Manual – Labs Section," Revision 0

QA-ES-202, "Laboratory QA Records & Control," Revision 0

QA-ES-203, "Training and Qualification," Revision 0

QA-ES-204, "Management and Control of Laboratory Work," Revision 0

QA-ES-205, "Nonconformance Reporting," Revision 0

QA-ES-206, "Instrument Calibration," Revision 000

QA-ES-207, "Reagent & Standard Control for Analytical Chemistry," Revision 000

QA-ES-208, "Verification of Analytical Performance for Analytical Chemistry," Revision 0

**Section 2RS8: Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation**Procedures

RP-AA-100, "Process Control Program for Radioactive Wastes," Revision 10

RP-AA-1000, "Radwaste Monthly Report Guidelines," Revision 5

RP-AA-1001, "Water Balance Guidelines," Revision 3

RP-AA-102, "Radwaste Storage Facility/DAW Waste Container Inspections," Revision 5

RP-AA-103, "Request for Disposal of Radioactive Waste," Revision 0

RP-AA-104, "Radwaste Storage Facility/Waste Container Inspection," Revision 5

RP-AA-105, "Guidelines for Operating an Interim On-Site Low Level Radioactive Waste Storage Facility," Revision 5

RP-AA-120, "Radwaste Processing Input Control Program," Revision 2

Condition Reports:

2013-001825

2014-004547

2014-004774

2014-005308

2014-005341

Audits/Assessments:

Calvert Cliffs Nuclear Power Plant Quality and Performance Assessment Report 13-2P-C,  
May 1 – August 31, 2013

GEL Laboratories Reports of Analysis for: DAW; NUKEM High Sb; Primary Resins;  
NUKEM Resins

Radioactive Material Shipments: 14-043; 14-024; 14-050; 14-091; 14-097  
Radiation Protection Program Audit RPP-13-01-C, November 4-15, 2013

Training:

Calvert Cliffs Lesson Plan RAD-MPX

Dade Moeller Training Academy, DOT, NRC and IATA Requirements for Shipping Radioactive Materials

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

Procedures:

AD-AA-3000, "Nuclear Risk Management Process," Revision 1

CNG-CA-1.01-1000, "Corrective Action Program," Revision 01000

CNG-OP-1.01-1002, "Conduct of Operability Determinations/Functionality Assessments,"  
Revision 00201

OP-AA-108-115, "Operability Determinations (CM-1)," Revision 15

PI-AA-125, "Corrective Action Program," Revision 2

PI-AA-125-1003, "Apparent Cause Evaluation Manual, Revision 2

PI-AA-125-1006, "Investigation Techniques Manual," Revisions 0 & 1

Condition Reports:

2011-003714	2014-000330	2014-000506
2014-006940	IR02408755	IR02414067
IR02415094	IR02497625*	IR02499301*
IR02499303*		

(\* denotes NRC identified during this inspection)

Work Orders:

2200200053	C92582214	C92589350	C92589357
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Drawings:

61076SH0011C, Schematic Diagram Containment Cooling Fan 11, Revision 3

82572SH0001, Control Wiring Diagram Size 5 Starter Assembly, Revision 4

Miscellaneous:

CAC Failure History

EPM60600 Maintenance Checklist

On-Line Plant Health Committee Issue List System Health Work Orders dated 5/1/15

P-CAL-034235, Preventive Maintenance Change Request for Containment Air Cooler Starters,  
dated 5/5/2015

VTM 12095-138, Instruction Manual for Cutler Hammer A200 Line Size 5 Starter Assembly,  
Revision 1

Modification Packages:

ES200101002, Containment Air Cooler Starter Replacements, Revision 0



**LIST OF ACRONYMS**

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
AAC	alternate alternating current
AC	alternating current
ACE	apparent cause evaluation
AFW	auxiliary feedwater
CAC	containment air cooler
CAP	corrective action program
CCHX	component cooling heat exchanger
CR	condition report
DG	diesel generator
ECp	engineering change package
EDG	emergency diesel generator
IMC	Inspection Manual Chapter
INPO	Institute of Nuclear Power Operation
kV	kilovolt
NCV	non-cited violation
NRC	Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
RAM-QC	radioactive material quantity of concern
RCP	reactor coolant pump
REMP	radiological environmental monitoring program
SIAS	safety injection actuation signal
SPAR	standardized plant analysis risk
SRW	service water
SSC	structure, system, and component
SW	saltwater
TS	technical specifications
Vac	volts alternating current
VTM	Vendor Technical Manual
WO	work order
WRNGM	wide range noble gas monitor
UFSAR	Updated Final Safety Analysis Report