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

April 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 – NRC INTEGRATED INSPECTION REPORT 05000317/2015001 AND 05000318/2015001

Dear Mr. Gellrich:

On March 31, 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 April 15, 2015, with Mr. Mark Flaherty, Plant General Manager, and other members of the Exelon 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 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.

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 Public Document Room or from the Publicly Available Records component of NRC's Agencywide 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 05000317/2015001 and 05000318/2015001
w/Attachment: Supplementary Information

cc w/encl: Distribution via ListServ

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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.	05000317/2015001 and 05000318/2015001
Licensee:	Exelon Generation Company, LLC (Exelon)
Facility:	Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Location:	Lusby, MD
Dates:	January 1, 2015 through March 31, 2015
Inspectors:	R. Clagg, Senior Resident Inspector E. Torres, Resident Inspector H. Anagnostopoulos, Health Physicist E. Burket, Emergency Preparedness Inspector M. Modes, Senior Reactor Inspector S. Horvitz, Reactor Engineer
Approved by:	Daniel L. Schroeder, Chief Reactor Projects Branch 1 Division of Reactor Projects

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SUMMARY

Inspection Report 05000317/2015001, 05000318/2015001; 01/01/2015 – 03/31/2015; Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2; Equipment Alignment, Operability Determinations and Functionality Assessments.

This report covered a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. The inspectors identified two findings of very low safety significance (Green) which were non-cited violations (NCVs). The significance of most findings are 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 June 2, 2011. Cross-cutting aspects are determined using IMC 0310, "Aspects Within the Cross-Cutting Areas," dated December 4, 2014. All violations of 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 Technical Specification (TS) Limiting Condition for Operation (LCO) 3.7.5, "Component Cooling (CC) System," and 3.0.3, because Exelon operated Units 1 and 2 CC systems in an unanalyzed condition on 18 occasions and operated in a condition prohibited by TS on two occasions within the last three years. The inspectors determined that Exelon's operation with both CC loops inoperable and the subsequent failure to place the unit in Mode 5 within 37 hours as required by TS is a performance deficiency. Exelon entered this issue into their corrective action program (CAP) as IR02439913. Exelon's immediate corrective actions included the submission of event notification (EN) 50752 and prohibiting operation of the CC system in a configuration outside of that specified in the TS bases while further analysis was conducted.

  The inspectors reviewed IMC 0612, Appendix B, "Issue Screening," and determined the issue is more than minor because it is associated with the configuration control attribute of the Mitigating Systems cornerstone 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 station operated with two CC loops unable to perform their safety function of maintaining component cooling heat exchanger (CCHX) outlet temperatures at or below 120°F. In accordance with IMC 0609, Attachment 4, "Initial Characterization of Findings," issued on June 19, 2012, and IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2, "Mitigating Systems Screening Questions," issued on June 19, 2012, the inspectors determined that a detailed risk evaluation was necessary to disposition the significance of this finding because the finding represented a loss of a system and/or function. The detailed risk evaluation considered that the deficiency could have, under some ultimate heat sink temperature conditions, resulted in the CCHX outlet temperatures exceeding the design analyzed limit of 120°F following the recirculation actuation signal (RAS) during a loss of coolant accident (LOCA). The Senior Reactor Analyst performed a bounding significance determination by conservatively assuming a complete loss of safety function for the CCHXs for the applicable limited exposure time. Emergency operating procedures also had

contingencies for a postulated loss of the CC function which directed the re-alignment of a containment spray (CS) pump to ensure adequate safety injection is maintained. This evaluation determined the issue was of very low safety significance (Green). The inspectors determined that the finding has a cross-cutting aspect in the area of Human Performance, Design Margins, because Exelon did not operate and maintain equipment within design margins. Specifically, Exelon operated the CC system outside its design safety-related specification, resulting in an operating condition prohibited by TS [H.6]. (Section 1R04)

- Green: The inspectors identified a Green NCV of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.65(a)(4) because Exelon did not implement adequate risk management actions (RMA) during the replacement of the loss of coolant incident (LOCI) sequencer for the safety-related 11 4KV [kilovolt] bus in accordance with station procedures. The inspectors determined that Exelon's failure to establish adequate RMA's during the performance of LOCI sequencer maintenance activities in accordance with CNG-OP-4.01-1000 is a performance deficiency. Exelon's immediate corrective actions included entering this issue into their CAP as IR02444523

  The inspectors reviewed IMC 0612, Appendix B, "Issue Screening," and determined the issue is more than minor because it was associated with the procedure quality attribute of the Mitigating Systems cornerstone 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, without adequate RMAs per station procedure CNG-OP-4.01-1000, the capability of the 0C alternate alternating current (AAC) diesel generator (DG) to perform its safety function of powering the 11 4KV bus was adversely impacted. The inspectors also reviewed IMC 0612, Appendix E, "Examples of Minor Issues," and noted that this issue is sufficiently similar to examples 7.e and 7.f, in that, Exelon was required, under plant procedures, to establish RMAs or additional RMAs. The inspectors, with the assistance of a Region I Senior Reactor Analyst, evaluated this finding using IMC 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process," issued on May 19, 2005. Using Appendix K, Flowchart 2, "Assessment of RMAs," the inspectors determined that the finding was of very low safety significance (Green) based upon the short duration exposure time (approximately one hour). Specifically, comparing the licensee's calculated Yellow (1E-5) annualized risk for this maintenance evolution to the actual (1E-4/year X 1 year/8760 hours = 1E-8) incremental risk increase places the risk of this finding below the Incremental Core Damage Probability (ICDP) > 1E-6 threshold, resulting in a very low safety significance (Green). The inspectors determined that the finding has a cross-cutting aspect in the area of Human Performance, Work Management, because Exelon did not implement a process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority. The work process includes the identification and management of risk commensurate to the work and the need for coordination with different groups or job activities. Specifically, Exelon failed to adequately plan, control, and execute the LOCI sequencer maintenance activity by establishing adequate RMAs that would have provided alternate success paths for maintaining the safety function of the out of service structures, systems, and components (SSCs) [H.5]. (Section 1R15)

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period at 100 percent power. On February 7, 2015, operators reduced power to 81 percent to conduct main turbine valve testing and returned the unit to 100 percent power that 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. On February 16, 2015, operators shut down the unit for a planned refueling outage. Unit startup began on March 11 and the unit was returned to 100 percent power on March 15. 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 Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors performed a review of the CCNPP's readiness for extreme cold weather forecasted for January 7, 2015. The inspectors reviewed the implementation of adverse weather preparation procedures before the onset of this adverse weather condition. The inspectors verified that operator actions defined in Exelon's adverse weather procedure maintained the readiness of essential systems. The inspectors discussed readiness and staff availability for adverse weather response with operations and work control personnel. Documents reviewed for each section of this inspection report are listed in the attachment.

b. Findings

No findings were identified.

1R04 Equipment Alignment

Partial System Walkdowns (71111.04Q – 4 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- Unit 1 'A' emergency core cooling system (ECCS) train during 'B' ECCS train out of service for maintenance, January 6, 2015
- 2A Emergency Diesel Generator (EDG) and 0C AAC DG during 2B EDG out of service for maintenance, January 12, 2015

- 12 CCHX and 12 CS header during 11 CCHX out of service for maintenance, January 20, 2015
- Unit 2 'B' ECCS train during 'A' ECCS train out of service for maintenance, January 27, 2015

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 Updated Final Safety Analysis Report (UFSAR), TS, condition reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted system performance of their 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 Exelon's staff had properly identified equipment issues and entered them into the CAP for resolution with the appropriate significance characterization.

b. Findings

Introduction: The inspectors identified a Green NCV of TS LCO 3.7.5, "Component Cooling (CC) System," and 3.0.3, because Exelon operated Units 1 and 2 CC systems in an unanalyzed condition on 18 occasions and operated in a condition prohibited by TS on two occasions within the last three years.

Description: The CC system is a closed cross-connected system with three pumps, one head tank, and two HXs cooled by saltwater (SW) from the Chesapeake Bay. The CC system safety-related heat loads include shutdown cooling (SDC) HXs, high pressure safety injection pumps seals, and low pressure safety injection pumps seals. The principal safety-related function of the CC system is the removal of decay heat from the reactor via the SDCHXs. This is accomplished, in part, by maintaining the CCHXs outlet temperature at or below 120°F following a LOCA design basis event. The SDCHXs have two modes of operation, SDC and CS. The SDC mode of operation is used to remove core decay heat and reactor coolant sensible heat during plant cooldown and cold shutdown. During the CS mode of operation, after a RAS, the CS pumps switch suction from the refueling water tank to the containment sump and sump water is circulated through the SDCHXs.

On January 20, 2015, Exelon removed the 11 CCHX from service to perform preventive maintenance and entered multiple TS LCOs, including TS LCO 3.7.5.A for having one CC loop inoperable. During a walkdown of the main control room, the inspectors noted that the 11 CS pump handswitch was not in the pull-to-lock position, thus allowing the automatic initiation of the CS pump on a safety injection actuation signal (SIAS). The inspectors questioned if the 11 SDCHX had CC isolated and were informed that it was not. This configuration would result in a lineup of 1 CC pump with 1 CCHX providing cooling to two SDCHXs upon a SIAS and RAS. The inspectors questioned if this lineup had been analyzed to support the operability of the remaining CC loop.

The inspectors reviewed the TS LCO 3.7.5 basis, which states, in part, "Following a loss of coolant accident (LOCA) while recirculating water from the containment sump, the CC heat exchangers are designed to provide a maximum outlet cooling water temperature of

120°F provided one of the following component alignment combinations is met (assumes CC to containment and evaporators is isolated): a) 1 CC pump, 2 CC heat exchangers, and 2 SDC heat exchangers; b) 1 CC pump, 1 CC heat exchanger, 1 SDC heat exchanger; and c) 2 CC pumps, 2 CC heat exchangers, 1 SDC heat exchanger." The inspectors determined that Exelon was not operating in a lineup addressed by the TS bases, which could impact the operability of the declared operable CC loop. Based on the inspectors' concerns, Exelon placed the 11 CS pump handswitch in the pull-to-lock position and isolated CC to the 11 SDCHX, which would result in the system being in one of the above described lineups following a SIAS and RAS.

On January 22, 2015, Exelon submitted EN 50752, "Unanalyzed Heat Exchanger Lineup Could Exceed Design Basis Temperatures," and on March 20, 2015, submitted Licensee Event Report 05000317/2015-001-00, "Component Cooling and Shutdown Cooling Heat Exchanger Lineup Potential to Exceed Design Basis Temperatures." Exelon determined that during the operation of 1 CC pump with 1 CCHX and 2 SDCHXs during a LOCA, SW temperatures needed to be less than 60°F in order to maintain CCHX outlet temperature at or below 120°F. Two instances within the last year that both units operated in the same maintenance lineup with SW temperatures greater than 60°F were identified. The inspectors reviewed the EN and Licensee Event Report and noted a total of 18 times within the last three years, during online SW header and CCHXs maintenance windows, where the station operated in an unanalyzed condition resulting in two inoperable CC loops. With two inoperable CC loops, TS LCO 3.7.5 does not provide an associated action, therefore, the unit in the prohibited lineup should enter TS LCO 3.0.3, which requires action be initiated within 1 hour to place the unit in a Mode where the TS LCO is not applicable, in this case Mode 5 within 37 hours. The inspectors identified two instances within the last three years where the station operated in excess of 37 hours in the above described condition. On October 24, 2013, Unit 1 operated the CC system a total of 42 hours in the described configuration. On October 1, 2014, Unit 2 operated the CC system a total of 52 hours in the described configuration. Exelon entered this issue into their CAP as IR02439913 and initiated an apparent cause evaluation. The inspectors concluded that Exelon operated Units 1 and 2 with both CC loops inoperable and failed to place each unit in Mode 5 as required by TS LCO 3.0.3.

Analysis: The inspectors determined that Exelon's operation with both CC loops inoperable and the subsequent failure to place the unit in Mode 5 within 37 hours as required by TS 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 configuration control attribute of the Mitigating Systems cornerstone 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 station operated with two CC loops unable to perform their safety function of maintaining CCHXs outlet temperatures at or below 120°F. In accordance with IMC 0609, Attachment 4, "Initial Characterization of Findings," issued on June 19, 2012, and IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2, "Mitigating Systems Screening Questions," issued on June 19, 2012, the inspectors determined that a detailed risk evaluation was necessary to disposition the significance of this finding because the finding represented a loss of a system and/or function. The detailed risk evaluation considered that the deficiency could have, under some ultimate heat sink temperature conditions, resulted in the CCHX outlet temperatures exceeding the design

analyzed limit of 120°F following the RAS during a LOCA. The Senior Reactor Analyst performed a bounding significance determination by conservatively assuming a complete loss of safety function for the CCHXs for the applicable limited exposure time. Emergency operating procedures also had contingencies for a postulated loss of the CC function which directed the re-alignment of a CS pump to ensure adequate safety injection is maintained. This evaluation determined the issue was of very low safety significance (Green).

The inspectors determined that the finding has a cross-cutting aspect in the area of Human Performance, Design Margins, because Exelon did not operate and maintain equipment within design margins. Specifically, Exelon operated the CC system outside its design safety-related specification, resulting in an operating condition prohibited by TS [H.6].

Enforcement: TS LCO 3.7.5, "Component Cooling (CC) System," requires in part, that two CC loops shall be operable. It is applicable for Modes 1 through 4. An action for two loops inoperable is not provided. TS LCO 3.0.3, requires in part, "When an LCO is not met and…, an associated ACTION is not provided…, the unit shall be placed in a MODE or other specified condition in which the LCO is not applicable. Action shall be initiated within 1 hour to place the unit in Mode 5 within 37 hours." Contrary to this, on October 24, 2013, for approximately 42 hours, and October 1, 2014, for approximately 52 hours, Exelon operated Unit 1 and Unit 2, respectively, in a condition prohibited by TS. Specifically, the CC system was operated in a configuration that prevented the CC system from performing its design safety function of maintaining CCHXs outlet temperature at or below 120°F following a LOCA. Exelon's immediate corrective actions included the submission of EN 50752 and prohibiting operation of the CC system in a configuration outside of that specified in the TS bases while further analysis was conducted. Because this violation is of very low safety significance (Green) and has been entered into Exelon's CAP (IR02439913), this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000317,318/2015001-01: Component Cooling Operated in Unanalyzed Condition)**

1R05 Fire Protection

Resident Inspector Quarterly Walkdowns (71111.05Q – 7 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 1, Turbine Building, March 2, 2015
- Unit 2, Turbine Building, March 2, 2015

- Unit 2, Containment, March 10, 2015
- Unit 1, CC Water Pump Room, March 16, 2015
- Unit 2, CC Water Pump Room, March 16, 2015
- Unit 1, 5' Fan Room, March 16, 2015
- Unit 2, 5' Fan Room, March 16, 2015

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 1 sample)

Annual Review of Cables Located in Underground Bunkers/Manholes

a. Inspection Scope

The inspectors conducted an inspection of underground bunkers/manholes subject to flooding that contain cables whose failure could affect risk-significant equipment on January 29, 2015. The inspectors performed walkdowns of risk-significant areas, including manholes 1HH-13, 2HH-14, and 2MH-19 (containing EDG cables), to verify that the cables were not submerged in water, that cables and/or splices appeared intact, and to observe the condition of cable support structures. When applicable, the inspectors verified proper sump pump operation and verified level alarm circuits were set in accordance with station procedures and calculations to ensure that the cables will not be submerged. The inspectors also ensured that drainage was provided and functioning properly in areas where dewatering devices were not installed.

b. Findings

No findings were identified.

1R08 In-Service Inspection Activities (71111.08P – 1 sample)

a. Inspection Scope

Pressurized-Water Reactor Vessel Upper Head Penetration Inspection Activities

The inspectors reviewed the bare metal inspection of the Unit 2 reactor head, placed into service in April 2007. The inspectors reviewed Examination Report 2-RFO-2011(18) to determine the prior condition of the reactor head and compared this with the results of the current visual examination of the reactor head. The inspectors verified the periodicity of the bare metal visual examination is in conformance with American Society of Mechanical Engineers (ASME) Code Case N-729-1, Table 1, B4.30, and footnote 3, as modified by 10 CFR 50.55a(g)(6)(ii)(D). The inspectors reviewed Exelon's relief request, dated January 8, 2015, for the extension of the volumetric examination interval required in ASME Code Case N-729-1, Table 1, B4.40, from once per interval to once every other interval. The inspectors noted, if granted, the volumetric examinations currently scheduled for 2016 and 2017 would be rescheduled to 2026 and 2027 for Unit 1 and Unit 2 respectively. The inspectors observed the "as-found" visual examination of penetration 66, a peripheral nozzle. The inspectors also observed the inspection of

penetration 1 at the top of the vessel near the vent line to determine how the obstruction of the vent line was handled in obtaining a 360° inspection of the nozzle. The “as-left” inspection of the number 1 nozzle was also observed. The inspectors observed the “as-found” vent line inspection. The inspectors observed the quality and clarity of the visual inspection to ascertain the extent of inspection for each penetration nozzle. The inspectors confirmed the extent of examination meets 10 CFR 50.55a(g)(6)(ii)(D) and any interference limiting the visual inspection of the nozzle was resolved.

The inspectors reviewed the calibration file and procedure ER-AP-335-001, “Bare Metal Visual Examination for Alloy 600/82/182 Materials,” Revision 3, in order to confirm the standards used for visual examination quality, and instructions for resolving interference or masking issues, are consistent with 10 CFR 50.55a(g)(6)(ii)(D). The inspectors verified the inspection was implemented in conformance with these requirements. The inspectors verified that indications and defects, if detected, would be dispositioned in accordance with 10 CFR 50.55a(g)(6)(ii)(D). The inspectors verified if relevant indications were identified, and accepted for continued service, Exelon's acceptance would be in accordance with 10 CFR 50.55a(g)(6)(ii)(D). The reactor head contained no repairs to nozzles.

Steam Generator Tube Inspection Activities

The inspectors reviewed Technical Evaluation 2434501-01, “Calvert Cliffs Unit 2, Outage CC2R21, Steam Generator Degradation Assessment,” Revision 0, and noted the steam generators aging degradation consists principally of fan-bar wear. The inspectors verified the condition monitoring limits used two models from the Electric Power Research Institute Steam Generator Degradation Specific Flaw Handbook. The inspectors compared the predicted number of fan bar wear indications from the evaluation with the number of fan bar indications discovered during the current refueling outage with the limiting size in order to assess Exelon’s prediction capability. No tube indication exceeded the monitoring limit which made in-situ pressure testing unnecessary.

The inspectors reviewed the degradation assessment to determine if the degradation assessment inspection scope anticipated areas of potential degradation based on a survey of industry experience and if the assessment accounted for site specific experience. The inspectors further reviewed the assessment, and inspection plan, to determine if the plan included focused inspections in challenging areas such as the top-of-tube sheet and the inner lane u-bends. The inspectors observed inspection activities to determine if new degradation was identified and noted the generator tubes did not leak during operation or during the post-shutdown.

The inspectors reviewed the secondary side inspection, including loose-parts evaluation. The inspectors observed the removal of loose parts in steam generator 22, at R29-C161. The inspectors verified that a loose part was captured in one generator, that it was evaluated, and caged with structurally reinforced plugs. The inspectors noted that Exelon implements rotating pancake coil inspection of the captured loose part to verify the loose part has not migrated and the potential for tube fretting does not exist.

The inspectors observed the resolution of fan bar wear in steam generator 21 in tubes R81–C79, and R108–C76. The inspectors observed the resolution of a ding in steam generator 21 in tube R75–83.

Boric Acid Corrosion Control Inspection Activities

The inspectors reviewed three engineering evaluations, Work Order (WO) C92949984, WO C92459273, and AR02456495, performed for boric acid found on reactor coolant system (RCS) piping and components, to determine if Exelon properly applied applicable corrosion rates to affected components and assessed the effects of corrosion induced wastage on structural or pressure boundary integrity. The inspectors reviewed procedure MN-3-123, "Boric Acid Corrosion Control Program," Revision 00402, to determine if the essential elements of the procedure had been implemented in the engineering evaluations.

Welding Activities

The inspectors reviewed a modification consisting of welding on a pressure boundary risk significant system, in order to verify that the welding activities, and any applicable nondestructive evaluations performed, were completed in accordance with ASME, Pressure and Vessel Code requirements, or an NRC approved alternative.

Miscellaneous

The inspectors verified there were no volumetric or surface examinations from the previous outage with relevant indication(s) that were analytically evaluated and accepted by Exelon for continued service.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11Q – 2 samples)

.1 Quarterly Review of Licensed Operator Requalification Testing and Training

a. Inspection Scope

The inspectors observed licensed operator simulator training involving shutdown operations with an entry into Abnormal Operating Procedure (AOP)-3B, "Abnormal Shutdown Cooling Conditions," Revision 27, due to a loss of a low pressure safety injection pump and a subsequent loss of both low pressure safety injection pumps on January 28, 2015. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal procedures 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 classification 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 March 10–11, 2015, performing Unit 2 plant heatup and reactor startup activities, including rod withdrawal, reactivity management, and steam generator feed pump manipulations. Additionally, 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.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 6 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 'B' ECCS train out of service for maintenance, January 6, 2015
- Updated maintenance risk assessment for Unit 2 Yellow risk activities associated with 2B EDG and 'B' ECCS train out of service for maintenance, January 13, 2015
- Updated maintenance risk assessment for Unit 1 Yellow risk activities associated with 11 CCHX, 11 ECCS air cooler, and 11 SW air compressor out of service for maintenance, January 20, 2015
- Updated maintenance risk assessment for Unit 2 Yellow risk activities associated with 'A' ECCS train out of service for maintenance, January 27, 2015
- Review of maintenance risk assessment for Unit 1 and Unit 2 maintenance activities for the week of March 16, 2015
- Review of maintenance risk assessment for Unit 1 and Unit 2 maintenance activities for the week of March 23, 2015

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 6 samples)

a. Inspection Scope

The inspectors reviewed the operability determinations 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. 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. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations.

- Monthly 11 4KV bus LOCI sequencer test, step 2, timed too long in STPO-8A-1 (CR-2013-005336)
- Evaluate single CCHX lineup, Units 1 and 2 (IR02439913)
- Hydraulic friction factor differences in SW calculation, Units 1 and 2 (IR02427723)
- 22A safety injection tank check valve leakage (IR02452695)
- Containment area radiation monitor reading less than desired, Unit 2 (IR02453836)
- 21A, 21B, 22B reactor coolant pump motor encapsulation cover access hatch missing bolts (IR02467743, IR02467734, IR02467751)

b. Findings

Introduction: The inspectors identified a Green NCV of 10 CFR 50.65(a)(4) because Exelon did not implement adequate RMAs during the replacement of the LOCI sequencer for the safety-related 11 4KV bus in accordance with station procedures.

Description: The inspectors identified that on June 23 and June 26, 2013, Exelon replaced the LOCI sequencer for the safety-related 11 4KV bus without implementing adequate RMAs to minimize the magnitude of risk increase and to establish other compensatory measures to provide alternate success paths for maintaining the safety function of the out of service SSCs.

The LOCI sequencer for the 11 4KV bus is part of the engineered safety features actuation system which functions to initiate the start of equipment that protects the public and plant personnel from the accidental release of radioactive fission products in the unlikely event of a LOCA, main steam line break, or loss of feedwater incident. The LOCI sequencer's functions are to start safety-related loads in a sequential manner to avoid overloading the EDG during design basis accidents and to sequence loads within the time limits of the safety analysis. The LOCI sequencer starts automatically with a

combination of a SIAS and an undervoltage (UV) signal on its associated 4KV bus. The UV signal's functions are to initiate the starting of the EDGs and to provide load shedding of its associated 4KV bus during a loss of offsite power (LOOP).

On June 23, 2013, the 11 4KV bus LOCI sequencer failed surveillance testing and the 1A EDG was declared inoperable. Exelon took immediate action to remove the 1A EDG from service and align the 0C AAC DG to the 11 4KV bus. Repair of the failed LOCI sequencer requires deenergizing its associated engineered safety features actuation system actuation cabinet. When the actuation cabinet is deenergized, a UV signal will not perform its design function of load shedding the safety bus from previously running loads if a LOOP occurs during the maintenance activity. This condition is present for approximately one hour during the maintenance activity. The LOCI sequencer failed post-maintenance testing and was subsequently replaced and successfully tested on June 26. Exelon assessed the plant risk as Yellow for the duration of the maintenance activity.

The inspectors questioned if the 0C AAC DG could perform its function of powering the 11 4KV bus, if a LOOP occurred during the maintenance activity, without the UV signal present to provide load shedding for the bus. Without the UV signal, all previously running loads on the bus would start simultaneously when the 0C AAC DG was manually paralleled to the 11 4KV bus, impacting the 0C AAC DG output voltage to the bus. CCNPP safety-related motors are designed to start with a bus voltage as low as 75 percent of nominal voltage. The station is committed to Safety Guide 9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," where Section C.4, states, in part, "Each diesel generator set should be capable of starting and accelerating to rated speed, in the required sequence, all the needed engineered safety feature and emergency shutdown loads. At no time during the loading sequence should the frequency and voltage decrease to less than 95 percent of nominal frequency and 75 percent of nominal voltage, respectively." Exelon conducted an electrical loading calculation to predict the 0C AAC DG output voltage drop on the bus for the loads that were present on the 11 4KV bus on June 23, 2013. The calculation predicted a bus voltage drop to 75.9 percent of nominal voltage. The inspectors concluded that, due to the electrical design of the 11 4KV safety bus, the potential existed for the 0C AAC DG to have to start more loads on the safety-related bus. This would lower bus voltage below the 75 percent nominal value potentially preventing safety-related loads from starting.

The inspectors reviewed Exelon procedure CNG-OP-4.01-1000, "Integrated Risk Management," Revision 01300 and WO C9233727, "Remove and replace LOCI Sequencer and Perform PMOT [post-maintenance operability test] for OPS," for the LOCI sequencer maintenance. The inspectors determined that WO C9233727 was classified as nuclear high risk and an infrequently performed test or evolution (IPTE). CNG-OP-4.01-1000, Section 5.3, identifies that Attachment 3, "Managing and Approving Risk Significant Activities," specifies actions to manage medium and high risk activities. One of the actions to manage risk significant activities for nuclear high risk is Attachment 3, Item 37, which states, "Develop "Contingency Plan" per Attachment 8, Contingency Plan, as appropriate, for "what could go wrong."" The inspectors identified that CNG-OP-4.01-1000, Attachment 8, was not completed for the activities of WO C9233727.

CNG-OP-4.01-1000, Section 5.3, also directs the completion of Attachment 9, "High Risk Activity/IPTE/IMA [Independent Management Appraisal] Plan," when a high risk

activity/IPTE does not have a technical procedure that will meet the requirements of Section 5.3.B.11. The inspectors noted that WO C9233727 completed Attachment 9. Attachment 9, Step 10, provides amplifying guidance to what should be considered for what could go wrong. Step 10 directs a review of internal and external operating experience and a consideration of industry guidance that provides key elements that were missed on procedures during IPTE activities. Some of those elements are, expected plant responses, verification that adequate margins of safety were maintained when interlocks and protection systems were bypassed, and contingency actions to address unexpected conditions or responses that may be encountered. The inspectors did not identify any documented evidence that a review using the guidance of CNG-OP-4.01-1000, Attachment 9, Step 10, was completed for the activities of WO C9233727.

CNG-OP-4.01-1000, Section 5.3.B, also directs the review of Attachment 13 for activities determined to be an IPTE. The inspectors reviewed Attachment 13 and noted that Step 1 contains multiple requirements for processing IPTEs, including; “Review proposed IPTE for operational impact; Request an engineering review of the proposed IPTE for technical adequacies, if necessary; Submit the proposed IPTE to the Plant General Manager with a recommendation regarding the submittal’s merits.” The inspectors noted that Attachment 13, Step 6, “Reviewing for Impact,” states, “Does the activity defeat any system designed to control or mitigate the consequences of an accident or transient? Consider those systems required for the following safety systems: Vital Auxiliaries,” Step 6, also states, “Does the activity place the plant in an unusual configuration, such that the plant is placed outside the scope of normal and emergency procedures?” The inspectors identified that CNG-OP-4.01-1000, Attachment 13, was not completed for the activities of WO C9233727.

The inspectors identified through review of Exelon documents and interviews with Exelon personnel that there was no documented evidence that Exelon considered the guidance in CNG-OP-4.01-1000, Attachment 8, Attachment 9, Step 10, or Attachment 13 when developing RMAs for the activities of WO C9233727. The inspectors determined that it was reasonable to conclude that if CNG-OP-4.01-1000, Attachments 8 and 13, were completed and if Attachment 9 was completed properly for the activities of WO C9233727 that Exelon would have identified the potential impact on the 11 4 KV bus voltage when placing the 0C AAC DG on the bus following a LOOP event and would have developed RMAs to minimize the magnitude of risk increase and establish other compensatory measures to provide alternate success paths for maintaining the safety function of the out of service SSCs. Exelon entered this issue into their CAP as IR02444523. Corrective actions include performing an apparent cause evaluation and identifying adequate RMAs for the LOCI sequencer replacement maintenance activities. The inspectors concluded that Exelon failed to establish adequate RMAs during the performance of LOCI sequencer maintenance activities in accordance with CNG-OP-4.01-1000.

Analysis: The inspectors determined that Exelon’s failure to establish adequate RMA’s during the performance of LOCI sequencer maintenance activities in accordance with CNG-OP-4.01-1000 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 procedure quality attribute of the Mitigating Systems cornerstone 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, without adequate RMAs per station procedure CNG-OP-

4.01-1000, the capability of the 0C AAC DG to perform the safety function to power the 11 4KV bus was adversely impacted. The inspectors also reviewed IMC 0612, Appendix E, "Examples of Minor Issues," and noted that this issue is sufficiently similar to examples 7.e and 7.f, in that, Exelon was required, under plant procedures, to establish RMAs or additional RMAs. The inspectors, with the assistance of a Region I Senior Reactor Analyst, evaluated this finding using IMC 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process," issued on May 19, 2005. Using Appendix K, Flowchart 2, "Assessment of RMAs," the inspectors determined that the finding was of very low safety significance (Green) based upon the short duration exposure time (approximately one hour). Specifically, comparing the licensee's calculated Yellow (1E-5) annualized risk for this maintenance evolution to the actual (1E-4/year X 1 year/8760 hours = 1E-8) incremental risk increase places the risk of this finding below the ICDP > 1E-6 threshold, resulting in a very low safety significance (Green).

The inspectors determined that the finding has a cross-cutting aspect in the area of Human Performance, Work Management, because Exelon did not implement a process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority. The work process includes the identification and management of risk commensurate to the work and the need for coordination with different groups or job activities. Specifically, Exelon failed to adequately plan, control, and execute the LOCI sequencer maintenance activity by establishing adequate RMAs that would have provided alternate success paths for maintaining the safety function of the out of service SSCs [H.5].

Enforcement: 10 CFR 50.65(a)(4) states, in part, that "before performing maintenance activities…, the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities." Contrary to this, on June 23 and 26, 2013, Exelon did not adequately manage the increase in risk of performing the 11 4KV bus LOCI sequencer maintenance activity. Specifically, no RMAs were implemented to minimize the magnitude of risk increase and to establish other compensatory measures to provide alternate success paths for maintaining the safety function of the out of service SSCs. Immediate corrective actions included entering this issue into their CAP as IR02444523. Because this violation is of very low safety significance (Green) and has been entered into Exelon's CAP (IR02444523), this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000317; 2015001-02: Inadequate Risk Management Actions for LOCI Sequencer Maintenance)**

1R18 Plant Modifications (71111.18 – 2 samples)

.1 Permanent Modifications

a. Inspection Scope

The inspectors evaluated the below modifications and verified that the design bases, licensing bases, and performance capability of the affected systems were not degraded by the modifications. The inspectors also reviewed revisions to the UFSAR and system design basis documents to ensure the modifications were incorporated into this document.

- ECP-14-000102, “High Pressure Safety Injection FLEX Connection”
- ECP-14-000377, “Atmospheric Dump Valves (ADV) Manual Operator Replacement”

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 9 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 C92250227, Replace the 2B EDG outboard generator bearing, February 11, 2015
- WO C92353169, Inspect, repair as required 2CKVSI-217, February 19, 2015
- WO C220092370, Replace the motor on 2MOV635OP, February 28, 2015
- WO C92349457, 21 Main steam isolation valve actuator replacement, March 2, 2015
- WO C92611475, 21 Auxiliary Feedwater pump overhaul, March 3, 2015
- WO C92353165, Disassemble and inspect 22B safety injection tank N2 inlet check valve (2CKVSI-493), March 4, 2015
- WO C92345960, 21A Safety injection tank (2RV-221) relief valve overhaul, March 4, 2015
- WO C92349855, Diagnostic testing on containment sump suction (MOV-4145OP), March 5, 2015
- WO C92422479, Main steam safety valve (2RV4003) replacement, March 6, 2015

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities (71111.20 – 1 sample)

a. Inspection Scope

The inspectors reviewed the station’s work schedule and outage risk plan for the Unit 2 maintenance and refueling outage 2R21, which was conducted February 16 through March 15, 2015. The inspectors reviewed Exelon’s development and implementation of outage plans and schedules to verify that risk, industry experience, previous site-specific problems, and defense-in-depth were considered. During the outage, the inspectors

observed portions of the shutdown and cooldown processes and monitored controls associated with the following outage activities:

- Configuration management, including maintenance of defense-in-depth, commensurate with the outage plan for the key safety functions and compliance with the applicable TSs when taking equipment out of service
- Implementation of clearance activities and confirmation that tags were properly hung and that equipment was appropriately configured to safely support the associated work or testing
- Installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication and instrument error accounting
- Status and configuration of electrical systems and switchyard activities to ensure that TSs were met
- Monitoring of decay heat removal operations
- Impact of outage work on the ability of the operators to operate the spent fuel pool cooling system
- Reactor water inventory controls, including flow paths, configurations, alternative means for inventory additions, and controls to prevent inventory loss
- Activities that could affect reactivity
- Maintenance of containment closure as required by TSs
- Refueling activities, including fuel handling and fuel receipt inspections
- Fatigue management
- Tracking of startup prerequisites, walkdown of the primary containment to verify that debris had not been left which could block the ECCS suction strainers, and startup and ascension to full power operation
- Identification and resolution of problems related to refueling outage activities

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 12 samples)

a. Inspection Scope

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's procedural 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. The inspectors reviewed the following surveillance tests:

- STP-O-5A11-1, "11 Auxiliary Feedwater Pump Quarterly Surveillance Test," Revision 0, January 16, 2015 (in-service test)
- STP-O-27-1, "Reactor Coolant System Leakage Evaluation," Revision 20, February 9, 2015

- STP-M-003A-0, “O-Line Main Steam Safety Valve Testing,” Revision 00500, February 11, 2015
- STP-O-66M-2, “Cold Shutdown Operability Test of MOV-651 and 652,” Revision 00300, February 16, 2015
- STP-O-66G-1-2, “Instrument Air Containment Check Valve, IA-175, Operability Test,” Revision 0, February 17, 2015
- STP-O-67H-2, “SIT OUT Check Valve Test,” Revision 00208, February 20, 2015
- STP-O-073G-2, “HPSI Pump Large Flow Test,” Revision 7, February 22, 2015
- STP-O-04B-2, “B Train Integrated Engineered Safety Features Test,” Revision 30, March 9, 2015
- STP-O-66F-2, “SI Pump Recirculation Valve Operability Test,” Revision 2, March 11, 2015
- STP-O-108D20A-2, “Containment Penetration 20A Local Leak Rate Test,” Revision 0, March 12, 2015
- STP-O-069-2, “SGIS and CSAS-3 Logic Test,” Revision 16, March 12, 2015
- PSTP-02, “Initial Approach to Critically and Low Power Physics Testing,” Revision 03600, March 12, 2015

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

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

a. Inspection Scope

Exelon implemented various changes to the CCNPP Emergency Action Levels (EALs), 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 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 criteria for determining compliance.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06 – 1 sample)

a. Inspection Scope

On March 25, 2015, the inspectors reviewed and observed the performance of an Emergency Planning Drill that involved a simulated loss of auxiliary feedwater, loss of core cooling, and loss of containment, CAL-EP-ID-15-2, "Emergency Preparedness Exercise," Revision 0. The inspectors assessed emergency procedure usage, emergency plan classification, notifications, and Exelon's identification and entrance of any drill problems into their CAP. This inspection evaluated the adequacy of Exelon's conduct of the drill and critique performance. Drill issues were captured by Exelon in their CAP as IR2475034 and were reviewed by the inspectors.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstone: Public Radiation Safety and Occupational Radiation Safety

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01 – 1 sample)

a. Inspection Scope

During the period of March 2–6, 2015, the inspectors reviewed Exelon's performance in assessing the radiological hazards and exposure control in the workplace. The inspectors used the requirements in 10 CFR 20, TSs, applicable industry standards, and the procedures required by TSs as criteria for determining compliance.

Inspection Planning

The inspectors reviewed the results of radiation protection (RP) program audits. The inspectors reviewed any reports of operational occurrences related to occupational radiation safety since the last inspection.

Radiological Hazard Assessment

The inspectors reviewed the last two radiological surveys of the following:

- Unit 2 refueling canal
- Unit 2 reactor head
- Unit 2 steam generators
- Unit 2 volume control tank room

The inspectors assessed the following radiation significant work activities:

- Reactor head disassembly/reassembly
- Reactor head/upper internals removal

- Containment outage scaffolding
- Emergent work

The inspectors observed work in the following potential airborne radioactivity areas, and evaluated whether air sampling was adequately implemented:

- Refueling cavity decontamination
- Removal of internals from the 2-SI-217 check valve
- Installation and removal of nozzle dams from steam generators
- Refueling cavity blind flange removal

The inspectors evaluated whether continuous air monitors were representative of actual work areas. The inspectors evaluated the Exelon program for monitoring and control of contamination in areas of the plant based on the potential for internal exposures and radioactive material control.

Instructions to Workers

The inspectors selected and evaluated the postings and controls associated with five containers of radioactive materials. The inspectors reviewed the following radiation work permits (RWP) used to access high radiation areas (HRA) and evaluated if the specified work control instructions and control barriers were consistent with procedure requirements:

- Reactor head disassembly/reassembly (CC-2-15-000613)
- Reactor head/upper internals removal (CC-2-15-000614)
- Containment outage scaffolding (CC-2-15-000605)
- Emergent work (CC-2-15-000412)

The inspectors reviewed one occurrence where a worker's electronic personal dosimeter alarmed.

Contamination and Radioactive Material Control

The inspectors observed two locations where Exelon monitors material leaving the radiological control area and inspected the methods used to control, survey, and release material from these areas. The inspectors selected three sealed sources from the Exelon inventory records and assessed whether the sources were accounted for and were leak tested for contamination as required. The inspectors evaluated whether any recent transactions involving nationally tracked sources were reported in accordance with10 CFR 20 requirements.

Radiological Hazards Control and Work Coverage

The inspectors evaluated:

- radiological conditions in the plant by performing independent radiation measurements during walk-downs of the facility
- radiological controls, radiation surveys, radiation protection job coverage and contamination controls associated with outage work activities

- dosimeter placement in the location of highest expected dose or that Exelon properly implemented an NRC-approved method of determining effective dose equivalent

The inspectors reviewed the following RWPs for work within airborne radioactivity areas with the potential for internal exposures:

- Refueling cavity decontamination (CC-2015-00624)
- Removal of internals for SI-217 (CC-2-15-00641)
- Install and remove nozzle dams from steam generators (CC-2-15-00704)
- Remove and install blind flange in cavity (CC-2-15-000618)

The inspectors examined the posting and physical controls for selected HRAs, locked HRAs and very high radiation areas (VHRA). The inspectors examined Exelon's controls for highly activated or contaminated materials stored within the spent fuel pool.

Risk-Significant HRA and VHRA Controls

The inspectors evaluated Exelon controls for VHRAs and areas with the potential to become a VHRA to ensure that an individual was not able to gain unauthorized access to these areas.

Radiation Worker and RP Technician Performance

The inspectors observed the performance of radiation workers and RP technicians with respect to RP work requirements.

Problem Identification and Resolution

The inspectors evaluated whether RP problems were being identified by Exelon at an appropriate threshold and were properly addressed for resolution in their CAP.

b. Findings

No findings were identified.

2RS2 Occupational ALARA Planning and Controls (71124.02 – 1 sample)

a. Inspection Scope

During the period of March 2–6, 2015, the inspectors reviewed Exelon's performance in maintaining occupational individual and collective radiation exposures as low as is reasonably achievable (ALARA). The inspectors used the requirements in 10 CFR 20, TSs, and the Exelon procedures required by TSs as criteria for determining compliance.

Inspection Planning

The inspectors reviewed pertinent information regarding CCNPP's collective dose history, current exposure trends, and ongoing planned work activities. The inspectors compared site-specific trends in collective exposures against industry average values for

similar reactors. The inspectors reviewed procedures associated with maintaining occupational exposures ALARA.

Radiological Work Planning

The inspectors selected the following high exposure 2R21 refueling outage ALARA plans: 14-01, 14-03, 14-12, 14-15, 14-18, RAP-0008, RAP-0009, RAP-0016, RAP-0023, and RAP-0033.

Based on the outage work activities selected above, the inspectors reviewed the ALARA work activity evaluations, exposure estimates, and exposure reduction requirements. The inspectors assessed whether Exelon's planning identified appropriate dose reduction techniques, considered alternate dose reduction features, and estimated reasonable dose goals. The inspectors evaluated whether Exelon's ALARA plans had evaluated decreased worker efficiency from the use of respiratory protective devices, considered the use of remote technologies, and evaluated industry operating experience and lessons learned into the ALARA and RWP requirements.

The inspectors compared the dose results with the estimated doses established in ALARA planning for these work activities; the person-hour results compared to the person-hour estimates provided by maintenance planning and other work groups; and assessed the reasons for any dose overruns. The inspectors determined whether post-job reviews were conducted to identify lessons learned and whether they were entered into Exelon's CAP.

Verification of Dose Estimates and Exposure Tracking Systems

The inspectors reviewed the basis for the current annual collective dose estimate for accuracy. The inspectors evaluated if Exelon had established measures to track, trend, adjust exposure estimates, and reduce occupational doses for ongoing work activities.

Source Term Reduction and Control

The inspectors reviewed Exelon records to determine the historical trends and current status of plant source term. The inspectors assessed whether Exelon had developed contingency plans for expected changes in the source term as the result of changes in plant fuel performance issues or changes in plant primary chemistry.

Radiation Worker Performance

The inspectors observed radiation worker and RP technician performance during work activities being performed in radiation areas, airborne radioactivity areas, and HRAs.

Problem Identification and Resolution

The inspectors evaluated whether problems associated with ALARA planning and controls are being identified by Exelon at an appropriate threshold and were properly addressed for resolution in Exelon's CAP.

b. Findings

No findings were identified.

2RS5 Radiation Monitoring Instrumentation (71124.05 – 1 sample)

a. Inspection Scope

During the period of January 12–16, 2015, the inspectors reviewed Exelon's performance in assuring the accuracy and operability of radiation monitoring instruments used to protect occupational workers and to protect the public from nuclear power plant operations. The inspectors used the requirements in 10 CFR 20, "Standards for Protection Against Radiation;" 10 CFR 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;" TS; applicable industry standards; and procedures required by TS as criteria for determining compliance.

Inspection Planning

The inspectors reviewed the CCNPP UFSAR, the TS requirements for post-accident monitoring instrumentation, procedures that govern instrument source checks and calibrations, and area radiation monitor alarm set-point values and bases.

Walk-downs and Observations

The inspectors performed the following:

- Inspection of ten portable survey instruments
- Observation of source checks for personnel contamination monitors, small article monitors (SAMs), whole body counters, RM-14 friskers, neutron meters, and RO-2 ion chambers
- Walk-down of five area radiation monitors and five continuous air monitors
- Inspection of three personnel contamination monitors, three portal monitors, and three SAMs

Calibration and Testing Program

Laboratory Instrumentation

The inspectors assessed laboratory analytical instruments to:

- Determine if the frequency of the calibrations is adequate
- Verify that there were no indications of degraded performance
- Assess whether appropriate corrective actions were implemented in response to indications of any degraded performance

Whole Body Counter

The inspectors reviewed or assessed:

- Calibration records for the whole body counter
- The methods and sources used to perform functional checks on the whole body counter
- Whether calibration and check sources were appropriate and aligned with the plant's radionuclides
- That appropriate calibration phantom(s) were used

Post-Accident Monitoring Instrumentation

The inspectors reviewed calibration documentation for the containment high-range monitors and assessed that electronic calibrations incorporated the complete range of the detectors and included detector calibrations using appropriate radiation sources. The inspectors selected one effluent/process monitor used as a basis for initiating EALs and evaluated the calibration and availability of this instrument. The inspectors reviewed Exelon's capability to collect high radioactivity post-accident effluent samples.

Portal Monitors, Personnel Contamination Monitors, and SAMs

The inspectors selected one of each type of these instruments and reviewed:

- The alarm set-point values to ensure that radioactive material is not released from the site
- The calibration methods consistent with the manufacturer's recommendations

Portable Survey Instruments, Area Radiation Monitors, Electronic Dosimetry, and Air Samplers/Continuous Air Monitors

The inspectors reviewed:

- Calibration documentation for at least one of each type of portable instrument in use
- Detector measurement geometry and calibration methods
- The use of the instrument calibrator

The inspectors selected four portable survey instruments that did not meet acceptance criteria during calibration or source checks and assessed whether Exelon had taken appropriate corrective action for these out of calibration instruments.

Instrument Calibrator

The inspectors assessed whether Exelon periodically verifies the calibrator accuracy over the range of the exposure rates/dose rates used and whether the calibration measurement devices used had been calibrated by a facility using National Institute of Science and Technology traceable sources.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

.1 RCS Specific Activity and RCS Leak Rate (4 samples)

a. Inspection Scope

The inspectors reviewed Exelon's submittal for the RCS specific activity (BI01) and RCS leak rate (BI02) performance indicators for both Unit 1 and Unit 2 for the period of January 2014 through December 2014. To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in Nuclear Energy Institute, Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7. The inspectors also reviewed RCS sample analysis and control room logs of daily measurements for RCS leakage and compared that information to the data reported by the performance indicator. Additionally, the inspectors observed surveillance activities that determined the RCS identified leakage rate, and chemistry personnel taking and analyzing an RCS sample.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152)

.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.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On April 15, 2015, the inspectors presented the inspection results to Mr. Mark Flaherty, Plant General Manager, 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
P. Amos, Manager, Site Emergency Preparedness
J. Ball, Supervisor, Radiation Protection
C. Blue, Manager, Radiological Engineering
D. Bodine, Manager, Programs Engineering
C. Brevig, Radiation Protection Technician
I. Byrnes, Radiation Protection Technical Specialist
R. Cantrell, Engineer 3, Programs Engineering
R. Courtney, Supervisor, Radiation Protection
J. Detchemendy, Supervisor, Radiation Protection
B. Erdman, Manager, Radiation Protection Technical Support
K. Fearrington, Radiation Protection Technician
M. Fick, Acting Manager, Site Regulatory Assurance
W. Frawley, Chemistry Technician
G. Helmrich, Chemistry Technician
T. Hoover, Radiation Protection Technician
J. McIntyre, Engineer 2, Programs Engineering
D. Moore, Engineering Analyst 2, Programs Engineering
J. Norris, Radiation Protection Technician
B. Pickett, Supervisor, Radiation Protection
S. Reichard, Regulatory Specialist, Regulatory Assurance
A. Reyes-Cruz, Engineer 3, Programs Engineering
A. Thorne, Engineer 2, Programs Engineering
J. York, Manager, Site Radiation Protection

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened and Closed

05000317,318/2015001-01	NCV	Component Cooling Operated in Unanalyzed Condition (Section 1R04)
05000317/2015001-02	NCV	Inadequate Risk Management Action for LOCI Sequencer Maintenance (Section 1R15)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures
ERPIP-3.0, Immediate Actions, Revision 04901
OAP 92-9, Operations Administrative Policy Cold Weather Operations, Change 7
SY-AA-101-146, Severe Weather Preparation and Response, Revision 000
WC-AA-107, Seasonal Readiness, Revision 014

Section 1R04: Equipment Alignment

Procedures
AOP-7C, Loss of Component Cooling Water, Revision 4
OI-16, Component Cooling System, Revision 34
OI-21A, 2A Diesel Generator, Revision 24
OI-29, Saltwater System, Revision 72

Incident Reports
IR02439913

Drawings
60710sh0002, Component Cooling System, Revision 39
60731sh0003, Safety Injection & Containment Spray Systems, Revision 30

Miscellaneous
B0025, Oi-16-2 Basis for Mode 1-3 Throttling Positions of 2-CC-261 and 2-CC-266 (CC Inlet to the SDCHXs)
CA06439, Evaluation of CC Flow Following Breaking of 12 CC HX Tubes (IR4-030-055), Revision 0
ECP-15-000058, Analyze the CCW System for New Lineups to Verify System Temperature Still Met, Revision 0
M-93-41, CCW Heat Exchangers

Section 1R06: Flood Protection Measures

Procedures
ER-AA-300-150, Cable Conditioning Monitoring Program, Revision 001

Work Order
C92530109

Section 1R08: In-Service Inspection Activities

Procedures:
ASME Case N-729-1, Alternate Examination Requirements for PWR Reactor Vessel Upper Heads With Nozzles Having Pressure-Retaining Partial-Penetration Welds, Section XI, Division 1, March 28, 2006
Calvert Cliffs 2, CC2R21 – Steam Generator “21” Secondary Side Top of Tubesheet Inspection & Test Plan

Calvert Cliffs Nuclear Power Plant Station Administration Procedure, MN-3-110, In-Service Inspection of ASME, Section XI, Components, Revision 00600
Calvert Cliffs Nuclear Power Plant Technical Procedure, NDE-5769-CC, Visual Examination for Leakage, Revision 00001
Calvert Cliffs U2R21 – RSG ECT Inspection Plan, S000135-WKP-000007, Revision 00
Calvert Cliffs Unit 2 – Eddy Current Examination Technique Sheets (ETSS) Document S000135-SPEC-002, Revision 000
Calvert Cliffs Unit 2, 2r21, EPRI Appendix H/I Eddy Current Technique Validation
Eddy Current Examination Technique Specification Sheet, ETSS# 20400.1
Eddy Current Examination Technique Specification Sheet, ETSS# 20500.1
Eddy Current Examination Technique Specification Sheet, ETSS# 27904.1
Eddy Current Examination Technique Specification Sheet, ETSS# 27903.1
ER-AP-335-001, Revision 3, Bare Metal Visual Examination for Alloy 600/82/182 Materials
ETTS, CCR2R21, BOB, Bobbin ASME Code Inspection
ETTS2, CC2R21, 3C, Rotating +Point 3-Coil examination
ETTS3, CC2R21, 1C, Rotating +Point 1-Coil Examination
Fourth Interval In-Service Inspection Program Plan for Calvert Cliffs Nuclear Power Plant, Units 1 and 2, Revision 00101
Second Interval Containment In-Service Inspection Program Plan for Calvert Cliffs Nuclear Power Plant, Units 1 and 2, Revision 00100

Condition Reports

CR-2011-001029	CR-2011-001394	CR-2012-001678
CR-2011-001139	CR-2012-000800	CR-2012-001777
CR-2011-001142	CR-2012-001172	CR-2012-001940
CR-2011-001146	CR-2012-001207	CR-2012-002095
CR-2011-001150	CR-2012-001209	CR-2012-002107
CR-2011-001162	CR-2012-001210	CR-2012-002212
CR-2011-001163	CR-2012-001280	CR-2012-002285
CR-2011-001164	CR-2012-001283	CR-2012-002346
CR-2011-001167	CR-2012-001443	CR-2012-002461
CR-2011-001168	CR-2012-001560	CR-2012-002464
CR-2011-001270	CR-2012-001581	CR-2012-002487
CR-2011-001313	CR-2012-001608	CR-2012-002520
CR-2011-001370	CR-2012-001609	CR-2012-002539
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Section 1R11: Licensed Operator Requalification Program

Procedures
AOP-3B, Abnormal Shutdown Cooling Conditions, Revision 27

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures
EOOS Guidelines – Dominant Risk Activities, Revision 0
EOOS Risk Monitor Guidelines – Senior Reactor Operators, Revision 1
OP-AA-108-117-0, Protected Equipment Program, Revision 004
WC-AA-104, Integrated Risk Management, Revision 22

Section 1R15: Operability Determinations and Functionality Assessments

Procedures
CNG-OP-4.01-1000, Integrated Risk Management, Revision 01300
EOP-0, Post-Trip Immediate Actions, Revision 13
EOP-2, Loss of Offsite Power/Loss of Forced Circulation, Revision 15
EOP-7, Station Blackout, Revision 17
EOP-8, Functional Recovery Procedure, Revision 35
NUMARC 93-0, Industry Guideline for Monitoring the Effectiveness of Maintenance At Nuclear Power Plants, Revision 4A
OI-21A, 1A Diesel Generator, Revision 22
OI-29, Saltwater System, Revision 69
STP-O-8A-1, Test of 1A DG and 11 4KV LOCI Sequencer, Revision 28

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IR02427723
IR02439913
IR02444523
IR02452695
IR02453836

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C92323727

Drawings
12315-0001, Setting Plan 24 x 30 Fig. 5712 Angle Flow Pump, Revision 9
60220, Equipment Location Serve Bldg, Water Treatment Area and Intake Structure Section "J-J", Revision 5
61834sh0012, Intake Structure Sections and Details, Revision 3

Miscellaneous
CA03386, Unit 1 Salt Water Flow Model Data Base (Post FCR 94-204 Configuration) Revision 2
CA04879, Salt Water NPSH and Pressure Evaluation, Revision 0
M-601, Piping Class Summary Sheets, Revision 49
M-94-093, Unit-2 Salt Water Flow Model, Revision 1

Section 1R18: Plant Modifications

Procedures
CC-AA-103, Configuration Change Control for Permanent Physical Plant Changes, Revision 25
CC-AA-103-1001, Configuration Change Control Guidance, Revision 4
CC-AA-112, Temporary Configuration Control Changes, Revision 21
NEI 96-07, Guidelines for 10 CFR 50.59 Implementation, Revision 1

Incident Report
IR02457169

Work Orders
C92672330

Miscellaneous
ECP-14-000377, Weights for Atmospheric Dump Valves (ADVs) Manual Operator Replacement, Revision 6

Section 1R19: Post-Maintenance Testing

Procedures
CC-AA-107-1001, Post Modification Acceptance Testing
MOV-009B, Operating the Crane Nuclear Viper System, Revision 00503
OP-AA-108-106, Equipment Return to Service, Revision 4
STP-O-008B-2, Test of 2B DG and 4KV Bus 24 LOCI Sequencer, Revision 29
STP-O-067D-2, N2 Check Valve Operability Verification Test (Modes 5, 6, or Defueled), Revision 00800
STP-O-1-2, MSIV Full Stroke, Revision 01402

Work Orders
C92250227
C92349457
C92349855
C92353165

Section 1R20: Refueling and Other Outage Activities

Procedures
OP-AA-117-1001, Revision 005
OP-1-2, Plant Start Up from Cold Shutdown, Revision 29
OP-2-2, Plant Start Up from Hot Standby to Minimum Load, Revision 46
OP-3-2, Normal Power Operation, Revision 52
OP-4-2, Plant Shutdown from Power Operation to Hot Standby, Revision 21
OP-5-2, Plant Shutdown from Hot Standby to Cold Shutdown, Revision 28
OP-7-2, Shutdown Operations, Revision 49

Section 1R22: Surveillance Testing

Procedures
PSTP-02, U-2 Initial Approach to Critically & Low Power Physics Testing, Revision 03600
STP-O-069-2, SGIS and CSAS-3 Logic Test, Revision 16
STP-O-108D20A-2, Containment Penetration 20A Local Leak Rate Test, Revision 0
STP-O-27-1, Reactor Coolant System Leakage Evaluation, Revision 20
STP-O-4B-2, 'B' Train Integrated Engineered Safety Features Test, Revision 30
STP-O-66F-2, SI Pump Recirculation Valve Operability Test, Revision 2
STP-O-66G-1-2, Instrument Air Containment Check Valve, IA-175, Operability Test, Revision 0
STP-O-66M-2, Cold Shutdown Operability Test of MOV-651 and 652, Revision 00300
STP-O-67H-2, SIT OUT Check Valve Test, Revision 00208
WC-AA-111, Surveillance Program Requirements, Revision 4

Condition Reports
AR02464488

AR02465287
AR02466069
AR02466396

Section 1EP4: Emergency Action Level and Emergency Plan Changes

Miscellaneous
EAL-Cold, Revision 00400
EAL-Hot, Revision 00400
EAL-TB, Emergency Action Level Technical Bases Document, Revision 00400

Section 2RS1: Radiological Hazard Assessment & Exposure Controls

Procedures
RP-AA-18, Revision 1, Radiological Posting and Labeling Program Description
RP-AA-19, Revision 2, High Radiation Area Program Description
RP-AA-100, Revision 1, Conduct of RP Operations
RP-AA-300, Revision 12, Radiological Survey Program
RP-AA-300-1005, Revision 1, Removing Items from SFP
RP-AA-301, Revision 8, Radiological Air Sampling Program
RP-AA-302, Revision 7, Determination of Alpha Levels
RP-AA-350, Revision 12, Personnel Contamination Monitoring, Decontamination and Reporting
RP-AA-376, Revision 8, Radiological Postings, Labeling and Markings
RP-AA-376-1001, Revision 9, Radiological Posting, Labeling, and Marking Standard
RP-AA-401-1002, Revision 6, Radiological Risk Management
RP-AA-401-1003, Revision 1, Contamination Control Best Practice Application
RP-AA-403, Revision 6, Administration of the Radiation Work Permit Program
RP-AA-460, Revision 26, Controls for High and Locked High Radiation Areas
RP-AA-460-001, Revision 5, Controls for Very High Radiation Areas
RP-AA-460-002, Revision 2, Additional High Radiation Exposure Controls
RP-AA-460-003, Revision 6, Access to HRAs-LHRAs-VHRAs and Contaminated Areas in Response to a Potential or Actual Emergency
RP-AA-503, Revision 8, Unconditional Release Survey Method
RP-AA-503-F-01, Revision 2, Unconditional Release SAM
RP-AA-1004, Revision 9, RP Stop Work Authority
RP-AA-1008, Revision 3, Unescorted Access to and Conduct in Radiologically Controlled Area
RP-AA-4007, Revision 1, Guidelines for Unconditional Release of Laundered Material

Documents
CR-02447777
CR-02448447
CR-02450035
CR-02452281
CR-02452287
CR-2014-002537

Surveys

Room#	Map#	RWP#	Date	Time
	C2-9	CC-2-15-00618	2/16/15	2330
	C2-8	CC-2-15-00618	2/16/15	2300

214	2-1G	CC-2-15-01103	2/19/15	0240
214	2-1G	CC-2-15-01103	2/19/15	0300
	C2-13F	CC-2-15-00702	2/26/15	2123
	C2-13E	CC-2-15-00702	2/25/15	2207
	C2-13F	CC-2-15-00702	2/25/15	2213
211	2-4C	CC-2-15-01103	2/22/15	1935
211	2-4C	CC-2-15-01103	2/20/15	2300
321	3-1F	CC-2-15-01103	2/28/15	1200
321	3-1F	CC-2-15-01103	2/26/15	1730
321	3-1F	CC-2-15-00511	2/27/15	1930
321	3-1F	CC-2-15-01103	2/16/15	0830
206	2-4D	CC-2-15-01103	2/18/15	1030
206	2-4D	CC-2-15-01103	2/21/15	1500
206	2-4D	CC-2-15-01103	2/16/15	1340
	C2-12D	CC-2-15-00621	2/20/15	2200
	C2-9	CC-2-15-00624	3/3/15	2130
	C2-9	CC-2-15-00624	3/4/15	0330
Misc 44' Rx Cav Decon		CC-2-15-00624	3/4/15	0900
	C2-12D	CC-2-15-00616	2/25/15	1400

Air Samples

Unit	Location	Date	Stop Time	GA/Lapel
2	S/G HL-21 Pump Bay	2/19/15	1214	GA
2	22 S/G CL	2/19/15	1356	GA
2	21 S/G Bowl	2/19/15	1345	Lapel
2	South Cavity	2/18/15	1125	Lapel
2	North Deep End RFP	2/18/15	0345	Lapel
2	Cavity	2/18/15	0400	Lapel
2	RFP	2/18/15	0445	GA
2	Lower Cavity	2/17/15	2010	Lapel
2	North Cavity Pit	2/18/15	1715	Lapel
2	North and South Deep Ends	2/16/15	2330	Lapel

Section 2RS2: Occupational ALARA Planning and Controls

Procedures

RP-AA-11, Revision 1, External Dose Control Program
RP-AA-400, Revision 11, ALARA Program
RP-AA-400-1001, Revision 4, Establishing Collective Radiation Exposure Annual Business Plan Goals
RP-AA-400-1002, Revision 1, Dose Equalization
RP-AA-400-1003, Revision 1, Work Group Radiological Excellence Plans
RP-AA-400-1005, Revision 1, ALARA Suggestion Program
RP-AA-400-1006, Revision 4, Outage Exposure Estimating and Tracking
RP-AA-400-1007, Revision 2, Elevated Dose Rate Response Planning
RP-AA-400-1008, Revision 1, Exposure Goal Recovery Plans
RP-AA-400-2000, Revision 1, Department Dose Zealot
RP-AA-4003, Revision 5, Guidelines for Daily Radiation Protection Outage Report
RP-AA-4004, Revision 2, Radiation Protection Refueling Outage Report Process

RP-AA-401, Revision 18, Operational ALARA Planning and Controls
RP-AA-401-1001, Revision 4, Dose Reporting Guidance
RP-AA-441, Revision 5, Evaluation and Selection Process for Radiological Respirator Use
RP-AA-552, Revision 0, Spot Shielding
RP-AA-870-1001, Revision 3, Set-Up and Operation of Portable Air Filtration Equipment
RP-AA-870-1002, Revision 5, Use of Vacuum Cleaners in Radiologically Controlled Areas
RP-AA-870-1003, Revision 3, Testing Portable Hepa Filter Units

Documents
2013 ALARA Post-Outage Report, dated 9/26/2013
2013 Rad Engineering Annual Dose Report – Online Dose
2014 ALARA Post-Outage Report
2-SI-306 Shutdown Cooling Clean-Up Trending
Air sample results for RWP CC-2-15-00641
Airborne Radioactivity Calculation Sheet, RP-AA-301, for U-2 CTMT 10' Rx Vessel Annulus, dated 2/27/2015
ALARA Briefing Attendance Records, RP-AA-401, Various, for U-2 Outage Work
ALARA Review 14-01 (U-1 GSI-191), with Associated Evaluations and RWPs
ALARA Review 14-03 (RCP Maintenance), with Associated Evaluations and RWPs
ALARA Review 14-12 (U-1 Refueling Path Minor Maintenance), with Associated Evaluations and RWPs
ALARA Review 14-15 (U-1 Scaffold Activities), with Associated Evaluations and RWPs
ALARA Review 14-18 (U-1 Mechanical Maintenance Outage Activities), with Associated
C2R21 Outage Daily Radiation Protection Report, dated 3/2/2015
C92353169, work order for the 2-SI-227 Check Valve
Daily Individual Dose Report for RWP CC-2-15-00641
Elevated Dose Rate Response Plan for 2R21
Evaluations and RWPs
RAP-0008, RP-AA-401, (ALARA Plan for S/G Primary Work), and Associated Work Orders
RAP-0009, RP-AA-401, (ALARA Plan for Reactor Vessel Head)
RAP-0016, RP-AA-401, (ALARA Plan for 2-SI-227)
RAP-0023, RP-AA-401, (ALARA Plan for S/G secondary side maintenance) and Associated Work Orders
RAP-0033, RP-AA-401, (ALARA Plan for Outage Scaffold Maintenance) and Associated Work Orders
RWP CC-2-15-00641, Revision 0 (2-SI-227 Valve)
Station ALARA Committee Meeting Minutes, 2015-001
Station ALARA Committee Meeting Minutes, August 2014 to January 2015
Survey, Standard Radiation Monitoring Points, Unit-2 2R21, dated 2/16/2015 to 2/19/2015
Survey, U-2 CTMT 10' Rx Vessel Annulus, dated 2/27/2015
Surveys, 2-SI-217, dated 2/25/2015
Surveys, Shutdown, Unit-2, dated 2/16/2015 to 2/18/2015
TEDE ALARA Evaluation for CC-2-15-00641
TEDE ALARA Evaluation Screening Worksheet for CC-2-15-00641
Whole Body Count Log, RP-AA-230, for 2014 and 2015
Work Group On-Line Exposure Reduction Plan, Operations, 2014
Work Group On-Line Exposure Reduction Plan, Radiation Protection, 2014

Section 2RS5: Radiation Monitoring Instrumentation

Procedures

CP-0508, Chemistry Emergency Response Sampling System, Revision 00800
CY-AA-170-000, Radioactive Effluent and Environmental Monitoring Programs, Revision 6
RP-700-1305, Operation and Calibration of the AMP-100 and AMP-200, Revision 1
RP-AA-700, Controls for Rad Protection Instrumentation, Revision 3
RP-AA-700-1100, Operation of Eberline RO-2,2A,20, Bicron RSO 50E, Revision 0
RP-AA-700-1101, Calibration of RO-2,2A,20 and RSO-50E Ion Chambers, Revision 1
RP-AA-700-1208, Operation of the Shepard Model 89 Calibrator, Revision 1
RP-AA-700-1209, Calibration of Shepard Box Irradiators, Revision 0
RP-AA-700-1213, Operation and Calibration of PCM-2 Whole Body Frisking Monitor, Revision 0
RP-AA-700-1215, Calibration of Low-Vol Air Samplers, Revision 1
RP-AA-700-1216, Calibration of Hi-Vol Air Sampler, Revision 2
RP-AA-700-1239, Operation and Calibration of the Model SAM-12 Small Articles Monitor, Revision 2
RP-AA-700-1240, Operation and Calibration of the Canberra ARGOS-5 Personnel Contamination Monitor, Revision 4
RP-AA-700-1246, Operation of Air Samplers, Revision 2
RP-AA-700-1249, Operation of the Ludlum Model 3 with GM Frisker Probe, Revision 1
RP-AA-700-1302, Operation of Portable Neutron Monitors, Revision 1
RP-AA-700-1401, Operation and Calibration of Eberline Model PM-7 Personnel Contamination Monitor, Revision 2
RP-AA-700-1501, Operation and Calibration of the Model SAM-9 and SAM-11 Small Articles Monitor, Revision 2
RP-CA-700-1000, Calibration of CCNPP-Specific Rad Protection Instruments, Revision 0
RP-CA-700-1002, Operation of CCNPP-Specific Rad Protection Instruments, Revision 0
RP-CA-700-1003, Pre-Operational Checks of CNPP-Specific Portal and Personnel Contamination Monitors, Revision 0
RP-CA-700-1004, Operation and Response Checks of CCNPP-Specific Counter Scaler Systems, Revision 0

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CR-2013-000521	CR-2014-000019	CR-2014-004770
CR-2013-005513	CR-2014-000245	CR-2014-004841
CR-2013-005546	CR-2014-000906	CR-2014-005334
CR-2013-006707	CR-2014-001029	CR-2014-006009
CR-2013-006717	CR-2014-003917	CR-2014-007164
CR-2013-008697	CR-2014-004233	

Documents

AR02414589
AR02423903
Calibration Report, Canberra Fastscan WBC #97-6317, dated 1/1/2014
Calibration Report, Canberra Fastscan WBC #97-6317, dated 2/6/2013
Calvert Cliffs 3P13 Periodic Assessment Report
Certificate for Sealed Radioactive Source No. EP-430
Certificate of Calibration, Depleted Uranium Slab Source #S-02898, dated 9/22/1994
Certificate of Calibration, Shepherd Model 89 Sources 4648GF and 84CS-141, dated 11/3/1986

Certificate of Conformance (Calibration), Radcal Electrometer/Ion Chamber Units, dated 9/19/2014
FTI-114A, Area Radiation Monitoring Drawer Calibration, 2RE7006, dated 1/20/2014
FTI-114B, Process Radiation Monitor Calibration, 0RE5420, dated 7/7/2014
ITEC-609A, Calibration of Eberline MS-2/GM Detector Counting System, dated 1/9/2012
ITEC-614, Attachment 1, Data Sheet (RM-14 7465), dated 7/1/2013
ITEC-619, Certification of J.L. Shepherd Calibrator Model 89, dated 10/14/2014
ITEC-620, Calibration of Eberline Scintillation Alpha Counter Model DAC-4, dated 8/7/2013
ITEC-639, Attachment 2, Data Sheet (Radeco H-809V1), dated 1/7/2014
ITEC-652, Attachment 1, Data Sheet (Radeco HD-29 Air Sampler), dated 1/17/2014
ITEC-658, Attachment 2, Particulate Radial Head Data Sheet, dated 12/19/2013
ITEC-664A, Calibration of Eberline Radiation Monitor Model E-600, dated 1/11/2013
ITEC-668, Attachment 1, Data Sheet (Argos-5AB), dated 2/19/2014
ITEC-668, Attachment 1, Data Sheet (DRM-2), dated 2/5/2013
ITEC-668, Attachment 1, Data Sheet (Radeye 478), dated 3/19/2014
ITEC-675, Attachment 1, Telepole Data Sheet, dated 2/8/2014
NOS Calvert Cliffs Site Status Report, updated 1/29/2014
Report of Audit RPP-13-01-C, Radiation Protection Program, dated 12/12/2013
Report of Test (NIST Calibration), Eberline PRS-2, dated 10/22/2014
RP-AA-700-1101, Calibration Data Sheet for RO-20 #610, dated 1/13/2015
STP-M-563-2, Containment High Range Radiation Monitor Source Check, 20110329-00047
STP-M-563-2, Containment High Range Radiation Monitor Source Check, 20130411-00006

Section 4OA1: Performance Indicators Verification

Procedures
CP-401, Nuclear Steam Supply System Sampling, Revision 00800
LS-AA-2090, Monthly Data Elements for NRC Reactor Coolant System (RCS) Specific Activity, Revision 4
STP-O-027-1, Reactor Coolant Leakage Evaluation, Revision 20

LIST OF ACRONYMS

10 CFR	Title 10 of the *Code of Federal Regulations*
AAC	Alternate Alternating Current
ALARA	As Low As Reasonably Achievable
AOP	abnormal operating procedure
ASME	American Society of Mechanical Engineers
CAP	corrective action program
CC	component cooling
CCHX	component cooling heat exchanger
CCNPP	Calvert Cliffs Nuclear Power Plant
DG	diesel generator
EAL	emergency action level
ECCS	emergency core cooling system
EDG	emergency diesel generator
EN	event notification
Exelon	Exelon Generation Company, LLC
HRA	high radiation area
HX	heat exchanger
ICDP	integrated core damage probability
IMC	Inspection Manual Chapter
IPTE	infrequently performed test or evolution
KV	kilovolt
LCO	limiting condition for operation
LOCA	loss of coolant accident
LOCI	loss of coolant incident
LOOP	loss of offsite power
NCV	non-cited violation
NRC	Nuclear Regulatory Commission
RAS	recirculation actuation signal
RCS	reactor coolant system
RMA	risk management actions
RP	radiation protection
RWP	radiation work permit
SAM	small article monitor
SDC	shutdown cooling
SIAS	safety injection actuation signal
SSC	structure, system, and component
SW	saltwater
TS	technical specifications
WO	work order
UFSAR	Updated Final Safety Analysis Report
UV	undervoltage
VHRA	very high radiation area