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

October 17, 2017

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

SUBJECT: OYSTER CREEK NUCLEAR GENERATING STATION – INTEGRATED INSPECTION REPORT 05000219/2017003

Dear Mr. Hanson:

On September 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Oyster Creek Nuclear Generating Station. On October 11, 2017, the NRC inspectors discussed the results of this inspection with Mr. Timothy Moore, Site Vice President and other members of your staff. The results of this inspection are documented in the enclosed report.

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

If you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555 0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC resident inspector at Oyster Creek Nuclear Generating Station.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U. S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I, and the NRC Resident Inspector at Oyster Creek Nuclear Generating Station.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at http://www.nrc.gov/reading-rm/adams.html and the NRC's Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* (CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Silas R. Kennedy, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Docket Nos. 50-219
License Nos. DPR-16

Enclosure:
Inspection Report 05000219/2017003
w/Attachment: Supplementary Information

cc w/encl: Distribution via ListServ

SUBJECT: OYSTER CREEK NUCLEAR GENERATING STATION – INTEGRATED INSPECTION REPORT 05000219/2017003 DATED OCTOBER 17, 2017

Distribution: (e-mail)
DDorman, RA (R1ORAMAIL)
DLew, DRA (R1ORAMAIL)
RLorson, DRP (R1DRPMAIL)
DPelton, DRP (R1DRPMAIL)
BWelling, DRS (R1DRSMAIL)
JYerokun, DRS
SKennedy, DRP
SShaffer, DRP
CSafouri, DRP
APatel, SRI
EAndrews, DRP, RI
KMcKenzie, DRP
JBowen, RI, OEDO
RidsNrrPMOysterCreek Resource
RidsNrrDorlLpl1 Resource
ROPreports Resource

DOCUMENT NAME: G:\DRP\BRANCH6\+++Oyster Creek\OC Inspection Reports 2017\OC Integrated Inspection Report 3Q2017 Final.docx ADAMS ACCESSION NUMBER: ML17291A425

☑ SUNSI Review		☑ Non-Sensitive ☐ Sensitive		☑ Publicly Available ☐ Non-Publicly Available	
OFFICE	RI/DRP	RI/DRP	RI/DRP		
NAME	KCarrington/via email	SShaffer/SS	SKennedy/SK		
DATE	10/17/2017	10/16/17	10/17/17		

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.	50-219
License No.	DPR-16
Report No.	05000219/2017003
Licensee:	Exelon Nuclear
Facility:	Oyster Creek Nuclear Generating Station
Location:	Forked River, New Jersey
Dates:	July 1, 2017 – September 30, 2017
Inspectors:	K. Carrington, Acting Senior Resident Inspector E. Andrews, Resident Inspector S. Elkhiamy, Reactor Inspector T. Fish, Senior Operations Engineer B. Fuller, Senior Operations Engineer T. Hedigan, Operations Engineer J. Kulp, Senior Reactor Inspector J. Lilliendahl, Senior Emergency Response Coordinator J. Schoppy, Senior Reactor Inspector S. Shaffer, Senior Project Engineer
Approved By:	Silas R. Kennedy, Chief Reactor Projects Branch 6 Division of Reactor Projects

Enclosure

TABLE OF CONTENTS

SUMMARY

Inspection Report 05000219/2017003; 07/01/2017 – 09/30/2017; Oyster Creek Nuclear Generating Station; Follow-Up of Events and Notices of Enforcement Discretion.

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

Cornerstone: Initiating Events

- Green. A self-revealing NCV of Technical Specification 6.8.1, "Procedures and Programs," was identified because Exelon did not adequately establish and maintain the augmented offgas (AOG) system operation procedure as required by NRC Regulatory Guide 1.33, "Quality Assurance Requirements (Operation)," Appendix A, Section 7, "Procedures for Control of Radioactivity." Specifically, Exelon procedure 350.1, "Augmented Offgas System Operation," did not include adequate guidance for placing the AOG system into a recycle or shutdown configuration following a system trip. Without this guidance, Operations personnel failed to ensure the correct configuration of the AOG system following a partial trip of the system which resulted in degraded main condenser vacuum and a subsequent manual reactor scram on July 3, 2017. This issue was entered into the corrective action program as issue report 4028402. The corrective actions included placing the AOG system in the correct configuration and revising the AOG system operation procedure to provide guidance for verifying proper alignment of the AOG system when the system is in recycle or shutdown.

  The inspectors determined the performance deficiency was more than minor because it was associated with the Initiating Events cornerstone attribute of Procedure Quality and affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the failure to establish an adequate procedure for verifying proper alignment of the AOG system following a full or partial trip of the system resulted in the AOG inlet valve being left in the open position, which allowed demineralized water to be siphoned from the flame arrestor tank and slowly fill the offgas hold-up pipe. This caused a degradation of main condenser vacuum and resulted in operators inserting a manual reactor scram on July 3, 2017. The inspectors evaluated the finding using IMC 0609, Attachment 4, "Initial Screening and Characterization of Findings," and IMC 0609, Appendix A, Exhibit 1, "Initiating Event Screening Questions." The inspectors determined the finding was a transient initiator that did not contribute to both the likelihood of a reactor trip and the loss of mitigation equipment relied upon to transition the plant from the onset of a trip to a stable shutdown condition, and therefore was of very low safety significance (Green). The finding had a cross-cutting aspect in the area of Human Performance, Avoid Complacency, because Exelon failed to recognize and plan for the possibility of mistakes or latent errors and implement appropriate error reduction tools by verifying the AOG system was properly aligned following a system trip; instead, Operations personnel relied upon using a procedure that did not contain adequate guidance to place the AOG system in the correct configuration following a system trip [H.12]. (Section 4OA3)

REPORT DETAILS

Summary of Plant Status

Oyster Creek began the inspection period at 100 percent power. On July 3, 2017, operators manually scrammed the reactor due to degrading vacuum in the main condenser; operators returned the unit to 100 percent power on July 6. On July 7, 2017, operators lowered power to 75 percent for a rod pattern adjustment and returned the unit to 100 percent power the same day. On July 26, 2017, operators lowered power to 79 percent to remove the No. 2 service water pump from service for emergent maintenance and returned the unit to 100 percent power the next day. On August 4, 2017, operators lowered power to 74 percent to maintain drywell temperature and thermal power within acceptable limits and returned the unit to 100 percent power the next day. On September 3, 2017, operators lowered power to 82 percent for a rod sequence exchange and returned the unit to 100 percent power the same day. On September 29, 2017, operators lowered power to 89 percent to restore the 'E' recirculation pump back to service following planned maintenance; the unit remained at approximately 90 percent at the end of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 2 samples)

.1 External Flooding

a. Inspection Scope

During the week of September 4, 2017, the inspectors performed an inspection of external flood protection measures for Oyster Creek Nuclear Generating Station. The inspectors reviewed technical specifications, procedures, design documents, and Updated Final Safety Analysis Report (UFSAR), Chapter 2.4.2, which depict design flood levels and areas containing safety-related equipment. The inspectors identified areas that had the potential to be affected by external flooding and conducted walkdowns of the emergency diesel generator building and intake area to ensure that Exelon erected flood protection measures in accordance with design specifications. The inspectors also reviewed operating procedures for mitigating external flooding during severe weather to confirm that, overall, Exelon had established adequate measures to protect against external flooding events. Documents reviewed for each section of this report are listed in the Attachment.

b. Findings

No findings were identified.

.2 Readiness for Impending Adverse Weather Conditions

a. Inspection Scope

The inspectors reviewed Exelon's preparations for an impending tropical storm from September 7-11, 2017. The inspectors reviewed the implementation of adverse weather preparation procedures before the onset of this adverse weather condition. The inspectors walked down the emergency diesel generators and emergency service water system to ensure system availability. The inspectors verified that operator actions defined in Exelon's adverse weather procedures maintained the readiness of essential systems. The inspectors discussed readiness and staff availability for adverse weather response with operations and work control personnel.

b. Findings

No findings were identified.

1R04 Equipment Alignment

.1 Partial System Walkdowns (71111.04 – 6 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- Reactor building closed cooling water system on August 2, 2017
- Standby gas treatment system on August 9, 2017
- Turbine building closed cooling water system on August 28, 2017
- Containment spray system II on September 7, 2017
- Core spray system I on September 7 – 8, 2017
- Control rod drive system on September 22, 2017

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 operating procedures, system diagrams, the UFSAR, technical specifications, work orders, issue reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted the systems' performance of intended safety functions. The inspectors also performed field walkdowns of accessible portions of the systems to verify the systems' 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 there were no deficiencies. The inspectors also reviewed whether Exelon staff had properly identified equipment issues and entered them into the corrective action program for resolution with the appropriate significance characterization.

b. Findings

No findings were identified.

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

a. Inspection Scope

On September 12 – 13, 2017, the inspectors performed a complete system walkdown of accessible portions of the emergency service water system to verify the existing equipment lineup was correct. The inspectors reviewed operating procedures, drawings, equipment line-up checklists, and the UFSAR to verify the system was aligned to perform its required safety functions. The inspectors also reviewed electrical power availability, and operability of support systems. The inspectors performed field walkdowns of accessible portions of the system to verify the as-built system configuration matched plant documentation, and that system components and support equipment remained operable. The inspectors confirmed that the system and its components were aligned correctly, free from interference from temporary services or isolation boundaries, environmentally qualified, and protected from external threats, where applicable. The inspectors also examined the material condition of the components for degradation and observed operating parameters of equipment to verify that there were no deficiencies. Additionally, the inspectors reviewed a sample of related issue reports and work orders to ensure Exelon appropriately evaluated and resolved any deficiencies.

b. Findings

No findings were identified.

1R05 Fire Protection

.1 Resident Inspector Quarterly Walkdowns (71111.05Q – 6 samples)

a. Inspection Scope

The inspectors conducted tours 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.

- Circulatory water intake area (CW-FA-14) on July 2, 2017
- Fire pump house (FW-FA-18) on July 20, 2017
- Reactor building (RB-FZ-1A), 119’ elevation, spent fuel pool area on August 1, 2017
- Reactor building (RB-FZ-1F), -19’ elevation, southeast corner room on August 1, 2017
- Reactor building (RB-FZ-1G), 51’ elevation on September 12, 2017
- Office building (OB-FZ-8C), 35’ elevation, ‘A’ and ‘B’ battery room on September 26, 2017

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06 – 2 samples)

.1 Internal Flooding Review

a. Inspection Scope

The inspectors reviewed the UFSAR, the site's internal flooding analysis, and Exelon procedures to identify those site areas susceptible to internal flooding. The inspectors' review focused on the northwest corner room and the 480 volt switchgear room. The inspectors verified the adequacy of equipment seals located below flood lines, floor and water penetration seals, watertight door seals, common drain lines and sumps, sump pumps, level alarms, control circuits, and temporary or removable flood barriers. The review also assessed the adequacy of operator actions identified as necessary to cope with flooding in each area and included a review of the corrective action program to determine if Exelon was identifying and correcting problems associated with the site's flood mitigation features and/or procedures for responding to internal flooding.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program and Licensed Operator Performance

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

a. Inspection Scope

The following inspection activities were performed using NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 10, and Inspection Procedure Attachment 71111.11, "Licensed Operator Requalification Program."

Examination Results

On July 14, 2017, the results of the annual operating tests were reviewed in the office to determine if pass/fail rates were consistent with the guidance in NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 10, and NRC IMC 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process." The review verified that the failure rate (individual or crew) did not exceed 20 percent.

- The overall individual operator failure rate was 2.0 percent.
- The overall crew failure rate was 0.0 percent.

Written Examination Quality

The inspectors reviewed one written examination administered during the 2017 examination cycle for qualitative and quantitative attributes as specified in Appendix B of Attachment 71111.11B, "Licensed Operator Requalification Program."

Operating Test Quality

Twelve job performance measures (JPMs) and six dynamic scenarios were reviewed for qualitative and quantitative attributes as specified in Appendix C of 71111.11B, "Licensed Operator Requalification Program."

Licensee Administration of Operating Tests

The dynamic simulator examinations and JPMs administered during the week of June 12, 2017 were observed. These observations included facility evaluations of two mixed shift and staff crews during two dynamic simulator examinations and individual performance of five JPMs.

Examination Security

The inspectors assessed Exelon staff's handling of examination material. The inspectors also checked JPMs, scenarios, and written examinations for excessive overlap of test items from week to week.

Conformance with Operator License Conditions

Medical records for ten license holders were reviewed to assess conformance with license conditions.

Proficiency watch-standing records were reviewed for the first and second quarters of 2017.

The reactivation plan for one license holder in 2017 was reviewed to assess the effectiveness of the reactivation process.

Simulator Performance

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

Problem Identification and Resolution

A review was conducted of recent operating history documentation found in inspection reports, Exelon's corrective action program, and the most recent NRC plant issues matrix. The inspectors also reviewed specific events from Exelon's corrective action program which indicated possible training deficiencies, to verify that they had been appropriately addressed. The NRC resident inspectors were also consulted for insights regarding licensed operators' performance.

b. Findings

No findings were identified.

.2 Quarterly Review of Licensed Operator Requalification Testing and Training (71111.11Q – 2 samples)

a. Inspection Scope

The inspectors observed licensed operator performance during an examination scenario in the Oyster Creek simulator on August 8, 2017. The inspectors evaluated operator performance during the simulated event and verified completion of risk-significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy of the emergency classification made by the shift manager and the technical specification action statements entered by the shift supervisor. 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.

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

a. Inspection Scope

The inspectors observed licensed operator performance during plant startup activities from a forced maintenance outage (1F41) on July 3, 2017. The inspectors observed infrequently performed test or evolution briefings, pre-shift briefings, reactivity control briefings, and alarm responses. Additionally, the inspectors observed test performance to verify that procedure use, crew communications, and coordination of activities between work groups met established expectations and standards.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 3 samples)

a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on structure, system, and component (SSC) performance and reliability. The inspectors reviewed system health reports, corrective action program documents, maintenance work orders, and maintenance rule basis documents to ensure Exelon was identifying and properly evaluating performance problems within the scope of the maintenance rule. For each sample selected, the inspectors verified the SSC was properly scoped into the maintenance rule in accordance with Title 10 of the *Code of Federal Regulations* (CFR) 50.65 and verified that the (a)(2) performance criteria established by Exelon staff was reasonable. As applicable, for SSCs classified as (a)(1), the inspectors assessed the adequacy of goals and corrective actions to return the SSCs to (a)(2).

Additionally, the inspectors ensured that Exelon staff was identifying and addressing common cause failures that occurred within and across maintenance rule system boundaries.

- Fire protection system on July 13, 2017
- 34.5 kilovolt system on July 19, 2017
- Emergency service water system on August 24, 2017

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 5 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 out of service 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 station personnel to verify plant conditions were consistent with the risk assessment. The inspectors also reviewed the technical specification requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

- Unplanned (emergent) service water pipe leak repair during week of July 17, 2017
- Unplanned (emergent) No. 2 service water pump replacement due to increased vibrations during weeks of July 24 and July 31, 2017
- Unplanned station risk change to yellow due to severe thunderstorm warning on July 26, 2017
- Unplanned (emergent) condensate transfer system temporary steam leak repair during week of August 24, 2017
- Planned station risk change to yellow due to core spray system I maintenance during week of September 5, 2017

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 3 samples)

a. Inspection Scope

The inspectors reviewed operability determinations for the following degraded or non-conforming conditions based on the risk significance of the associated components and systems:

- Missing and undertorqued bolts on No. 2 emergency diesel generator exhaust manifold flange on August 23, 2017
- Momentary undervoltage condition on 'C' 125 volts direct current (VDC) bus on September 8, 2017
- Failure vulnerability and technical evaluation of Anchor Darling double-disc gate valves in isolation condenser system on September 27, 2017

The inspectors evaluated the technical adequacy of the operability determinations to assess whether technical specification 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 technical specifications and UFSAR to Exelon's evaluations to determine whether the components or systems were operable. The inspectors confirmed, where appropriate, compliance with bounding limitations associated with the evaluations. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled by Exelon.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 1 sample)

.1 Permanent Modifications

a. Inspection Scope

The inspectors evaluated a modification to the emergency service water system that was implemented by engineering change request OC 01-00621, "Crosstie ESW to Service Water to Allow Repairs." The inspectors verified that the design bases, licensing bases, and performance capability of the affected systems were not degraded by the modification. In addition, the inspectors reviewed modification documents associated with the design change, including plant drawings, to ensure they were updated and accurately reflected the design changes made in the field. The inspectors also reviewed revisions to the control room alarm response procedure and interviewed engineering and operations personnel to ensure the procedure could be reasonably performed and that the modification did not affect the design of the emergency service water system.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 1 sample)

a. Inspection Scope

The inspectors reviewed the post-maintenance test for the replacement of hydraulic control unit 30-11 hydraulic accumulator on September 3, 2017, to verify that procedures and test activities adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure were consistent with the information in the applicable licensing basis and/or design basis documents, and that the test results were properly reviewed and accepted and problems were appropriately documented. The inspectors also walked down the affected job site, observed the pre-job brief and post-job critique, where possible, confirmed worksite cleanliness was maintained, and witnessed the test and reviewed test data to verify the results adequately demonstrated restoration of the affected safety functions.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 6 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 technical specifications, the UFSAR, and Exelon procedure requirements. The inspectors verified that test acceptance criteria were clear, tests demonstrated operational readiness and were consistent with design documentation, test instrumentation had current calibrations and the range and accuracy for the application(s), tests were performed as written, and applicable test prerequisites were satisfied.

Upon test completion, the inspectors considered whether test results supported that the equipment was capable of performing the required safety function(s). The inspectors reviewed the following surveillance tests:

- 636.4.003, No. 1 emergency diesel generator load test on July 24, 2017
- 602.3.004, Test and calibration of ‘A’, ‘B’, ‘C’, ‘D’, and ‘E’ electromatic relief valve (EMRV) pressure sensors on July 26, 2017
- 609.03.013, Test and calibration of ‘B’ isolation condenser pipe break sensors on August 3, 2017
- 607.4.017, Containment spray and emergency service water system II operability and quarterly in-service test (IST)
- 603.4.001, Recirculation pumps trip circuitry test
- 610.3.115, ‘A’ isolation condenser valve operability (IST)

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151 – 2 samples)

.1 Reactor Coolant System Specific Activity and Reactor Coolant System Leak Rate

a. Inspection Scope

The inspectors reviewed Exelon's submittal for the reactor coolant system specific activity and reactor coolant system leak rate performance indicators for Unit 1, for the period of July 1, 2016, through June 30, 2017. 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. In addition, the inspectors reviewed reactor coolant system sample analyses and control room logs of daily calculations and/or measurements of reactor coolant system leakage, and compared that information to the data reported for the performance indicator. The inspectors also reviewed Exelon's operator narrative logs, event reports, issue reports, and NRC Integrated inspection reports to validate the accuracy of the submittals.

b. Findings

No findings were identified.

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

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

As required by Inspection Procedure 71152, "Problem Identification and Resolution," the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify Exelon entered issues into the corrective action program 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 corrective action program and periodically attended condition report screening meetings. The inspectors also confirmed, on a sampling basis, that, as applicable, for identified defects and non-conformances, Exelon performed an evaluation in accordance with 10 CFR 21.

b. Findings

No findings were identified.

.2 Annual Sample: Emergency Diesel Generator Reliability Improvement Program and System Preventive Maintenance Template Reviews

a. Inspection Scope

The inspectors performed an in-depth review of Exelon's emergency diesel generator reliability improvement program, issue report 2610027. Specifically, the inspectors reviewed the corrective actions generated for the issue report which included: determination of the critical engine standby and operating parameters, preventive maintenance improvements for enhanced inspection of elastomeric hoses, implementation of a case study to enhance station personnel knowledge of the emergency diesel generator, and preventative maintenance program system template reviews.

The inspectors reviewed the emergency diesel generator preventative maintenance templates against fleet templates and vendor recommendations. The inspectors also ensured the extent of cause for issue report 269774, which included preventative maintenance template reviews of the main power output and start-up transformers, refuel bridge, and small diesel engine, had been completed. The inspectors interviewed the system engineer and performed a walkdown of both emergency diesel generators.

b. Findings and Observations

No findings were identified.

The inspectors' evaluation of Exelon's reliability improvement program determined that the program was in-depth and detailed. The program was multifaceted and included all components required for proper emergency diesel generator operation, including starter batteries, generator, turbo chargers, and control cabinets. Although a few items from the improvement program have not been implemented yet, the inspectors verified that these items were planned and scheduled for the upcoming emergency diesel generator No. 2 maintenance outage. The inspectors noted that the emergency diesel generator No. 2 coupling replacements will be performed under work order 4629640 and the emergency diesel generator No. 2 fuse replacements will be performed under work order 4603699. The inspectors did a detailed review of the emergency diesel generator preventative maintenance templates versus the fleet template and/or vendor requirements. All discrepancies were either conservative or determined to be not applicable to the emergency diesel generators at Oyster Creek. Material condition of both emergency diesel generators was determined to be good during inspector walkdowns.

.3 Annual Sample: Electromatic Relief Valve Low Margin NCV Follow-up

a. Inspection Scope

The inspectors performed an in-depth review of Exelon's evaluation and corrective actions to address an error in a voltage drop calculation for the EMRVs. Specifically, a non-conservative drywell temperature was used in the voltage drop calculation for the EMRVs (C-1302-735-E320-038, "Voltage Drop After Modification to 125 VDC Operated EMRV High Pressure Relief Function"). Exelon revised the EMRV voltage drop calculation to show that sufficient voltage margin exists with the correct drywell temperature. The inspectors reviewed issue reports, the revised calculation, plant drawings, and supporting calculations to evaluate the identification, evaluation, and corrective actions taken to address the calculation error.

In addition to the review of these documents, the inspectors interviewed the responsible system engineer to determine whether the scope of the corrective actions addressed all identified deficiencies. The inspectors also walked down accessible portions of the 125 volts direct current (VDC) system to verify that the calculation was consistent with the plant design.

The inspectors assessed Exelon's evaluation, completed corrective actions, and the prioritization and timeliness of actions to evaluate whether the actions taken by Exelon were appropriate. The inspectors evaluated whether the corrective actions or revising the calculation addressed the identified issues. The inspectors also evaluated whether the 125 VDC battery testing demonstrated that the batteries are capable of providing the required voltage and current as assumed in the calculations.

b. Findings and Observations

No findings were identified.

The inspectors determined that Exelon's evaluations were thorough and the causes were appropriately identified. The inspectors also determined that the corrective actions were reasonable, addressed the deficiencies, and corrected the identified issues.

However, the inspectors' review did identify two examples of errors in the voltage drop calculation that were not previously identified. There were several examples where currents from the batteries to the battery buses were different than the calculated worst-case currents in C-1302-735-E320-049, "Oyster Creek 'B' and 'C' Station Battery Sizing Calculation." All of the incorrect currents were found to be higher than the worst-case maximum current which is conservative. The second example was Exelon incorrectly stated that there is one conductor from the positive side of the battery and one conductor from the negative side of the battery. Based on plant drawings and a walkdown of the batteries, the inspectors determined that there are two conductors from both the positive and negative sides. Having more conductors lowers the voltage drop, so this error was conservative. Issue report 4040967 was written to document these errors. These examples were determined to be of minor significance in accordance with IMC 0612 because they were both conservative, which resulted in more voltage drop margin.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153 – 6 samples)

.1 Plant Events

a. Inspection Scope

On July 3, 2017, the inspectors responded to a manual scram due to degrading main condenser vacuum. The inspectors reviewed and observed plant parameters, reviewed personnel performance, and evaluated performance of mitigating systems. The inspectors communicated the plant events to appropriate regional personnel, and compared the event details with criteria contained in IMC 0309, "Reactive Inspection Decision Basis for Reactors," for consideration of potential reactive inspection activities. As applicable, the inspectors verified that Exelon made appropriate emergency classification assessments and properly reported the event in accordance with 10 CFR 50.72 and 50.73. The inspectors reviewed Exelon's follow-up actions related to the events to assure that Exelon implemented appropriate corrective actions commensurate with their safety significance.

b. Findings

Introduction. A self-revealing Green NCV of Technical Specification 6.8.1, "Procedures and Programs," was identified because Exelon did not adequately establish and maintain the AOG system operation procedure as required by NRC Regulatory Guide 1.33, Appendix A, Section 7, "Procedures for Control of Radioactivity." Specifically, Exelon procedure 350.1, "AugmentedOffgas System Operation," did not include adequate guidance for placing the AOG system into recycle following a trip of the system. Without this guidance, operations personnel failed to ensure the correct configuration of the AOG system following a system trip which resulted in degraded main condenser vacuum and a subsequent manual reactor scram on July 3, 2017.

Description. The air ejector and main offgas system aids in maintaining main condenser vacuum by removing noncondensable gases from the main condenser and discharging the gases to the stack through a delay (hold-up pipe) line and filter which are designed to reduce radiation levels of the gases. In addition, the AOG system functions to reduce radioactive releases to the environment to within the levels required by 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." In general, the AOG system is in operation whenever the main condenser air ejectors are in service, except during start-up or shutdown with reactor power less than 40 percent.

On July 2, 2017, an offsite grid disturbance resulted in a partial trip of Oyster Creek's AOG system. In response to the system trip, the control room dispatched an operator to the AOG building to place the AOG system on recycle. Placing the AOG system on recycle following a trip of the system requires closure of the AOG inlet valve (OG-HV-116) to preclude backflow of off gases from the AOG system into the main offgas system. However, Procedure 350.1, "Augmented Offgas System Operation," did not include adequate guidance for placing the AOG system on recycle following a partial trip of the system. Specifically, Section 5, "Placing Recombiner on Recycle," assumed the AOG system was isolated from the main offgas system meaning OG-HV-116 was closed in accordance with the valve lineup instructions contained in Section 7, "Removing AOG from Service." Although Section 7 contained a step to close OG-HV-116, the prerequisite for performing the step was that the AOG system be in service. Since the AOG system was not in service, the operator did not enter Section 7.

During a normal trip of the AOG system, the AOG inlet valve closes automatically. Based on AOG system alarms and parameters, the operator assumed the system tripped satisfactorily, OG-HV-116 closed, and the system was on recycle or isolated from the main offgas system. However, when the AOG system trip occurred, OG-HV-116 failed to close. Because the operator never entered Section 7 of the procedure, the position of the valve was never verified and the valve was left in the open position.

Since the AOG inlet valve was open, water was allowed to continuously flow backwards out of the flame arrestor tank into the offgas hold-up pipe. The steam jet air ejector pump worked against the line filling with water, which caused a slowly degrading main condenser vacuum trend. On July 3, 2017, operators noted the degrading main condenser trend and entered ABN-14, "Loss of Condenser Vacuum." Per ABN-14, operators conducted a rapid downpower in an attempt to improve main condenser vacuum conditions. Unable to improve main condenser vacuum conditions, operators inserted a manual scram per procedure. At the time of the manual scram, the plant was at approximately 40 percent power.

Exelon completed a root cause evaluation under issue report 4028402 and determined that operations personnel had not reinforced the use of error reduction tools in HU-AA-101, "Human Performance Tools and Verification Practices." Specifically, operations personnel failed to utilize error reduction tools by verifying the AOG system was in the correct lineup after an incorrect determination was made that the AOG system was already on recycle and therefore failed to complete steps in the AOG system operating procedure to isolate AOG from the main offgas system.

Analysis. The failure to establish and maintain the AOG system operation procedure to ensure the AOG system was in the correct configuration following a trip of the system in accordance with Technical Specification 6.8.1 is a performance deficiency that was within Exelon's ability to foresee and correct. This performance deficiency was determined to be more than minor because it is associated with the Initiating Events cornerstone attribute of Procedure Quality and affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown and power operation. Specifically, the failure to establish adequate guidance for placing the AOG system into a shutdown configuration following a trip of the system resulted in the AOG inlet valve being left in the incorrect position (OPEN), which allowed demineralized water to be siphoned from the flame arrestor tank and slowly fill the offgas hold-up pipe. This caused a degradation of main condenser vacuum, and resulted in operators inserting a manual scram on July 3, 2017.

The inspectors evaluated the finding using IMC 0609, Attachment 4, "Initial Screening and Characterization of Findings," and IMC 0609, Appendix A, Exhibit 1, "Initiating Event Screening Questions." The inspectors determined that this finding is a transient initiator that did not contribute to the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. Therefore, the inspectors determined the finding to be of very low safety significance (Green).

The finding has a cross-cutting aspect in the area of Human Performance, Avoid Complacency because plant operators failed to recognize and plan for the possibility of mistakes, latent issues, and inherent risk, while expecting successful outcomes and implement appropriate error reduction tools accordingly. Specifically, operators failed to implement error reduction tools by verifying the AOG system was in the correct lineup, when the AOG system operation procedure did not provide adequate guidance for placing the AOG system into a shutdown or recycle configuration following a partial trip of the system [H.12].

Enforcement. Technical Specification 6.8.1, "Procedures and Programs," requires, in part, that written procedures be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, "Quality Assurance Requirements (Operation)," Revision 2 as referenced in NO-AA-10, "Quality Assurance Topical Report. Regulatory Guide 1.33, Appendix A, requires establishing, implementing, and maintaining procedures for the control of radioactivity, including offgas treatment. Exelon Procedure 350.1, "Augmented Offgas System Operation," Revision 99 was established as the implementing procedure for controlling augmented offgas system operations.

Contrary to the above, prior to and on July 2, 2017, Exelon did not adequately establish and maintain the AOG system operation procedure. Specifically, Exelon procedure, 350.1, "Augmented Offgas System Operation," Revision 99 did not include adequate guidance for placing the AOG system into a shutdown configuration following a trip of the system. This resulted in a degraded main condenser vacuum and subsequent manual reactor scram on July 3.

This issue was entered into the corrective action program as issue report 4028402. Exelon's immediate corrective actions included putting the AOG system in the correct configuration and revising the AOG system operation procedure to provide guidance for verifying the proper alignment of the AOG system when the system is in recycle or shutdown. Because the violation was of very low safety significance (Green) and was entered into the corrective action program, this violation is being treated as an NCV, consistent with Section 2.3.2.a of the NRC Enforcement Policy. **(NCV 05000219/2017003-01, Inadequate Augmented Offgas System Procedure Resulted in a Manual Reactor Scram)**

.2 (Closed) Licensee Event Report (LER) 05000219/2016-001-00: Failure of the No. 1 Emergency Diesel Generator during Surveillance Testing due to a Cooling Water System Leak

On January 4, 2016, the No. 1 emergency diesel generator was operated for its bi-weekly load surveillance test when alarms "EDG 1 LOW COOLANT PRESSURE" and "EDG 1 DISABLE" were received. Following automatic shutdown of the emergency diesel generator unit, Exelon staff discovered that the flexible coupling hose had ruptured, which allowed engine coolant to escape through the ruptured hose. This resulted in low cooling water pressure and the actuation of the engine shutdown protective features and alarms.

Exelon's root cause evaluation 2610027, determined "the site implementation of Exelon's Electro-Motive Division Diesel Generator performance-centered maintenance template did not include performing the preventive maintenance for the Miscellaneous – Non-metallic flexible hose replacement at the 12-year frequency template line item while performing the corrective action to preclude recurrence captured under Root Cause corrective action program O2004-1184 – "Loose EDG-1 Pillow Block Fan Shaft Bearing."

The initial enforcement of this issue was dispositioned as AV [apparent violation] 05000219/2016001-03, "Inadequate Instructions for the Flexible Coupling Hose Preventative Maintenance Resulting in an Inoperable Emergency Diesel Generator" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16132A436). The NRC performed a supplemental inspection of this issue which is documented in NRC Inspection Report 05000219/2016011 (ADAMS Accession No. ML16228A053).

The inspectors performed a review of this LER. The inspectors did not identify any new issues during the review. This LER is closed.

.3 (Closed) LER 05000219/2016-001-01: Failure of the No. 1 Emergency Diesel Generator during Surveillance Testing due to a Cooling Water System Leak

This LER was a supplement to LER 05000219/2016-001-00. The inspectors performed a review of this LER supplement. The inspectors did not identify any new issues during the review. This LER is closed.

.4 (Closed) LER 05000219/2016-002-01: Control Rod Drive Cooling Water System Isolation Scram Time Testing was not Performed

On March 16, 2016, the NRC inspectors identified that scram time testing had not been performed following the isolation of cooling water flow to control rods 18-47 and 42-27. The isolation of cooling water flow to a control rod can impact scram times. Technical Specification 4.2.C.2 states, in part, "specifically affected individual control rods following maintenance on or modification to the control rod or control rod drive system which could affect the scram insertion time of those specific control rods shall be scram time tested." Since the testing was not performed, Technical Specification 4.0.1 was applicable as a surveillance requirement that was not met. In accordance with Technical Specification 4.0.1, if the surveillance requirement was not met, this would require entry into the appropriate limiting condition for operation for Technical Specification 3.2.B.4, which would have required the control rods be declared inoperable, fully inserted, and isolated. Additionally, Technical Specifications 3.2.A.2 and 3.2.A.3 would also be applicable which required a determination that adequate shutdown margin would be maintained within six hours of declaring the control rods inoperable. Since these technical specifications actions were not completed, this resulted in an operation or condition that was prohibited by the technical specifications.

The cause of the event was determined to be a lack of procedural guidance to perform control rod drive scram time testing when cooling water is isolated to a control rod drive mechanism, as required by technical specification for any system modification that could impact scram times. Exelon revised operating procedures to require performance of scram time testing when cooling water is isolated to a control rod drive mechanism.

This LER was revised to include information on the cause and subsequent corrective actions from the event. The enforcement aspects of this issue are discussed in NRC Inspection Reports 05000219/2016001 and 05000219/2016009 (ADAMS Accession No. ML16132A436), Section 1R15. The inspectors did not identify any violations or new issues during the review of Revision 1 of the LER. This LER is closed.

.5 (Closed) LER 05000219/2017-002-00: Manual Scram due to Degraded Main Condenser Vacuum

On July 2, 2017, an offsite grid disturbance resulted in a partial trip of Oyster Creek's AOG system. In response to the system trip, the control room dispatched an operator to the AOG building to place the AOG system on recycle. On July 3, 2017, control room operators noted a degrading main condenser vacuum trend. Unable to improve main condenser vacuum conditions, control room operators initiated a manual scram of the reactor to place the plant in a safe condition. Following the manual scram, all systems operated as expected. Troubleshooting following the manual scram determined that the AOG system was in the incorrect configuration, which resulted in the degraded condenser vacuum.

Exelon performed a root cause analysis on the event and determined that operations personnel had not reinforced the use of human performance error reduction tools when it was incorrectly determined that the AOG system was on recycle and failed to complete steps in the AOG system operating procedure to isolate AOG from the offgas system. The enforcement aspects of this issue are discussed in Section 4OA3.1. The inspectors did not identify any new issues during the review of this LER. This LER is closed.

.6 (Closed) LER 05000219/2017-003-00: Automatic Scram while Subcritical due to Low Reactor Level

On July 3, 2017, after the plant was shutdown following a manual reactor scram, the plant experienced an automatic scram due to low reactor pressure vessel water level. Prior to the event, the main control room operators established reactor water letdown, reset the manual scram, and were placing the reactor pressure vessel water level control system in automatic using a low flow feedwater regulator valve. Reactor pressure control was automatically being maintained with turbine bypass valves. A low reactor water level occurred when a bypass valve opened as expected to lower reactor pressure. The expected transient resulted in an automatic scram due to the reactor pressure level dropping below the scram setpoint. Following the automatic scram actuation, all systems responded as expected.

Exelon determined that operations personnel reset the scram signal without fully evaluating other plant conditions or communicating their intended actions with the control room. The reactor was subcritical with all rods inserted at the time the automatic scram initiation signal occurred, therefore this issue is considered minor per IMC 0612. The inspectors did not identify any new issues during the review of this LER. This LER is closed.

4OA5 Other Activities

.1 Inspection Procedure 92702, "Follow-up on Traditional Enforcement Actions Including Violations, Deviations, Confirmatory Action Letters, Confirmatory Orders, and Alternate Dispute Resolution Confirmatory Orders"

a. Inspection Scope

During the week of July 10, 2017, inspectors performed an onsite review of Exelon's records related to corrective actions taken in response to a Severity Level IV NCV- Use of An Analytical Method to Determine the Core Operating Limits without Prior NRC Approval (NCV 05000219/2015008-01). The violation of Technical Specification 6.9.1.f.2 involved using an analytical method (TRACG04P) to determine core operating limits, since that particular method was not previously reviewed and approved by the NRC. The NCV is discussed in NRC Inspection Report 05000219/2015008 (ADAMS Accession No. ML15147A398). The objectives of the inspection were to ensure Exelon implemented adequate corrective actions for the Severity Level IV NCV, identified apparent causes, addressed generic implications, and appropriately enhanced their programs and practices to prevent recurrence.

The inspectors compared the actions taken to the requirements of Exelon's operating and administrative procedures, corrective action program, 10 CFR 50, Appendix B, technical specifications, and the Maintenance Rule. The inspectors reviewed corrective action issue reports, procedures, and relevant references. The inspectors also interviewed management and staff personnel who participated in the evaluation and implementation of corrective actions for the violation. The inspection criteria used included the inspection guidance contained in Inspection Procedure 92702 and the performance attributes listed in Table 1 of Inspection Procedure 71152.

b. Findings and Observations

No findings were identified.

Exelon initiated issue report 2482042 to evaluate the associated condition adverse to quality within their corrective action program. Exelon subsequently performed apparent cause evaluation 2537659, extent of condition reviews which revealed that the condition existed at several other plants in the Exelon fleet, and implemented corrective actions. Corrective actions included making revisions to multiple procedures, clarifying changes to UFSAR methods versus technical specifications, strengthening reload design communication, and providing training to individuals performing the analysis. Inspectors verified that the NRC subsequently reviewed and approved TRACG04P on October 24, 2014, and therefore, inspectors concluded that there were no concerns regarding safe operation of the unit.

The inspectors determined that Exelon's associated apparent cause evaluations were sufficiently thorough and were based on the best available information, sound judgment, and relevant operating experience. In general, Exelon's assigned corrective actions were aligned with the identified causal factors, adequately tracked, appropriately documented, and completed as scheduled. Based on a review of issue reports and corrective actions, review of casual evaluation products, and interviews with site personnel, the inspectors concluded that Exelon took appropriate corrective actions for the identified violation of Technical Specification 6.9.1.f.2.

4OA6 Meetings, Including Exit

On October 11, 2017, the inspectors presented the inspection results to Mr. Timothy Moore, Site Vice President, and other members of the Oyster Creek 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
T. Moore, Site Vice President
M. Gillin, Plant Manager
M. Arnao, Director, Maintenance
M. Chanda, Manager, Emergency Preparedness
J. Clark, Manager, Environmental/Chemistry
L. Dorman, System Engineer
R. Dutes, Regulatory Assurance Specialist
G. Flesher, Regulatory Assurance Manager
J. Gessner, Exam Author
M. Heck, System and Design Engineer
F. Jordan, Reactor Engineering Manager
T. Keenan, Manager, Site Security
A. Krukowski, Shift Operations Superintendent
B. Nguyen, Reactor Operator
H. Ray, Senior Manager, Design Engineering
J. Renda, Director, Work Management
C. Ricketts, System Engineer
M. Rossi, Licensed Operator Requalification Training Lead
R. Sales, Senior Reactor Operator
J. Stanley, Director, Engineering
C. Symonds, Director, Training
J. Weissinger, Director, Operations
K. Wolf, Manager, Radiation Protection

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATED

Opened/Closed

05000219/2017003-01	NCV	Inadequate Augmented Offgas System Procedure Resulted in a Manual Scram (Section 4OA3)

Closed

05000219/2016-001-00	LER	Failure of the No. 1 Emergency Diesel Generator during Surveillance Testing due to a Cooling Water System Leak (Section 4OA3)
05000219/2016-001-01	LER	Failure of the No. 1 Emergency Diesel Generator during Surveillance Testing due to a Cooling Water System Leak (Section 4OA3)
05000219/2016-002-01	LER	Control Rod Drive Cooling Water System Isolation Scram Time Testing was not Performed (Section 4OA3)
05000219/2017-002-00	LER	Manual Scram due to Degraded Main Condenser Vacuum (Section 4OA3)

05000219/2017-003-00	LER	Automatic Scram while Subcritical due to Low Reactor Level (Section 4OA3)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures
341, Emergency Diesel Generator Operation, Revision 116
ABN-31, High Winds, Revision 20
ABN-32, Abnormal Intake Level, Revision 28
ABN-36, Loss of Offsite Power & Station Blackout (Plant Control), Revision 31
ABN-60, Grid Emergency, Revision 19
OP-AA-108-111-1001, Severe Weather and Natural Disaster Guidelines, Revision 16
OP-OC-108-109-1001, Severe Weather Preparation T&RM for Oyster Creek, Revision 38
SY-AA-101-146, Severe Weather Preparation and Response, Revision 2

Issue reports
4050110 4050180

Section 1R04: Equipment Alignment

Procedures
308, Emergency Core Cooling System Operation, Revision 98
309.2, Reactor Building Closed Cooling Water System, Revision 98
309.1, Turbine Building Closed Cooling Water System, Revision 58
310, Containment Spray System Operation, Revision 114
302.1, Control Rod Drive System, Revision 117

Issue reports
3968592 4019732 4040603

Drawings
BR 2006, Reactor Building Closed Cooling Water System Flow Diagram, Sheet 1, Revision 81
BR 2006, Reactor Building Closed Cooling Water System Flow Diagram, Sheet 3, Revision 58
BR 2005, Reactor & Turbine Building Service Water System Flow Diagram, Sheet 2, Revision 109
BR 2006, Turbine Building Closed Cooling Water System Flow Diagram, Sheet 4, Revision 65
BR 2006, Turbine Building Closed Cooling Water System Flow Diagram, Sheet 5, Revision 59
GU 3E-821-21-1000, Standby Gas Treatment System Flow Diagram, Sheet 1, Revision 11
GE 148F740, Containment Spray System Flow Diagram, Sheet 1, Revision 44
GE 885D781, Core Spray System Flow Diagram, Sheet 1, Revision 76
GE 237E487, Control Rod Drive System Flow Diagram, Sheet 1, Revision 70

Miscellaneous
680.4.007, Safety Related Equipment Verification, performed September 7, 2017
SDBD-OC-212-A, System Design Basis Document for Low Pressure Core Spray System, Revision 3
SDBD-OC-822, Design Basis Doc for Standby Gas Treatment System/Containment Spray, Revision 2

Section 1R05: Fire Protection

Procedures
OP-OC-201-008-1034, Intake Structure, Revision 1
OP-OC-201-008-1038, Fire Water House (Pond Area), Revision 1
OP-OC-201-008-1001, Reactor Building (119' Elevation), Revision 1
OP-OC-201-008-1008, Reactor Building (-19' Elevation) Southeast Corner Room, Revision 0
ER-AA-600-1069, High Risk Fire Area Identification, Revision 4
OP-AA-201-012-1001, Operations On-line Fire Risk Management, Revision 1
OP-OC-201-012-1001, On-line Fire Risk Management, Revision 4
101.2, Oyster Creek Site Fire Protection Program, Revision 73

Issue reports
4047469

Drawings
GU 3D-911-02-015, Fire Area Layout Reac. Bldg. Plan Floor Elevation 33'5", 38'0" & 51'-3", Revision 9

Miscellaneous
990-1745, Fire Hazards Analysis Report, Revision 18

Section 1R06: Flood Protection Measures

Procedures
101.2, Oyster Creek Site Fire Protection Program, Revision 73
RAP-RB1C(1-7), 1-7 Sump Reactor Bldg Flr Drain Sump High Level, Revision 3
RAP-ER 616-041, Torus Room Doors Open, Revision 1
338, 480 Volt Electrical System, Revision 61

Issue reports
4047239 0813797

Drawings
BR 2005, Emergency Service Water System Flow Diagram, Sheet 4, Revision 88
BR 2151, Containment Spray & Emergency Service Water Piping Plans, Sections, & Details Reactor Building, Sheet 1, Revision 8

Miscellaneous
OC-PSA-012, Internal Flood Evaluation Summary Notebook, dated May 2014
OC-PSA-022, Internal Flood Walkdown Notebook, dated May 2014
Design and Licensing Bases for Flooding at OCGS, dated August 29, 2007
Design Basis Document for Emergency Service Water, dated May 9, 2005
Oyster Creek Probabilistic Risk Assessment (Level 1), dated November 1991

Section 1R11: Licensed Operator Requalification Program

Procedures
201, Plant Startup, Revision 106
TQ-AA-150, Operator Training Programs, Revision 14
TQ-AA-155, Conduct of Simulator Training and Evaluation, Revision 6
TQ-AA-201, Examination Security and Administration, Revision 17
TQ-AA-306, Simulator Management, Revision 8

Job Performance Measures
JPM 345.30 State/Local Notification Form Initiation
JPM 200.02 Determine Torus Water Level During Accident Conditions
JPM 259.11 Place Feedwater Controller in Auto
JPM 207.15 FLEX Makeup to Isolation Condensers
JPM 211.03 Liquid Poison Injection for RPV Water Level Control
JPM 202.10 Recirculation Pump Trip Circuitry Test with Multiple Pump Trips
JPM 204.13 Start Second RWCU Pump with HELB
JPM 279.01 Lineup Firewater to the 1-1 Air Compressor
JPM 345.20 State/Local Notification Form Review
JPM 345.10A Classify an Emergency or Abnormal Event
JPM 275.15 Backwash Main Condenser, Loss of Vacuum
JPM 202.20 Local Manual Control of Scoop Tube

Simulator Scenarios
Scenario Guide 2010-87, Revision 0
Scenario Guide 2010-88, Revision 0
Scenario Guide 2010-93, Revision 0
Scenario Guide 2010-94, Revision 0
Scenario Guide 2010-95, Revision 0
Scenario Guide 2010-96, Revision 0
Scenario Guide 2010-96, Revision 1

Biennial Written Exams
OC 2017 RO A OC 2017 SRO A

Simulator Testing
SBT Packages for Scenario Guides 2010-87, 2010-88, 2010-89, 2010-90, 2010-91, 2010-92, 2010-93, 2010-94, 2010-95, 2010-96

Section 1R12: Maintenance Effectiveness

Procedures
ER-AA-310, Implementation of the Maintenance Rule, Revision 10
ER-AA-1001, Maintenance Rule – Scoping, Revision 4
ER-AA-310-1004, Maintenance Rule – Performance Monitoring, Revision 13
ER-AA-310-1005, Maintenance Rule – Dispositioning Between (a)(1) and (a)(2), Revision 7
645.4.001, Fire Pump #1 Operability Test, Revision 74
645.4.018, Fire Pump Monitoring Test, Revision 69
645.4.036, Fire Pump #2 Operability Test, Revision 27
ABN-22, AOG Building Trip Loss of Power, Revision 10
ABN-52, Loss of USS 1E1, Revision 8
ABN-56, Loss of the J69361 North Yard Distribution System, Revision 6
310, Containment Spray System Operation, Revision 114

2400-SMM-3531.01, ESW Pump and Motor Maintenance, Revision 14

Issue reports

2700913	2702822	2733239	2547023	2548275	2598562
2600835	2634749	2655776	2676669	4001379	4019693
4027636	3950405	3949575	4030209	4032126	2690863
2616081	4030747	4040978	2581224	2581421	2613871
2616062	2616067	2616073	2616078	2616080	2616081
2616259	2629008	2629694	2670567	2690863	2696347
2699108	2700626	2729136	4003597	4030747	4030010
4030075	4030094	4030892	2538914	2539220	2539883
2545202	2546989	2622390	2656410	2658157	2658183
2663438	2695253	2696098	2719449	2719450	4012656
4036489					

Drawings
GU-3E-811-A2-1000, ISI Configuration Drawing Fire Protection System, Sheet 2, Revision 2
JC 19479, Fire Protection Water System Flow Diagram, Sheet 3, Revision 69

Maintenance Orders/Work Orders
4345322

Miscellaneous
Oyster Creek Maintenance Rule Database, updated June 30, 2017
Oyster Creek Maintenance Rule Database, updated July 31, 2017

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Issue reports

4036010	4036279	4040399	1560508	4048967	4049050
4049507	4042862				

Procedures
ABN-18, Service Water Failure Response, Revision 17
ABN-19, RBCCW Failure Response, Revision 10
OP-OC-108-117-1000, Oyster Creek Protected Equipment Program, Revision 12
WC-AA-101, On-Line Work Control Process, Revision 27
WC-AA-101-1002, On-Line Scheduling Process, Revision 19
WC-AA-101-1004, On-Line Maintenance for Limiting Condition for Operation of Systems or Components, Revision 7
WC-AA-104, Integrated Risk Management, Revision 24
WC-OC-101-1001, On-Line Risk Management and Assessment, Revision 21

Drawings
DJP-3E-531-22-1002, ESW1, ESW2, SW Underground Piping Bypass Mod., Sheet 1, Revision 3
BR 2004, Condensate Transfer Sys Flow Diagram, Sheet 2, Revision 103
3E-424-A2-1000, ISI Configuration Drawing Condensate Transfer System, Sheet 2, Revision 6
Maintenance/Work Orders
4669594

Miscellaneous
Adverse Condition Monitoring and Contingency Plan- Service Water Pumps Degraded, Revision 1
Adverse Condition Monitoring and Contingency Plan- Condensate Transfer Leak in Condenser Bay Drain Pit, dated August 13, 2017

Section 1R15: Operability Determinations and Functionality Assessments

Procedures
MA-AA-716-012, Post Maintenance Testing, Revision 23
312.11, Nitrogen System and Containment Atmosphere Control, Revision 50
340.3, 125 Volt DC Distribution System C, Revision 42
ABN-55, DC Bus C and Panel/MCC Failures, Revision 10
U-5-f, BAT CHG C2 Trouble, Revision 4

Issue reports

2577232	2686036	4048804	4049087	4050051	4043230
4044173	4044868	4008979	4020166	4020164	4020162
4020157	4020152				

Maintenance/Work Orders
R2164091 C2030509

Miscellaneous
665.5.007, Torus to Drywell Vacuum Relief Valve Leak rate Test at Power, performed 9/18/16
SDBD-OC-243, System Design Basis Document for Containment System, Revision 0
EC 620989, Missing Bolt on EDG-2 Exhaust Manifold, Revision 1
ASME B16.5, Pipe Flanges and Flanged Fittings, 1996
Engineering Technical Evaluation 619736, Technical Evaluation for Impact of NER NC-017-008-Y to Oyster Creek, Attachments 1-11

Section 1R18: Plant Modifications

Procedures
ABN-18, Service Water Failure Response, Revision 7
ABN-19, RBCCW Failure Response, Revision 10

Drawings
DJP-3E-531-22-1002, ESW1, ESW2, SW Underground Piping Bypass Mod., Revision 3
BR 2005, Reactor & Turbine Building Service Water System Flow Diagram, Sheet 2, Revision 109

Maintenance Orders/Work Orders
C2028722

Miscellaneous
ECR OC-01-00621, Crosstie ESW to Service Water to Allow Repairs, Revision 0
OC-2001-S-0765, ECR-01-00621: ESW to SW Cross-connect Modification, Revision 0
ASME B31.11-1989 Edition, Slurry Transportation Piping Systems
OYS-0-2015-0494, Underground SW Piping
OYS-0-2014-0080, Buried SW Pipe Temp Repairs
ECR 49, Determine Acceptable NDE Results for Underdeck SW Piping, October 18, 2012
Registration # F-003143, Exelon/Oyster Creek 20” Line Enclosure, Sheet 1, Revision 1

Registration # F-003143, Exelon/Oyster Creek 20" Line Enclosure, Sheet 2, Revision 1
Registration # F-003143, Exelon/Oyster Creek 20" Line Enclosure, Sheet 3, Revision 1

Section 1R19: Post-Maintenance Testing

Procedures
617.4.003, Control Rod Scram Insertion Time Test and Valve IST Test, Revision 55
302.1, Control Rod Drive System, Revision 117

Issue reports
4045609 4045942 4046124 4046125 4046127

Drawings
GE 237E487, Control Rod Drive System Flow Diagram, Sheet 1, Revision 70

Maintenance Orders/Work Orders
4678809

Section 1R22: Surveillance Testing

Procedures
636.4.003, Diesel Generator #1 Load Test, Revision 105
602.3.004, Electromatic Relief Valve Pressure Sensor Test and Calibration, Revision 57
609.3.113, Isolation Condenser Isolation Test and Calibration- B2 Sensors First, Revision 7
607.4.017, Containment Spray and Emergency Service Water Pump System 2 Operability and Quarterly Inservice Test, Revision 47
603.4.001, Recirculation Pumps Trip Circuitry Test, Revision 18
609.4.001, Isolation Condenser Valve Operability and In Service Test, Revision 84
307, Isolation Condenser System, Revision 127

Issue reports
4043294 4048746 4048911 4043037

Drawings
GE 148F740, Containment Spray System Flow Diagram, Sheet 1, Revision 44
BR 3029, Emergency Condenser System Electrical Elementary Diagram, Sheet 2, Revision 26
GU 3E-611-17-007, Elec. Elem. Diagram Control Panel 3F- Annun. E, Revision 13

Maintenance Orders/Work Orders
4662188 4586769 4646323 4663118 4636474

Miscellaneous
Risk Screening/Mitigation Plan for WO 4222417-603.4.01 Recirc Pump Trip Circuitry Test

Section 4OA1: Performance Indicator Verification

Procedures
ER-AB-331-1006, BWR Reactor Coolant System Leakage Monitoring and Action Plan

Issue reports
3958850 2729454 2736943 4017602 3943779

Miscellaneous
NUREG 1022, Reporting Requirements, Revision 3
NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 7
Various Operator Logs from July 1, 2016 to June 30, 2017
Increase in Unidentified Leak Rate (UILR) Adverse Condition Monitoring Plan, Revision 1 and Revision 2
CDE Max Iodine 131 Data from July 1, 2016 to June 30, 2017

Section 4OA2: Problem Identification and Resolution

Procedures
634.2.201, Main Station B Battery Discharge Test, Revision 17

Issue reports

619239	622261	624177	624950	630307	631967
632485	2520997	2522756	4040967*	4040998*	

*written as a result of this inspection

Drawings
BR 3028, Sheet 1, 25V Station DC System One Line Diagram, Distribution Center A&B, Revision 22
EB D-3033, 125V Station DC System One Line Diagram, Distribution Center C, Revision 32
GE 729E182, Sheet 1, Auto Depressurization System Electrical Elementary Diagram, Revision 35

Engineering Change Requests
EC-545040, Revision to Calculation C-1302-735-E320-038 For EMRV Max Temp Correction, Revision 0
ECR-OC-10-00461, Engineering Change Request for Station Battery Calculation, Revision 0

Calculations
C-1302-735-E320-038, Voltage Drop After Modification to 125 VDC Operated EMRV High Pressure Relief Function, Revision 4
C-1302-735-E320-044, Oyster Creek 125V DC Voltage Drop Calculation, Revision 2B
C-1302-735-E320-049, Oyster Creek B and C Station Battery Sizing Calculation, Revision 1

Work Orders
R2173687 R2179407

Miscellaneous
R3-580A-29, Sheet 13- Environmental Qualification Binder

Section 4OA3: Follow-up of Events and Notices of Enforcement Discretion

Procedures
201, Plant Startup, Revision 106
203.4, Plant Cooldown Following Reactor Scram, Revision 57
350.1, Augmented Offgas System Operation, Revisions 99, 100 and 103
ABN-1, Reactor Scram, Revision 16
ABN-14, Loss of Condenser Vacuum, Revision 5
ABN-22, AOG Building Trip Loss of Power, Revision 10

OP-AA-108-114, Post Transient Review, Revision 12
OP-AA-101-111-1001, Operations Standards and Expectations, Revision 18
OP-AA-108-108, Unit Restart Review, Revision 19
HU-AA-101, Human Performance Tools and Verification Practices, Revision 9

Issue reports

4029183	4029223	4029243	4029299	4029310	4029035
4029038	4029042	4029030	4029020	4028932	4028608
4028561	4028584	4028616	4028618	4028620	4028628
4028246	4028402	4028416	4028431	4028441	4028444
4028500	4028528	4042835	4042832		

Drawings
BR M608, Augmented Off-Gas System Flow Diagram, Sheet 1, Revision 34
BR M608, Augmented Off-Gas System Flow Diagram, Sheet 2, Revision 31

Section 4OA5: Other Activities

Procedures
PI-AA-125, Corrective Action Program (CAP) Procedure, Revision 5
PI-AA-120, Issue Identification and Screening Process, Revision 7
LS-AA-104, Exelon 50.59 Review Process, Revision 10
LS-AA-104-1001, Exelon 50.59 Resource Manual, Revision 10
NF-AA-100, Reload Control Procedure, Revision 17
NF-AB-120, Reload Licensing (BWR), Revision 18
NF-AA-100-1000, Core Reload and Cycle Management Configuration Changes, Revision 12

Issue reports
2482042 2537659

Miscellaneous
Oyster Creek Nuclear Generating Station Technical Specifications, Section 6.9, Reporting Requirements, Amendment 254
NCV 05000219/2015008-01, Use of an Analytical Method to Determine the Core Operating Limits without Prior NRC Approval

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
AOG	augmented offgas
CFR	*Code of Federal Regulations*
EDG	emergency diesel generator
EMRV	electromatic relief valve
IMC	Inspection Manual Chapter
IST	In-service Test
JPM	job performance measure
LER	licensee event report
NCV	non-cited violation
NRC	Nuclear Regulatory Commission
SSC	structures, systems, and components
UFSAR	Updated Final Safety Analysis Report
VDC	volts direct current