



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

October 17, 2017

EA-16-241

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 – SUPPLEMENTAL  
INSPECTION REPORT 05000219/2017008 AND ASSESSMENT FOLLOW-UP  
LETTER**

Dear Mr. Hanson:

On September 14, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed a supplemental inspection using Inspection Procedure 95001, “Supplemental Inspection Response to Action Matrix Column 2 Inputs,” and the NRC inspection team discussed the results of this inspection and the implementation of your corrective actions with Mr. Michael Gillin, Plant Manager, and members of your staff. The results of the inspection are documented in the enclosed report.

The NRC performed this inspection to review your station’s actions in response to a White finding in the mitigating system cornerstone which was documented in NRC’s inspection report 05000219/2016004 (ML17025A063)<sup>1</sup> and finalized in the Oyster Creek Nuclear Generating Station – Final Significance Determination for a White Finding Letter dated April 13, 2017. On August 11, 2017, you informed the NRC that your station was ready for this inspection.

The objectives of this supplemental inspection were to provide assurance that: (1) the root causes and the contributing causes of significant performance issues were understood; (2) the extent of condition and extent of cause of significant performance issues were identified; (3) corrective actions taken to address and preclude repetition of significant performance issues were prompt and effective; and (4) corrective plans direct prompt actions to effectively address and preclude repetition of significant performance issues. The inspection consisted of examination of activities conducted under your license as they related to safety, compliance with the Commission’s rules and regulations, and the conditions of your operating license.

Based on the results of this inspection, the NRC concluded that, overall, the supplemental inspection objectives were met and no significant weaknesses were identified. Additionally, no findings were identified.

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<sup>1</sup>. Designation in parentheses refers to the Agencywide Documents Access and Management System (ADAMS) Accession Number. Documents referenced in this letter are publicly available using the Accession Number in ADAMS.

B. Hanson

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Therefore, in accordance with the guidance in Inspection Manual Chapter 0305, "Operating Reactor Assessment Program," the White finding will only be considered in assessing plant performance for a total of four quarters. As a result, the NRC determined the performance of Oyster Creek to be in the Licensee Response Column of the NRC's Reactor Oversight Process Action Matrix as of October 1, 2017.

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 at 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 No. 50-219  
License No. DPR-16

Enclosure:  
Inspection Report 05000219/2017008  
w/Attachment: Supplementary Information

cc w/encl: Distribution via ListServ

SUBJECT: OYSTER CREEK NUCLEAR GENERATING STATION – SUPPLEMENTAL INSPECTION REPORT 05000219/2017008 AND ASSESSMENT FOLLOW-UP LETTER DATED OCTOBER 17, 2017

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**U.S. NUCLEAR REGULATORY COMMISSION (NRC)**

**REGION I**

Docket No. 50-219

License No. DPR-16

Report No. 05000219/2017008

Licensee: Exelon Generation Company, LLC (Exelon)

Facility: Oyster Creek Nuclear Generating Station (Oyster Creek)

Location: Forked River, New Jersey

Dates: September 11, 2017 through September 14, 2017

Inspectors: J. Krafty, Senior Resident Inspector, Beaver Valley, Team Leader  
P. Braxton, Construction Inspector, Vogtle Units 3 and 4

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

Enclosure

## SUMMARY

Inspection Report 05000219/2017008; 9/11/2017 – 9/14/2017; Oyster Creek Nuclear Generating Station, Supplemental Inspection - Inspection Procedure (IP) 95001

A senior resident inspector and a construction inspector performed this inspection. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process."

### **Cornerstone: Mitigating Systems**

The NRC staff performed this supplemental inspection in accordance with (IP) 95001, "Supplemental Inspection Response to Action Matrix Column 2 Inputs," to assess Exelon's evaluation associated with the inoperability of the 'E' electromatic relief valve (EMRV) identified in September 2016. The NRC staff previously characterized this issue as having low to moderate safety significance (White) as documented in NRC Final Significance Determination Letter dated April 13, 2017. During this supplemental inspection, the inspectors determined that Exelon performed a comprehensive evaluation of the self-revealing 'E' EMRV failure, which occurred during an as-found preventive maintenance activity. Exelon identified the primary root cause of the issue to be that the maintenance leadership team failed to provide adequate oversight, reinforce, and hold technicians accountable for human performance and maintenance fundamentals. The failure to provide adequate oversight and hold technicians accountable was not limited to maintenance leadership; therefore, Exelon has taken corrective actions for all site leadership to implement a policy that defines observation quantity, criticality requirements, and leadership response expectations for gaps observed. Exelon also performed one-on-one reviews of HU-AA-104-101, "Procedure Use and Adherence", with all individuals in the maintenance department and reinforced expectations for proper work package instructions with the maintenance planner.

Given Exelon's acceptable performance in addressing the inoperable 'E' EMRV, the White finding associated with this issue will only be considered in assessing plant performance for a total of four quarters, in accordance with the guidance in Inspection Manual Chapter (IMC) 0305, "Operating Reactor Assessment Program." Inspectors will review the effectiveness of Exelon's implemented corrective actions during a future inspection.

No findings were identified.

## REPORT DETAILS

### 4. OTHER ACTIVITIES

#### 4OA4 Supplemental Inspection (95001)

##### .01 Inspection Scope

The NRC staff performed this supplemental inspection in accordance with IP 95001 to assess the licensee's evaluation of a White finding, which affected the mitigating systems cornerstone in the reactor safety strategic performance area. The inspection objectives were:

- To assure that the root causes and contributing causes of individual and collective significant performance issues are understood.
- To independently assess and assure that the extent of condition and extent of cause of significant individual and collective performance issues are identified.
- To assure that corrective actions taken to address and preclude repetition of significant performance issues are prompt and effective.
- To assure that corrective plans direct prompt actions to effectively address and preclude repetition of significant performance issues

The licensee entered the Regulatory Response Column of the NRC's Action Matrix in the fourth quarter of 2016, as a result of one inspection finding of low to moderate safety significance (White). The finding was associated with the inoperability of the 'E' EMRV. On September 19, 2016, the 'E' EMRV failed to open during an as-found preventive maintenance activity. The finding was characterized as having White safety significance based on the results of a detailed risk analysis performed by a region-based senior reactor analyst, as discussed in the NRC Final Significance Determination Letter dated April 13, 2017. The failure of the 'E' EMRV was attributed to the maintenance technicians not reinstalling lock washers on the 'E' EMRV cut-out switch lever as required by the work package instructions. The incorrect reassembly created excessive friction which prevented the 'E' EMRV from opening when tested.

Exelon informed NRC's staff on August 11, 2017, that they were ready for the supplemental inspection. In preparation for the inspection, the licensee performed a root-cause investigation titled "E EMRV Failed to Stroke", to identify weaknesses that existed in the organization which allowed for a risk-significant finding, and to determine the organizational attributes that resulted in the White finding.

The inspectors reviewed the licensee's root cause in addition to other evaluations conducted in support and as a result of the root cause. The inspectors reviewed corrective actions that were taken or planned to address the identified causes. The inspectors also held discussions with licensee personnel to ensure that the root and contributing causes and the contribution of safety culture components were understood and corrective actions taken or planned were appropriate to address the causes and preclude repetition.

.02 Evaluation of the Inspection Requirements

02.01 Problem Identification

- a. IP 95001 requires that the inspectors determine that Exelon's evaluation of the issue documents who identified the issue (i.e., licensee-identified, self-revealing, or (NRC - identified) and under what conditions the issue was identified.

The licensee identified the inoperability of the 'E' EMRV during an as-found preventive maintenance activity. During a stroke test of the EMRV actuator on September 19, 2017, the pilot valve failed to open. The inspectors verified that this information was documented in the licensee's root cause evaluation (RCE). This is a self-revealing issue.

- b. IP 95001 requires that the inspectors determine that Exelon's evaluation of the issue documents how long the issue existed and prior opportunities for identification.

The licensee's root cause documented that the washers that were not installed on the EMRV occurred when the EMRV was rebuilt on September 8, 2014. There were no prior opportunities to identify this issue. However, Exelon identified in a 2014 automatic voltage regulator scram evaluation that the causes of the issue, specifically, not following procedures and lack of management oversight, existed at least since 2012. The inspectors determined that the licensee's evaluation was adequate with respect to identifying how long the issue existed and prior opportunities for identification.

- c. IP 95001 requires that the inspectors determine that the Exelon's evaluation documents plant-specific consequences, as applicable, and compliance concerns associated with the issue.

The NRC determined this issue was a White finding, as documented in Oyster Creek Final Significance Determination Letter dated April 13, 2017, and Exelon's root cause also documented that the finding associated with this issue had White safety significance. In addition, the root cause documented that the consequences of the issue were that the EMRV was unable to perform its safety function for the two year operating cycle and was a violation of Technical Specification 6.8.1, Procedures and Programs. The inspectors concluded that the licensee appropriately documented the plant-specific consequences and compliance concerns associated with the issue.

- d. Findings

No findings were identified.

02.02 Root Cause, Extent of Condition, and Extent of Cause Evaluation

- a. IP 95001 requires that the inspectors determine that Exelon evaluated the problem using a systematic methodology to identify the root and contributing causes.

Exelon used systematic methods to complete the root cause including interviewing, event and causal factor chart, and cause and effect analysis to complete the root cause. The inspectors determined that the licensee evaluated the issue using a systematic methodology to identify root and contributing causes.

- b. IP 95001 requires that the inspectors determine that Exelon's root cause was conducted to a level of detail commensurate with the significance of the problem.

Exelon initially performed an equipment apparent cause evaluation to determine the material failures and then performed a root cause investigation to address the human performance and organizational aspects of the issue. Exelon used three systematic methodologies in determining the root and contributing causes. The root cause identified that lack of management oversight and not holding technicians accountable for human performance was not limited to the maintenance department and corrective actions were assigned to all departments in the organization. Exelon determined that the contributing causes were that the technicians violated the standard for procedure usage and place-keeping and planning personnel failed to adequately revise the work instructions following the revision to the engineering change request. Based on the detailed work performed for this root cause evaluation, the inspectors concluded that the root cause evaluation was conducted to a level of detail commensurate with the significance of the problem.

- c. IP 95001 requires that the inspectors determine that Exelon's root cause included a consideration of prior occurrences of the issue and knowledge of operating experience (OE).

Exelon's root cause included an evaluation of internal and external OE and used applicable operating experience as inputs to their corrective actions. There were no prior occurrences of EMRV failures due to missing lock washers. Supplemental evaluations identified that the issues of not following procedures and lack of supervisory oversight existed since at least 2012. The inspectors determined that Exelon's root cause included a consideration of prior occurrences of the problem and knowledge of prior OE.

- d. IP 95001 requires that the inspectors determine that Exelon's root cause evaluation addressed the extent of condition and extent of cause of the problem.

Exelon's evaluation addressed the extent of condition associated with the technicians not following the instructions in the work procedure. Exelon reviewed the other EMRV work packages and reviewed other safety systems and determined that the issue was not limited to EMRVs and corrective actions were addressed to all station departments.

Exelon's evaluation also addressed the extent of cause associated with the maintenance leadership failing to provide adequate oversight and hold technicians accountable for human performance. Exelon determined the issue had the potential to exist in other station departments and corrective actions were addressed to all station departments.

The inspectors concluded that the licensee's RCE addressed the extent of condition and the extent of cause of the issue.

- e. IP 95001 requires that the inspectors determine that the Exelon's root cause, extent of condition, and extent of cause evaluations appropriately considered the safety culture traits in NUREG-2165, "Safety Culture Common Language," referenced in IMC 0310, "Aspects within Cross-Cutting Areas."



Exelon found weaknesses in the cross-cutting area of Human Performance in the Field Presence, Documentation, and Procedure Adherence components. Exelon found that leaders were not providing adequate oversight and holding technicians accountable for human performance, work documents relating to the 'E' EMRV failure were lost, and individuals were deviating from procedures. These weaknesses correlate to the H.2, H.7, and H.8 cross-cutting aspects described in IMC 0310, dated December 4, 2014. Corrective actions were assigned to address these issues. Exelon's root cause did not consider the supplemental cross-cutting aspects for supplemental inspections (X designator). After the inspectors pointed out this omission, Exelon determined that there was a weakness in the area of Standards in that leaders and individuals were deviating from nuclear standards, X.6. No new corrective actions were necessary as existing corrective actions addressed this issue. The inspectors determined that the licensee's RCE included a proper consideration of whether a weakness in any safety culture component was a root cause or a significant contributing cause of the issue.

f. Findings

No findings were identified.

02.03 Corrective Actions Taken and Corrective Actions Planned

- a. IP 95001 requires that the inspectors determine that appropriate corrective actions are specified for each root and contributing cause or Exelon has an adequate evaluation for why no corrective actions are necessary.

To address the root cause, Exelon developed an organizational policy that defined observation quality, criticality requirements, and leadership response expectations for observed gaps and created a goal for maintenance managers and first line supervisors to demonstrate usage of the organizational policy. Exelon's corrective actions for the contributing causes included performing one-on-one reviews with all individuals in the maintenance department on the requirements for procedure use and adherence and reinforcing work instruction standards with the planner. Other corrective actions included revising the EMRV rebuild procedure to include verification for critical steps and a planned corrective action to brief managers and first line supervisors on document retention and its importance. The inspectors determined that the corrective actions were appropriate and addressed each root and contributing cause.

- b. IP 95001 requires that the inspectors determine that corrective actions have been prioritized with consideration of significance and regulatory compliance.

At the time of the inspection, the corrective actions for the root and one contributing cause were complete. The other corrective action for the contributing cause was completed on September 22, 2017.

The remaining corrective actions are due by November 1, 2017. Because the corrective actions for the root and contributing causes were completed, the inspectors determined that the corrective actions were prioritized with consideration of the risk significance and regulatory compliance.

- c. IP 95001 requires that the inspectors determine that corrective actions taken to address and preclude repetition of significant performance issues are prompt and effective.

Exelon's corrective action taken to address and preclude repetition was completed on August 31, 2017. Exelon's effectiveness review is scheduled for completion on November 7, 2017. The inspectors determined that corrective actions taken to address and preclude repetition of significant performance issues were prompt. The effectiveness of the corrective action to prevent recurrence will be reviewed in a separate inspection following Exelon's completion of the effectiveness review.

- d. IP 95001 requires that the inspectors determine that each Notice of Violation (NOV) related to the supplemental inspection is adequately addressed, either in corrective actions taken or planned.

The NRC issued an NOV to the licensee on April 13, 2017. In the NOV, the NRC concluded that information regarding the reason for the violation, the corrective action taken and planned to correct the violation and prevent recurrence, and the date when full compliance was achieved was adequately addressed in NRC inspection report 05000219/2016004.

- e. IP 95001 requires that the inspectors determine that appropriate quantitative or qualitative measures of success have been developed for determining the effectiveness of planned and completed corrective actions.

The details of the corrective action to preclude repetition of significant performance issues are as follows:

- Each week first line supervisors document the equivalent of at least one in-field observation per day in the employee observation software (EOS)
- Perform at least one critical observation per week, with a target criticality percentage of at least 20 percent
- Managers perform a minimum of three paired observations a week, with a target criticality of at least one observation per week

Additionally, when below standard performance is observed for failing to comply with procedure requirements, human performance, management expectations, or safety standards, the leadership is required to:

- Provide immediate coaching to the individual
- Document the observation in EOS and the individual's working file

The measures of success for determining the effectiveness is 100 percent compliance with the above requirements. The inspectors determined that quantitative and qualitative measures of success had been developed for determining the effectiveness of the planned and completed corrective actions to preclude repetition.

- f. Findings

No findings were identified.

## 02.05 Evaluation of IMC 0305 Criteria for Treatment of Old Design Issues

Exelon did not request credit for self-identification of an old design issue; therefore, this section is not applicable.

### 40A6 Exit Meeting

On September 14, 2017, the inspectors presented the inspection results to Mr. Michael Gillin, Plant Manager and other members of his staff, who acknowledged the findings. The inspectors asked the licensee if any of the material examined during the inspection should be considered proprietary. The licensee did not identify any proprietary information.

Upon completion of the exit meeting, the Region I Chief, Reactor Projects Branch 6, Mr. Silas R. Kennedy, conducted the Regulatory Performance Meeting, in accordance with IMC 0305, with Mr. Michael Gillin, Plant Manager, and other members of his staff. The purpose of the meeting was to discuss Exelon's corrective actions in response to the White finding and NOV. Based on the results of this inspection, the NRC concluded that, overall, the supplemental inspection objectives were met and no significant weaknesses were identified. Additionally, no findings were identified. Therefore, in accordance with the guidance in Inspection Manual Chapter 0305, "Operating Reactor Assessment Program," the White finding will only be considered in assessing plant performance for a total of four quarters. As a result, the NRC determined the performance of Oyster Creek to be in the Licensee Response Column of the NRC's Reactor Oversight Process Action Matrix as of October 1, 2017.

ATTACHMENT: SUPPLEMENTARY INFORMATION

**SUPPLEMENTARY INFORMATION  
KEY POINTS OF CONTACT**

Licensee Personnel

T. Moore, Site Vice-President  
M. Gillin, Plant Manager  
M. Caldeira, Programs Engineer  
D. Capoferri, Assistant Maintenance Director  
M. Capone, Engineering Branch Manager  
R. Dutes, Senior Regulatory Specialist  
J. Eagan, Manager, Maintenance Planning  
R. Fitts, Corrective Action Program Owner  
G. Flesher, Regulatory Assurance Manager  
R. Newman, Planning supervisor  
S. Schwartz, Senior Engineer  
D. Siecinski, Electrical Technician

**LIST OF ITEMS OPENED, CLOSED AND DISCUSSED**

Closed

05000219/2016004-01                      NOV                      'E' EMRV Failure to Stroke Due to Incorrect Reassembly (Section 40A4)

**LIST OF DOCUMENTS REVIEWED**

Procedures

2400-SME-3918.03, EMRV Solenoid Operator Removal, Refurbishment, and Installation, Revision 18  
2400-SME-3918.03, EMRV Solenoid Operator Removal, Refurbishment, and Installation, Revision 20  
2400-SME-3918.03, EMRV Solenoid Operator Removal, Refurbishment, and Installation, Revision 23  
2400-SME-3918.03, EMRV Solenoid Operator Removal, Refurbishment, and Installation, Revision 24  
CC-AA-103-1001, Configuration Change Control Guidance, Revision 7  
ER-AA-330-009, ASME Section XI Repair/Placement Program, Revision 13  
HU-AA-104-101, Procedure Use and Adherence, Revision 5  
HU-AA-1212, Technical Task Risk/Rigor assessment, Pre-Job Brief, Independent Third Party Review, and Post-Job Review, Revision 3  
MA-AA-716-010, Maintenance Planning, Revision 20  
MA-AA-716-010, Maintenance Planning, Revision 25  
MA-AA-716-011, Work Execution & Close Out, Revision 23  
MA-OC-716-1018, Oyster Creek Standards and Expectations Criteria, Revision 3  
PI-AA-125, Corrective Action Program (CAP) Procedure, Revision 5  
PI-AA-125-1001, Root Cause Analysis Manual, Revision 3  
PI-AA-125-1004, Effectiveness Review Manual, Revision 2  
PI-AA-125-1006, Investigation Techniques Manual, Revision 3  
PI-AA-126, Self-Assessment and Benchmark Program, Revision 2  
PI-AA-126-1001, Self-Assessments, Revision 2  
PI-AA-126-1001-F-01, Self-Assessment, Revision 2

Condition Reports

2394374	2722121	4011263
2568336	2736322	4023265
2634210	3959349	4050917
2713099	3984815	4051589
2717363	4001737	

Maintenance Orders / Work Orders

C2032680

Miscellaneous

## Duty Team Responsibilities

E EMRV failed to Stroke Apparent Cause Investigation Report

E EMRV failed to Stroke Root Cause Investigation Report

ECR 14-00371, Implement MOD 14-0037 New Springs for EMRV's, Revision 0

Failed As Found Testing of B and D Electromatic Relief Valve Actuators Root Cause Investigation Report

Pre-NRC Supplemental Inspection 95001 – "E" EMRV Self-Assessment

Reactor Scram due to Unauthorized AVR Troubleshooting Root Cause Investigation Report

Wrong Test Cap Removed During Testing Apparent Cause Investigation Report

**LIST OF ACRONYMS USED**

ADAMS	Agencywide Documents Access and Management System
EMRV	Electromatic relief valve
EOS	Employee observation software
IP	Inspection procedure
IMC	Inspection manual chapter
NOV	Notice of Violation
NRC	U. S. Nuclear Regulatory Commission
OE	Operating experience
RCE	Root cause evaluation