UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE RD. SUITE 210
LISLE, ILLINOIS 60532-4352

November 28, 2018

EA–17–203

Mr. Bryan C. Hanson
Senior VP, Exelon Generation Company, LLC
President and CNO, Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: CLINTON POWER STATION—NRC 95001 SUPPLEMENTAL INSPECTION REPORT 05000461/2018041 AND ASSESSMENT FOLLOW-UP LETTER

Dear Mr. Hanson:

On October 19, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed a supplemental inspection at Clinton Power Station using Inspection Procedure 95001, "Supplemental Inspection Response to Action Matrix Column 2 Inputs." The NRC performed this inspection to review the station's actions in response to a White Finding/Violation in the Mitigating Systems Cornerstone which was documented and finalized in NRC Inspection Report 05000461/2017011 and after being notified of your readiness for this inspection via letter dated July 13, 2018. The NRC inspectors discussed the results of this inspection and the implementation of corrective actions with Mr. T. Stoner and other members of your staff. The results of this inspection are documented in the enclosed report.

This supplemental inspection was conducted to provide assurance the root causes and contributing causes of the events resulting in the Division 3 Shutdown Service Water Pump's failure to start on June 15, 2017, were understood. In addition the inspectors verified the extent of condition and extent of cause of any performance issues were identified and the corrective actions for any performance issues were sufficient to address the causes in addition to preventing recurrence.

The NRC determined your staff's evaluation identified the primary root cause of the White Finding to be an incremental increase in internal pump resistance which could not be overcome and untimely corrective actions for a 2014 pump failure. The extent of condition was determined to potentially affect other vertical pumps in a standby condition. The corrective actions to prevent recurrence were replacement of subcomponents with improved materials and revision of a fleet procedure.

Based on the results of this inspection, the NRC has identified three issues that were evaluated under the Significance Determination Process as having very-low safety significance (Green). The NRC has also determined two violations are associated with these issues. Because the licensee initiated condition reports to address these issues, these violations are are being treated as Non-Cited Violations (NCVs), consistent with Section 2.3.2 of the Enforcement Policy. These NCVs are described in the subject inspection report.

If you contest the violations or significance of these NCVs, 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 III; the Director, Office of Enforcement; and the NRC Resident Inspector at the Clinton Power 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 III; and the NRC resident inspector at Clinton Power Station.

After reviewing Clinton's performance in addressing the White Finding/Violation related to the shutdown service water pump failure, the NRC concluded your actions met the objectives of Inspection Procedure 95001. As a result, the NRC determined the performance at Clinton Station to be in the Licensee Response Column of the NRC's Action Matrix as of the date of this letter. However, in accordance with the guidance provided in NRC Inspection Manual Chapter 0305, "Operating Reactor Assessment Program," this White Finding/Violation remains an input into the NRC's Action Matrix through December 31, 2018.

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 Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Karla Stoedter, Chief
Engineering Branch 2
Division of Reactor Safety

Docket No. 50–461
License No. NPF–62

Enclosure:
Inspection Report 05000461/2018041

cc: Distribution via LISTSERV®

Letter to Brian Hanson from Karla Stoedter dated November 28, 2018

SUBJECT: CLINTON POWER STATION—NRC 95001 SUPPLEMENTAL INSPECTION REPORT 05000461/2018041 AND ASSESSMENT FOLLOW-UP LETTER

DISTRIBUTION:
Christopher Cook
RidsNrrDorlLpl3
RidsNrrPMClinton Resource
RidsNrrDirsIrib Resource
Steven West
Darrell Roberts
Jamnes Cameron
Allan Barker
DRSIII
DRPIII
ROPreports.Resource@nrc.gov

ADAMS Accession Number: ML18332A417

OFFICE	RIII		RIII		RIII			
NAME	MJones:bw		JHanna		KStoedter			
DATE	11/27/2018		11/26/2018		11/28/2018			

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Numbers:	50–461
License Numbers:	NPF–62
Report Numbers:	05000461/2018041
Enterprise Identifier:	I–2018–041–0000
Licensee:	Exelon Generation Company, LLC
Facility:	Clinton Power Station
Location:	Clinton, IL
Dates:	September 17, 2018 through October 19, 2018
Inspectors:	J. Hanna, Senior Reactor Analyst M. Jones, Reactor Engineering Inspector
Observer:	E. Fernandez, Reactor Engineering Inspector
Approved by:	K. Stoedter, Chief Engineering Branch 2 Division of Reactor Safety

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) reviewed the licensee's planned and completed corrective actions to address a White finding by performing a 95001 Supplemental Inspection at Clinton Power Station in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to https://www.nrc.gov/reactors/operating/oversight.html for more information. Findings and violations being considered in the NRC's assessment are summarized in the table below.

List of Findings and Violations

Failure to Close Corrective Action to Prevent Recurrence in accordance with Quality Assurance Topical Report Implementing Procedure			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000461/2018041–01 Closed	H.1 Resources	95001
The inspectors identified a Green finding and an associated Non-Cited Violation of Title 10 of the *Code of Federal Regulations* (CFR), Part 50, Appendix B, Criterion II, "Quality Assurance Program," for the failure to accomplish activities affecting quality in accordance with the Quality Assurance Topical Report, whose requirements are implemented through the corrective action program procedure PI–AA–125, "Corrective Action Program." Specifically, the licensee failed to ensure Corrective Action to Prevent Recurrence (CAPR) Assignment 42 included in Action Request 4022176 was completed and closed to CAPR assignment activities as required by step 4.7.1 of procedure PI–AA–125.			

Failure to Establish Acceptance Criteria for Component Performance Monitoring			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000461/2018041–02 Closed	H.13 Human Performance	95001
The inspectors identified a Green finding and an associated Non-Cited Violation of Title 10 of the *Code of Federal Regulations*, Part 50, Appendix B, Criterion V, "Instruction Procedures, and Drawings," for the failure to establish acceptance criteria in accordance with the Equipment Reliability Program. Specifically, the licensee failed to establish acceptance criteria for startup current and coast down time following implementation of performance monitoring tasks for these parameters as required by step 4.2 of ER–AA–20, "Equipment Reliability Program."			

Failure to Establish an Adequate Effectiveness Review			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green FIN 05000461/2018041–03 Closed	H.8 Procedure Adherence	95001
The inspectors identified a Green finding for the failure to establish an effectiveness review in accordance with PI–AA–125–1004, “Effectiveness Review Manual,” Revision 2. Specifically, the licensee failed to establish an effectiveness review that analyzed and documented the cause of issue had been eliminated or had reduced the recurrence rate to an acceptable level. This was contrary to step 4.3.6 of PI–AA–125, “Corrective Action Program,” which required the licensee to perform effectiveness reviews in accordance with PI–AA–125–1004.			

Additional Tracking Items

None.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

OTHER ACTIVITIES—TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL

95001—Supplemental Inspection Response to Action Matrix Column 2 Inputs

The inspectors reviewed the licensee's root causes, contributing causes, extent of condition, and extent of cause determinations taken in response to a White Violation of Title 10 of the *Code of Federal Regulations* (CFR) Part 50, Appendix B, Criterion XVI, "Corrective Action," and associated Technical Specification (TS) violations of TS 3.7.2, "Division 3 Shutdown Service Water (SX)," and TS 3.5.1, "[Emergency Core Cooling Systems] ECCS - Operating." The inspectors assessed whether the licensee's corrective actions to address the root and contributing causes were sufficient to prevent recurrence. The highlights of the performance review and NRC's assessment are documented below.

INSPECTION RESULTS

95001—Supplemental Inspection Response to Action Matrix Column 2 Inputs

(1) Problem Identification—Determine whether the licensee's evaluation documented who identified the issue and under what conditions the issue was identified; the evaluation documented how long the issue existed and prior opportunities for identification; and the evaluation documented significant plant-specific consequences, as applicable, and compliance concerns associated with the issue.

Observation	95001
Based upon information included in the root cause anlaysis (RCA) for Action Request (AR) 4022176, "Division 3 SX [shutdown service water] Pump Tripped during Start Up of 9069.01," the self-revealing failure of the Division 3 SX pump was discovered on June 15, 2017, when the pump motor breaker tripped during surveillance testing. The pump attempted to start for approximately 30 seconds before thermal overloads tripped the pump motor breaker. The licensee confirmed the pump could be rotated by hand and proceeded to run the pump a second time. During the second run, the pump rotated at 70 rotations per minute for 8 seconds before the licensee manually secured it. Based on the failed surveillance, the licensee declared the pump inoperable. The vulnerable condition (a failure of the Division 3 SX pump to overcome static friction when starting) existed since the last successful run on March 15, 2017, for surveillance testing. The time of the actual pump failure was determined to be when the pump was secured on March 15, 2017 or shortly thereafter when the pump packing was completely dried out. In other words, another pump failure-to-start would have occurred any time after the	

March 15, 2017, run of the Division 3 SX pump. Additionally, there were prior opportunities to identify this condition in June 2016 and September 2016 when the licensee operated the Division 3 SX pump and noticed abnormal noises when the pump started. The licensee concluded the abnormal noises were not indicative of degraded pump performance nor did it impact pump operability. The licensee decided to repack the pump during its next system outage window scheduled for September 2017.

The corrosion of the Division 3 SX pump sleeves, which was a contributing cause of the 2014 Division 3 SX pump failure, and the failure to evaluate and correct the causes of this corrosion resulted in the failure of the pump to start on June 15, 2017. As described in NRC Inspection Report 05000461/2017011, the internal events change in core damage frequency (CDF) estimate was approximately 8E–6/yr, which represents a finding of low to moderate safety significance (White). The dominant sequence for internal events was a Loss of Offsite Power which progresses to a Station Blackout with a subsequent failure of the high pressure core spray system (due to the performance deficiency), failure of operator actions to extend reactor core isolation cooling operation, as well as failure of manual reactor depressurization and recovery of AC power from either on-site or off-site sources. Three violations (Title 10 of the CFR, Part 50, Appendix B, Criterion XVI, “Corrective Action,” with associated violations of Technical Specification (TS) 3.7.2 “Division 3 Shutdown Service Water (SX),” and TS 3.5.1, “[Emergency Core Cooling Systems] ECCS - Operating”) were identified.

(2) Root Cause, Extent-of-Condition, and Extent-of-Cause Evaluation—Determine the problem was evaluated using a systematic methodology to identify the root and contributing causes; the root cause evaluation was conducted to a level of detail commensurate with the significance of the problem and included a consideration of prior occurrences of the problem and knowledge of prior operating experience; the root cause evaluation addressed the extent of condition, the extent of cause and safety culture traits in NUREG-2165, “Safety Culture Common Language,” referenced in IMC 0310, “Aspects Within Cross-Cutting Areas;” and examine the common cause analyses for potential programmatic weaknesses in performance when a licensee has a second White input in the same cornerstone.

Observation	95001
The licensee performed the RCA provided in AR 4022176 using a systematic methodology to identify the root and contributing causes. The techniques used included (but were not limited to): TapRoot, an Event and Causal Factor Chart, Failure Modes and Effects Analysis, a Support/Refute Matrix, and a Cause and Effect Analysis. The RCA was conducted to a level of detail commensurate with the safety/risk significance of the problem. For example, the RCA explored how the design of the Division 3 SX pump had changed over time, considered all failures of the pump since initial construction and operation, and the similarities to the pump failure in 2014. The licensee’s RCA team reviewed Clinton’s specific operating history and industry operating experience in order to identify prior opportunities to identify the problem. No items were identified. The RCA team concluded there were significant differences between prior occurrences and industry operating experience to the point they should not be considered precursors. The RCA concluded the extent of condition included other vertical pumps maintained in a standby status, of which there were 10 at the Clinton site. The rationale behind the extent of	

condition was based on it capturing the same failure modes and degradation mechanisms that precipitated the Division 3 SX pump failures.

The RCA appropriately considered all potential safety culture components (as described in NUREG–2165, "Safety Culture Common Language), for the root cause, extent of condition, and extent of cause.

The licensee performed a common cause analysis for potential programmatic weaknesses in performance due to a second White input in the same cornerstone. Specifically, the NRC had previously documented a White Finding/Violation related to the design of the Division 1 emergency diesel generator room ventilation fan circuitry prior to the Division 3 SX pump White Finding/Violation being identified and documented. At the conclusion of the on-site portion of this inspection, the inspectors identified a number of concerns associated with the common cause analysis. These included concerns over the rigor of the licensee's analysis, conclusions reached the inspectors did not agree with, and at least one alternate plausible connection between the two White Findings/Violations which had not been explored by the RCA team. Following completion of the on-site portion of this inspection, the licensee reperformed this common cause assessment. The licensee identified additional corrective actions including sampling of risk-significant structures, systems and coponents and reviewing them for legacy design vulnerabilities. The inspectors reviewed these actions and ultimately concluded they were adequate.

(3) Corrective Actions Taken and Corrective Action Plans—Determine if the licensee has developed appropriate corrective actions for each root cause and contributing cause. In addition, determine if the corrective actions have been prioritized based upon significance and regulatory compliance, whether the corrective actions taken were prompt and effective, and that each Notice of Violation (NOV) related to the supplemental inspection is adequately addressed. For corrective action plans, determine whether corrective plans direct prompt actions to effectively address and preclude repetition of significant performance issues and ensure appropriate quantitative or qualitative measures of success have been developed for determining the effectiveness of planned and completed corrective actions.

Observation	95001

Based upon information provided in the licensee's RCA, the licensee identified the following two root causes for the Division 3 SX pump failure:

- Incremental increase of internal pump resistance could not be overcome by developed torque of the motor starting from standby; and
- The corrective action to replace the Division 3 SX Pump created in the 2014 Root Cause Report (RCR 2577348) was not timely to prevent recurrence.

The corrective actions to prevent recurrence (CAPR) taken for each of the two Root Causes included:

- Replace the Division 3 SX pump causal components with the following improved components: packing, packing shaft sleeves, shaft sleeves, pump and motor; and
- Revise fleet procedure PI–AA–125–1006, Attachment 14 to include specific guidance under Step 9 for "Design Review" to ensure identified design issues have been corrected. If the design is still installed or in use, the revised procedure would have the licensee validate that the failure modes and effects are known. If the failure modes

and effects were not known, the licensee would assign a Special Plant Condition to perform a failure modes and effects analysis to better inform the timeliness and scope of corrective actions to address the identified design issue.

These CAPRs were completed at the time of the inspection. However, the inspectors questioned the adequacy of the first CAPR listed above (also known as Action Tracking Assignment 4022176–42) since the licensee had subsequently determined the replacement causal components were not improved in regards to packing shaft sleeve corrosion resistance. In addition, the inspectors questioned the appropriateness of establishing a preventive maintenance (PM) task to inspect the Division 3 SX pump packing shaft sleeve every 12 months as a corrective action rather than a CAPR since the PM was developed in response to the licensee's discovery that the replacement causal components were not improved in regards to packing shaft sleeve corrosion resistance.

The inspectors also requested the results of the first PM inspection. The inspectors identified the licensee had not performed this inspection even though more than a year had passed since the causal components were replaced. The licensee entered this issue into the corrective action program and performed an inspection of the packing shaft sleeve. The licensee identified corrosion in the packing shaft sleeve area, but it did not impact the availability, reliability, or capability of the pump. The licensee also revised the 1 year inspection frequency by removing the option of extending the inspection due date by up to 25 percent (i.e., the licensee eliminated the use of a grace period when scheduling this inspection). Based upon revisions made by the licensee during the inspection, the inspectors determined the licensee adequately prioritized the CAs based upon risk significance and regulatory compliance.

With respect to corrective action plans, the inspectors identified issues related to the establishment of quantitative or qualitative measures for determining the effectiveness of CAPRs and the establishment of effectiveness reviews to ensure the causes of significant conditions had been eliminated or the recurrence rate had been reduced to an acceptable level as directed by the licensee's CAP. These issues are discussed in later portions of this report.

Based on the revisions made to the CAs and to effectiveness reviews during the inspection, the inspectors concluded the licensee adequately developed quantitative or qualitative measures of success for determining effectiveness of the CAs to prevent recurrence. In addition, the inspectors concluded the licensee's corrective actions (both taken and planned) adequately addressed the Notice of Violations associated with the 2017 Division 3 SX Pump White Finding/Violation.

Failure to Close CAPR in Accordance with QATR Implementing Procedure			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000461/2018041–01 Closed	H.1 Resources	95001

Introduction:

The inspectors identified a Green finding and an associated NCV of 10 CFR 50, Appendix B, Criterion II, "Quality Assurance Program," for the licensee's failure to accomplish activities

affecting quality in accordance with the Quality Assurance Topical Report, through the implementation of the corrective action program procedure PI–AA–125, “Corrective Action Program.” Specifically, the licensee failed to ensure CAPR Assignment 4022176–42 was completed and closed to CAPR assignment activities as required by step 4.7.1 of procedure PI–AA–125.

Description:

The inspectors reviewed AR 4022176, “Div 3 SX pump trip during start up of 9069.01,” and the detailed RCA 4022176, “Failure to Correct an Identified Degraded Condition Results in a Division 3 SX Pump Failure and NRC Corrective Action White Finding,” to verify the root causes were appropriately determined and CAPRs were properly identified and implemented.

The licensee identified the following two root causes:

- Incremental increase of internal pump resistance could not be overcome by developed torque of the motor starting from standby; and
- The corrective action to replace the Division 3 SX Pump created in the 2014 Root Cause Report (RCR 2577348) was not timely to prevent recurrence.

During the review of the first root cause listed above, the inspectors noted the associated corrective action to prevent recurrence (Action Tracking Assignment 4022176–42) which stated, “Replace the Division 3 SX pump causal components with the following improved components: Packing, Packing Shaft Sleeves, Shaft Sleeves, Pump and Motor,” was documented as complete on October 15, 2017.

The inspectors reviewed Engineering Change (EC) 404025, dated September 13, 2017, which authorized installation of the shaft sleeves and a packing shaft sleeve made of an improved material. Section 4.1.13 of the EC stated, “Since there is the potential for accelerated corrosion at the packing sleeve due to wet/dry cycles, a conservative approach is recommended to establish a PM task to inspect the packing shaft sleeve for corrosion every 12 months and replace if necessary. The packing should also be replaced. If no significant corrosion is noted, extending the PM frequency can be evaluated.” The licensee considered the development of the PM activity to be a corrective action (rather than a CAPR) and assigned action tracking assignment number 2044176–45 to this activity.

The inspectors determined that once the PM task was recommended to address the fact the corrosion issues (i.e. accelerated packing sleeve corrosion) would not be prevented from recurring by replacement of the causal components, the licensee was required to have completed a change of intent in accordance with the corrective action program procedure prior to documenting CAPR 4022176–42 as closed or completed on October 15, 2017. Specifically, step 4.7.1.1 of PI–AA–125 requires, “If the intent (i.e., deviation from the specified action) of a CAPR cannot be performed as defined in Action Tracking, the responsible department head shall bring the [intent] change back to MRC for review and approval of the change. The CAPR assignment will be documented to indicate why the intent of the assignment was changed.” In addition, step 4.7.1 of PI–AA–125, “Corrective Action Program,” stated in part, “Assignments for CAPRs… shall be entered in Action Tracking and a CAPR or FWAP can only be closed to another CAPR or after the defined action is completed.” Neither of these steps were performed correctly once the licensee determined the CAPR directed at replacing the causal components would not prevent recurrence of a

Division 3 SX pump failure due to sleeve corrosion. The licensee captured this issue in the corrective action program under AR 04175709.

Corrective Actions: In response to the inspectors concerns the licensee generated AR 4175709. The licensee upgraded CA 4022176-45 to a CAPR which required the licensee to "Evaluate and install a packing shaft sleeve not susceptible to identified corrosion or establish a PM to preclude corrosion effects."

Corrective Action Reference: AR 04175709

Performance Assessment:

Performance Deficiency: The inspectors determined the failure to accomplish activities affecting quality in accordance with the Quality Assurance Topical Report, through the implementation of the corrective actions program procedure PI–AA–125, "Corrective Actions Program," was contrary to 10 CFR 50, Appendix B, Criterion II, "Quality Assurance Program," and was a performance deficiency.

Screening: The performance deficiency was determined to be more than minor because if left uncorrected, it would have the potential to lead to a more significant safety concern. Specifically, the failure to appropriately document corrective actions to prevent recurrence and ensure those actions are completed prior to assignment closure could result in ongoing corrosion being unidentified and/or uncorrected possibly resulting in an additional pump failure.

Significance: The inspectors determined the finding affected the Mitigating Systems Cornerstone and assessed its significance using SDP Appendix A, "The Significance Determination Process for Findings At-Power," Exhibit 2, "Mitigating Systems Screening Questions." The finding screened as having very low safety significance (Green) because the inspectors were able to answer "No" to all of the associated screening questions.

Cross-cutting Aspect: The finding had a cross-cutting aspect in the Resources component of the Human Performance cross-cutting area which states leaders shall ensure personnel, equipment, procedures, and other resources are available and adequate to support nuclear safety. Specifically, the organization failed to perform a change of intent in accordance with step 4.7.1. of procedure PI–AA–125, "Corrective Action Program," after the licensee determined the packing shaft sleeve remained vulnerable to corrosion and wear mechanisms addressed by the parts replacements performed under Action Tracking Assignment 4022176–42. (H.1)

Enforcement:

Violation: Title 10 CFR 50, Appendix B, Criteria II. "Quality Assurance Program," requires in part "a Quality Assurance Program which complies with the requirements of this appendix. This program shall be documented by written policies, procedures, or instructions and shall be carried out throughout plant life in accordance with those policies, procedures, or instructions."

The Exelon Quality Assurance Program was described in "Quality Assurance Topical Report (NO–AA–10)," Revision 92. Chapter 16 of NO–AA–10 states, in part, "the company

implements a Corrective Action Program to promptly identify and correct items or occurrences that are adverse to quality…"

Procedure PI–AA–125, "Corrective Action Program (CAP) Procedure" Revision 6, implements the requirements of the Quality Assurance Topical Report (QATR) as described in Chapter 16 of NO–AA–10. Step 4.7.1 states, in part, "Assignments for CAPRs shall be entered in Action Tracking and a CAPR can only be closed to another CAPR Assignment or after the defined action is completed." Step 4.7.1.1 states "If the intent of a CAPR cannot be performed as defined in Action Tracking, the responsible department head shall bring the change back to MRC for review and approval of the change. The CAPR assignment will be documented to indicate why the intent of the assignment was changed."

Contrary to the above, as of October 15, 2017, the licensee failed to carry out the corrective action portion of the quality assurance program as required by NO–AA–10, "Exelon Quality Assurance Program," and PI–AA–125, "Corrective Action Program." Specifically, the licensee closed CAPR 4022176–42 without completing the defined action of replacing the Division 3 SX pump causal components with the following improved components: packing, packing shaft sleeves, shaft sleeves, pump and motor. Furthermore, the licensee's closure of CAPR 4022176–42 relied on the establishment and performance of inspection activities documented under a corrective action assignment, which effectively resulted in the licensee closing CAPR 4022176–42 to a corrective action.

Disposition: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy."

Failure to Establish Acceptance Criteria for Component Performance Monitoring			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000461/2018041–02 Closed	H.13 Consistent Process	95001

Introduction:

The inspectors identified a Green finding and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instruction Procedures, and Drawings," due to the licensee's failure to include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. Specifically, the licensee failed to establish acceptance criteria for startup current and coast down time following implementation of performance monitoring tasks for these parameters as required by step 4.2 of ER–AA–20 "Equipment Reliability Program."

Description:

Following the Division 3 SX pump failure in 2014, the licensee evaluated the need and created a PM task to obtain startup current and coast down time on the Division 3 SX pump during every run. While reviewing RCA 4022176, the inspectors noted one of the contributing causes of the Division 3 SX pump issue was the failure to perform an adequate evaluation of pump issues identified during quarterly surveillances. Specifically, in March 2016 the licensee observed a step change in startup current, however no evaluation of the step change was documented in the issue report.

The inspectors held discussions with the licensee on whether specific acceptance criteria for startup current and coast down time had been established to determine when an additional evaluation of pump performance was needed. The licensee stated the monitoring program reviews data for general trends, and the site had no defined criteria to assess how the data being collected could impact reliable pump operation. The inspectors reviewed procedure ER–AA–20, "Equipment Reliability Program," Revision 5 and found Step 4.2, "Performance Monitoring," requires the licensee to "define the parameters and acceptance criteria for determining whether equipment is performing at an acceptable level." The licensee captured this issue in the corrective actions program as AR 4175693.

Corrective Actions: The licensee performed a review of current trends and determined the trends did not indicate degrading Division 3 SX pump performance. The site recommended actions to the system manager to determine acceptance criteria and or action limits for PMID 00159334–05 to limit the potential to misinterpret startup current or coast down time data.

Corrective Action Reference: AR 4175709

Performance Assessment:

Performance Deficiency: The inspectors determined the failure to establish monitoring criteria for startup current and coast down time in accordance with the Equipment Reliability Program was contrary to 10 CFR 50, Appendix B, Criterion V, "Instruction Procedures, and Drawings," and was a performance deficiency.

Screening: The performance deficiency was determined to be more than minor because it was associated with the mitigating systems cornerstone attribute of design control, and effected the cornerstone objective of ensuring the availability, reliability, and capability of mitigating systems to respond to initiating events to prevent undesirable consequences. Specifically, the failure to establish monitoring criteria to effectively track equipment and system performance prior to equipment failure had the potential to affect the reliability of the system.

Significance: The inspectors determined the finding affected the Mitigating Systems Cornerstone and assessed its significance using SDP Appendix A, "The Significance Determination Process for Findings At-Power," Exhibit 2, "Mitigating Systems Screening Questions." The finding screened as having very low safety significance (Green) because the inspectors were able to answer "No" to all of the associated screening questions.

Cross-Cutting Aspect: The finding had a cross-cutting aspect in the Consistent Process component of the Human Performance cross-cutting area, which states "Individuals use a consistent, systematic approach to make decisions. Risk insights are incorporated as appropriate." Specifically, individuals failed to use the systemic approach established in Exelon and site specific procedures to ensure acceptance criteria for monitoring the Division 3 SX pump's performance were defined to support nuclear safety.

Enforcement:

Violation: Title 10 CFR Part 50, Appendix B, Criterion V, "Instruction Procedures, and Drawings," requires, in part, "Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished." Licensee procedure ER–AA–20, "Equipment Reliability

Program," established the requirement to "define the parameters and acceptance criteria for determining whether equipment is performing at an acceptable level." Contrary to the above, as of September 21, 2018, the licensee failed to establish acceptance criteria for coast down time or startup current to determine whether equipment was performing at an acceptable level." Specifically, quarterly surveillance PMID-00159334-05 did not incorporate acceptance criteria to assess whether the operation of the Division 3 SX pump remained acceptable.

Disposition: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy."

Failure to Establish Adequate Effectiveness Reviews for Corrective Actions to Prevent Recurrence

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green FIN 05000461/2018041–03 Closed	[H.8] Procedure Adherence	95001

Introduction:

The inspectors identified a Green finding for the failure to establish effectiveness reviews in accordance with procedure PI–AA–125–1004, "Effectiveness Review Manual." Specifically, the licensee failed to establish effectiveness reviews (EFRs) which analyzed and documented that the causes of the Division 3 SX pump failure had been eliminated or had reduced the recurrence rate to an acceptable level following implementation a final CAPR.

Description:

As discussed earlier in this report, the licensee implemented two CAPRs to address the failure of the Division 3 SX pump to start during a planned surveillance test. The team reviewed the EFRs associated with the CAPRs to ensure the EFRs analyzed and documented that the causes of the Division 3 SX pump failure had been eliminated or had reduced the recurrence rate to an acceptable level in accordance with the licensee's CAP procedures.

The team reviewed EFR 4022176–49 which was associated with the CAPR to replace the Division 3 SX pump causal components with improved components. This effectiveness review was completed on December 22, 2017. The inspectors noted the purpose of EFR 4022176–49 was to "validate the rebuilt Division 3 SX pump meets quarterly surveillance requirements." Through a review of procedure PI–AA–125–1004, "Effectiveness Review Manual," the inspectors noted the licensee was required to ensure the causes of a failure had been eliminated or reduced as part of the effectiveness review. Specifically, the procedure stated the following:

- Step 4.3.4 stated, "Determine whether the recurrence rate has been eliminated or reduced to an acceptable level since the corrective action has been implemented;" and
- Step 4.3.5 stated, "The evaluation should determine effectiveness at the lowest practical level."

The inspectors determined that establishing an effectiveness review to validate the rebuilt Division 3 SX pump meets quarterly surveillance requirements would not ensure the recurrence rate of the identified root and contributing causal factors had been eliminated or reduced to an acceptable level. The team concluded this because the Division 3 SX pump passed all required surveillance testing prior to failing in June 2017. In addition, the quarterly surveillance tests did not contain any steps to perform inspections aimed at identifying corrosion internal to the pump. Lastly, because the licensee's EFR procedure stated that effectiveness should be established at the lowest level possible the licensee failed to meet step 4.3.5 of procedure PI–AA–1004.

Corrective Actions: The licensee generated AR 4175709 to capture these concerns and to revise EFR 4022176–49 to address potential causal factors (wear and corrosion) at the appropriate level in accordance with procedure PI–AA–125–1004. Specifically, the licensee planned to review the results of the first packing shaft sleeve inspection to ensure the inspection frequency eliminated or reduced the recurrence rate.

Corrective Action Reference: AR 4175709

Performance Assessment:

Performance Deficiency: The inspectors determined the failure to generate an EFR which analyzed and documented the cause of issue had been eliminated or had reduced the recurrence rate to an acceptable level was contrary to Step 4.3.6 of PI–AA–125 which required the licensee to "perform effectiveness reviews in accordance with PI–AA–124–1004" and was a performance deficiency.

Screening: The performance deficiency was determined to be more than minor because if left uncorrected, it would have the potential to lead to a more significant safety concern. Specifically, the failure to establish an adequate EFR could result in the licensee failing to identify an ineffective CAPR and lead to a recurring pump failure.

Significance: The inspectors determined the finding affected the Mitigating Systems Cornerstone and assessed its significance using SDP Appendix A, "The Significance Determination Process for Findings At-Power," Exhibit 2, "Mitigating Systems Screening Questions." The finding screened as having very low safety significance (Green) because the inspectors were able to answer "No" to all of the associated screening questions.

Cross-cutting Aspect: The finding had a cross-cutting aspect in the Procedure Adherence component of the Human Performance cross-cutting area, which states individuals shall follow processes, procedures, and work instructions. Specifically, individuals failed to ensure appropriate EFRs were established in accordance with procedures to determine whether a CAPR action has effectively resolved the condition and whether the CAPR has effectively eliminated or reduced the recurrence rate to an acceptable level. (H.8)

Enforcement:

The inspectors did not identify a violation of regulatory requirements associated with this finding since EFRs are not required by the NRC.

(4) Evaluation of IMC 0305 Criteria for Treatment of Old Design Issues

Observation	95001
The licensee did not request credit for self-identification of an old design issue; therefore, the risk-significant issue was not evaluated against the IMC 0305 criteria for treatment of an old design issue.	

EXIT MEETINGS AND DEBRIEFS

The inspectors confirmed proprietary information had been controlled to protect from public disclosure. No proprietary information was documented in this report.

- On October 19, 2018, the inspectors presented the Supplemental Procedure 95001 inspection results to Mr. T. Stoner, Site Vice President, and other members of the licensee staff.

  On October 19, 2018, the NRC also held a Regulatory Performance Meeting with Clinton Station as required by IMC 0305, Section 10.01.a. The meeting was attended by the Division of Reactor Projects Branch Chief for Clinton (who now serves as the Chief of Engineering Branch 2 in the Division of Reactor Safety), the Site Vice President and other senior licensee staff. The NRC and licensee discussed the issues related to the White Finding/Violation including the causes, corrective actions, extent of condition and extent of cause, and other planned licensee actions. The criteria required for returning to the Licensee Response Column of the Action Matrix was also discussed.

DOCUMENTS REVIEWED

95001—Supplemental Inspection Response to Action Matrix Column 2 Inputs

- AR 4022176; DIV III SX Pump Tripped During Start Up of 9069.01; 06/15/2017
- CPS 8210.02; DIV III SX Pump Maintenance; Revision 12
- EC 404025; DIV III SX Pump Lower Bearing Failure – New Information from Pump Vendor; Revision 2
- EC 404045; DIV III SX Pump Lower Bearing Failure – New Information from Pump Vendor; Revision 2
- EC 618700; Design: Review Electrical Calcs, Breaker Settings, and Affected Documents for 1SX01PC Replacement Motor; Revision 0
- ER-AA-10; Equipment Reliability Process Description; Revision 9
- ER-AA-20; Equipment Reliability Program Description; Revision 5
- ER-AA-200; Preventive Maintenance Program; Revision 4
- ER-AA-2003; System Performance Monitoring and Analysis; Revision 14
- IR 4022176; Failure to Correct and Indentified Condition Results in a Division 3SX Pump Failure and NRC Corrective Action White Finding; Revision 3
- IR 4174550: NRC ID: VTIP Update for Pump Lift Not Incorporated in Procedure
- IR 4174781: 1SX01FC: Division 3 SX Strainer Packing Gland Has Corrosion; 09/19/2018
- IR 4175273; NRC ID: CA-45 Missing from CA Table in RCR 04022176
- IR 4175693: NRC ID: NRC 95001 1SX01PC Acceptance Criteria; 09/21/2018
- IR 4175709: NRC ID: NRC 95001 Issues of Concern for DIV 3 SX RC; 09/21/2018
- IR 4175710: NRC ID: PM From CA 4022176-45 Exceeded 1Y; 09/21/2018

- MA-AA-716-230; Predictive Maintenance Program; Revision 11
- MA-AA-716-230-1002; Vibration Analysis Accepptance Guideline; Revision 5
- PI-AA-125; Corrective Action Program; Revision 6
- PI-AA-125-1001; Root Cause Analysis Manual; Revision 3
- PI-AA-125-1004; Effectiveness Review Manual; Revision 2
- Powerlabs Packing Failure Analysis; 07/27/2017
- RCR 04022176; DIV III SX Pump Failure; 07/06/2018
- RER Pump Performance Test Report; 11/27/2017
- Sulzer Pumps As Found Report and Repair Plan; 10/27/2017
- WO 1769847; DIV III SX Pump Maintenance; 09/17/14
- WO 1817681; EM 1SX01PC – Obtain Baseline Running Amperages; 04/02/2015
- WO 1822901; Op Run DIV III SX Pump for 2 HRS then Time Coastdown; 09/16/2015
- WO 1822901; Op Run DIV III SX Pump for 2 HRS then Time Coastdown; 06/19/2015
- WO 1887857; 9069.01C20 Op SX Pump Operability Test (SX Pump C); 03/16/2016
- WO 4596872; Replace 1SX01PC with New Design EC 404025; 09/21/2017
- WO 4662777; 9069.01C20 Op SX Pump Operability Test (SX Pump C); 09/12/2017