UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE ROAD, SUITE 210
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November 1, 2019

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

SUBJECT: DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3 – INTEGRATED INSPECTION REPORT 05000237/2019003 AND 05000249/2019003

Dear Mr. Hanson:

On September 30, 2019, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Dresden Nuclear Power Station, Units 2 and 3. On October 8, 2019, the NRC inspectors discussed the results of this inspection with Mr. P. Karaba and other members of your staff. The results of this inspection are documented in the enclosed report.

One finding of very low safety significance (Green) is documented in this report. This finding did not involve a violation of NRC requirements.

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 Dresden.

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/

Kenneth R. Riemer, Chief
Branch 1
Division of Reactor Projects

Docket Nos. 05000237 and 05000249
License Nos. DPR-19 and DPR-25

Enclosure:
As stated

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Letter to Bryan Hanson from Kenneth Riemer dated November 1, 2019.

SUBJECT: DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3 – INTEGRATED INSPECTION REPORT 05000237/2019003 AND 05000249/2019003

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers:	05000237 and 05000249
License Numbers:	DPR-19 and DPR-25
Report Numbers:	05000237/2019003 and 05000249/2019003
Enterprise Identifier:	I-2019-003-0063
Licensee:	Exelon Generation Company, LLC
Facility:	Dresden Nuclear Power Station, Units 2 and 3
Location:	Morris, IL
Inspection Dates:	July 01, 2019 to September 30, 2019
Inspectors:	L. Alvarado Guilloty, Resident Inspector R. Elliott, Resident Inspector M. Garza, Emergency Preparedness Inspector J. Havertape, Resident Inspector A. Nguyen, Senior Resident Inspector C. Phillips, Project Engineer M. Porfirio, Illinois Emergency Management Agency
Approved By:	Kenneth R. Riemer, Chief Branch 1 Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting an integrated inspection at Dresden Nuclear Power Station, Units 2 and 3 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.

List of Findings and Violations

Inadequate Work Instructions for Operationally Critical Work			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green FIN 05000249,05000237/2019003-01 Open/Closed	[H.2] - Field Presence	71152
A self-revealed finding of very low safety significance was identified for the licensee's failure to provide adequate work instructions for maintenance activities on multiple occasions in accordance with procedures MA-AA-716-010, Maintenance Planning, and MA-AA-716-010-1015, Planning Operational Critical Component (OPCC) Tasks. Specifically, between December 2018 and May 2019, two instances of inadequate work instructions were identified as being primary causes of improper maintenance performed on OPCC systems that caused operational transients.			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
LER	05000237/2019-002-00	LER 2019-002-00 for Dresden Nuclear Power Station, Unit 2 Scram Due to Main Turbine Low Oil Pressure Trip.	71153	Closed

PLANT STATUS

Unit 2 began the inspection period at rated thermal power. On July 13, 2019, the unit was down powered to 70 percent for a control rod pattern adjustment. The unit returned to full power on July 14, 2019. On August 3, 2019, the unit was down powered to 68 percent for a control rod pattern adjustment. The unit returned to full power on August 4, 2019. Unit 2 began coast down for the upcoming scheduled refueling outage, D2R26, on August 14, 2019, and ended the inspection period in coast down.

Unit 3 began the inspection period at rated thermal power. On September 23, 2019, the unit performed an emergent down power and was taken off-line to repair an oil leak on the Unit 3 Main Power Transformer. During the forced outage (D3F52) for the transformer repairs, the unit maintained approximately 20 percent thermal power output without being connected to the grid. The unit synchronized back to the grid on September 27, 2019, and returned to full power on September 29, 2019. The unit remained at rated thermal power for the rest of the inspection period.

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 performed plant status activities described in IMC 2515 Appendix D, "Plant Status" and conducted routine reviews using IP 71152, "Problem Identification and Resolution." 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.

REACTOR SAFETY

71111.04Q - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (3 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

(1) Unit 2 isolation condenser alternate injection sources (primary out of service for maintenance) on September 3, 2019
(2) Unit 2 core spray system on September 17, 2019
(3) Unit 2 high pressure coolant injection system (HPCI) on September 19, 2019

71111.04S - Equipment Alignment

Complete Walkdown Sample (IP Section 03.02) (1 Sample)

(1) The inspectors evaluated system configurations during a complete walkdown of the cooling water systems on July 16 - 18, 2019.

71111.05A - Fire Protection (Annual)

Annual Inspection (IP Section 03.02) (1 Sample)

(1) The inspectors evaluated fire brigade performance during a drill in the administration building on July 18, 2019.

71111.05Q - Fire Protection

Quarterly Inspection (IP Section 03.01) (6 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

(1) Fire Zone 8.2.1B, Unit 3 Condensate Pump Floor, Elevation 469’ on July 9, 2019
(2) FZ 8.2.2B, Unit 3 CCSW Pump Floor, Elevation 495’ on July 9, 2019
(3) FZ 1.1.2.3, Unit 2 Reactor Building General Area, Elevation 545’ on July 31, 2019
(4) FZ 8.2.6A, Unit 2 Reactor Feed Pump Ventilation and Hydrogen Seal Oil Area, Elevation 538’ on July 31, 2019
(5) FZ 8.2.5.C, Unit 2/3 EHC Reservoir and Condensate Demineralizer Areas, Elevation 517' on September 9, 2019
(6) FZ 8.2.6.C, Unit 2/3 Lube Oil Reservoir and Common Mezzanine Areas, Elevation 534' on September 9, 2019

71111.07A - Heat Sink Performance

Annual Review (IP Section 02.01) (1 Sample)

The inspectors evaluated readiness and performance of:

(1) 2A and 2C shutdown cooling heat exchangers

71111.11Q - Licensed Operator Requalification Program and Licensed Operator Performance

Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (1 Sample)

(1) The inspectors observed and evaluated licensed operator performance in the Control Room during an emergent down power on Unit 3 to take the turbine off-line for repairs to the Main Power Transformer on September 24, 2019.

Licensed Operator Requalification Training/Examinations (IP Section 03.02) (2 Samples)

(1) The inspectors observed and evaluated licensed operator requalification training with Emergency Preparedness requalification requirements in the control room simulator on August 29, 2019.
(2) The inspectors observed and evaluated licensed operator requalification training with Emergency Preparedness requalification requirements in the control room simulator on September 12, 2019.

71111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness Inspection (IP Section 02.01) (2 Samples)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:

(1) Repetitive failures of the auxiliary electric equipment room (AEER) ventilation chiller compressors
(2) Unit 2 and 3 125V DC Power system and Batteries

Quality Control (IP Section 02.02) (1 Sample)

The inspectors evaluated maintenance and quality control activities associated with the following equipment performance activities:

(1) Unit 2 and 3 service water pump seal failures

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (4 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

(1) Elevated plant risk and fire risk for emergent work on the service water (SW) and Unit 2 control rod drive (CRD) systems July 7 - 10, 2019
(2) Elevated plant risk due to emergent leak on the Unit 2 stator water cooling system on July 25, 2019
(3) Elevated plant risk due to emergent troubleshooting and repair of the Unit 2 channel 'B' fuel pool radiation monitor and the 3A service water pump on August 5, 2019
(4) Unit 2 on-line risk increase to Yellow due to trip of 345 kV Line 1202 and emergent work on Unit 3 to troubleshoot and repair the 3A fuel pool radiation monitor on September 3-5, 2019

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 02.02) (4 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

(1) 3A containment cooling service water (CCSW) keepfill system pressure below minimum limit
(2) Unit 3 125 VDC system level II ground
(3) 3B electromatic relief valve (ERV) flange torque low
(4) Potential vulnerability identified with torus vacuum breakers

71111.18 - Plant Modifications

Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (2 Samples)

The inspectors evaluated the following temporary or permanent modifications:

(1) Unit 2 and Unit 3 Fuel Pool Cooling pumps trip logic (permanent modifications)
(2) Defeating the Unit 2 'C' Moisture Separator High Level Switches Automatic Turbine Trip function (temporary modification)

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (5 Samples)

The inspectors evaluated the following post maintenance tests:

(1) DOS 1300-05, 2/3 B isolation condenser makeup pump capacity test, after preventive maintenance on August 21, 2019
(2) DFPS 4123-06, 2/3 diesel fire pump capacity test, after replacement on July 24 - 26, 2019
(3) DOS 6600-01, Unit 3 emergency diesel generator surveillance test, after work on the lubricating oil system on September 16, 2019
(4) DIS 1500-06, Unit 3 low pressure coolant injection recirculation loop select logic on September 3, 2019
(5) WO 4962865-13, Electrical Testing of Main Power Transformer 3, after bushing replacement on September 25, 2019

71111.20 - Refueling and Other Outage Activities

Refueling/Other Outage Sample (IP Section 03.01) (1 Sample)

(1) The inspectors evaluated D3F52, Unit 3 forced outage to replace a leaking bushing on the Main Power Transformer, from September 23-27, 2019.

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Surveillance Tests (other) (IP Section 03.01) (3 Samples)

(1) DIS 0260-12, U3 reactor core flow calibrated transmitter calibration on July 24, 2019
(2) DES 8300-58, Unit 2 125V main station battery technical specification surveillance test on September 10, 2019
(3) DOS 6600-08, Unit 3 EDG cooling water pump comprehensive test on September 16, 2019

Inservice Testing (IP Section 03.01) (1 Sample)

(1) Work Order 04936060-01, Unit 2 HPCI Inservice testing surveillance (IST) on September 18, 2019

71114.04 - Emergency Action Level and Emergency Plan Changes

Inspection Review (IP Section 02.01-02.03) (1 Sample)

(1) The inspectors evaluated the following submitted Emergency Action Level and Emergency Plan changes.
- Evaluation 18-45; Exelon Nuclear Standardized Radiological Emergency Plan, Revision 30; February 7, 2019

This evaluation does not constitute NRC approval.

71114.06 - Drill Evaluation

Select Emergency Preparedness Drills and/or Training for Observation (IP Section 03.01) (1 Sample)

(1) 3rd Quarter Emergency Preparedness Full Team Drill on August 20, 2019

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

MS05: Safety System Functional Failures (SSFFs) Sample (IP Section 02.04) (2 Samples)

(1) Unit 2, July 1, 2018 - June 30, 2019
(2) Unit 3, July 1, 2018 - June 30, 2019

MS08: Heat Removal Systems (IP Section 02.07) (2 Samples)

(1) Unit 2, July 1, 2018 - June 30, 2019
(2) Unit 3, July 1, 2018 - June 30, 2019

MS09: Residual Heat Removal Systems (IP Section 02.08) (2 Samples)

(1) Unit 2, July 1, 2018 - June 30, 2019
(2) Unit 3, July 1, 2018 - June 30, 2019

MS10: Cooling Water Support Systems (IP Section 02.09) (2 Samples)

(1) Unit 2, July 1, 2018 - June 30, 2019
(2) Unit 3, July 1, 2018 - June 30, 2019

71152 - Problem Identification and Resolution

Annual Follow-up of Selected Issues (IP Section 02.03) (2 Samples)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issues:

(1) Complete loss of power to security equipment due to failure of the UPS batteries
(2) Unit 2 turbine trip and reactor scram

71153 – Follow-up of Events and Notices of Enforcement Discretion

Event Report (IP Section 03.02) (1 Sample)

The inspectors evaluated the following licensee event reports (LERs):

(1) LER 05000237/2019-002-00, Unit 2 Scram due to Main Turbine Low Oil Pressure Trip (ADAMS ML 19189A087)
The circumstances surrounding this LER are documented in report Section 71152. A Green finding related to this follow-up inspection is documented in the Results section.

INSPECTION RESULTS

Inadequate Work Instructions for Operationally Critical Work			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green FIN 05000249,05000237/2019003-01 Open/Closed	[H.2] - Field Presence	71152

A self-revealed finding of very low safety significance was identified for the licensee's failure to provide adequate work instructions for maintenance activities on multiple occasions in accordance with procedures MA-AA-716-010, Maintenance Planning, and MA-AA-716-010-1015, Planning Operational Critical Component (OPCC) Tasks. Specifically, between December 2018 and May 2019, two instances of inadequate work instructions were identified as being primary causes of improper maintenance performed on OPCC systems that caused operational transients.

Description:

On May 9, 2019, Dresden Unit 2 turbine tripped on low oil pressure which resulted in a reactor SCRAM. The turbine was inspected and found to have severe damage to the spline interface between the Main Gear Quill Shaft and the High Pressure turbine rotor. This led to a loss of power transfer between the main turbine and the Main Shaft Oil Pump (MSOP) which supplies bearing header pressure at rated speed, thus causing the low oil trip. The licensee performed a root cause analysis subsequent to this event and identified that the cause of the spline damage was due to oil starvation because of an improperly fabricated gasket that blocked oil lubrication feeding the Quill Shaft. The root cause was determined to be improper work order instructions that lacked detail needed to prevent human error during installation of the Quill Shaft Oil Nozzle. The work order instructions contained one step for the installation of the oil spray nozzle, which simply instructed workers to "install the oil spray nozzle…and verify the nozzle is centered." The actual work needed to complete this step involved identifying the proper gasket and fabricating it appropriately to fit the oil block, verifying proper oil flow after installation, and aligning the nozzle to ensure the oil lubrication traveled to all the correct components. Also, it was identified that a post-maintenance test (PMT) was never completed for the work (all work collectively) on the turbine front standard

which could have included verifying proper lubrication of components. The contributing cause was determined to be inadequate supervision which failed to catch the missing work step details and provide intrusive observations during the work activity.

Exelon procedure, MA-AA-716-010, Maintenance Planning, Revisions 21-26, section 4.10 describes the level of detail required for work instructions. Level 1 work packages are for complex, infrequently performed work that presents high risk of single failure or errors that could cause a unit/generator trip or transient. These packages should contain minimal reliance on skill of the craft, must clearly provide acceptance criteria, such as clearances and torque values, and shall have technical human performance standards incorporated to prevent human performance errors, which include having steps to verify new parts satisfy fit, form, and functions and assuring appropriate detail to install components is provided. This procedure also provides the definition of a Critical Activity, which is an activity where the quality of the work cannot be fully assured through a PMT or the PMT can only be performed in a condition where the correction of any failure would cause a down power, dose impact, or impact outage critical path. Procedure MA-AA-716-010-1015, Planning Operational Critical Component (OPCC) Tasks, Revisions 0-5, provide the definition of OPCCs and the categories of work for OPCC tasks. An Operational Critical Component (OPCC) is a "critical component whose failure alone has or could have directly led to a significant (>20%) plant power transient." Operational Critical Component Work Requirement Standards are "additional work controls administered through verification, oversight, technical review, or additional or more restrictive tolerances, that are incorporated into the work instructions for an OPCC that reduce the risk of introducing latent issues or operational failures because of improperly performed work."

For the turbine front standard work, as described above, the one large step of installing the oil spray nozzle did not meet the requirements of MA-AA-716-010 for a Level 1 package. Clear acceptance criteria were not provided, technical human performance standards were not adequately incorporated, and Critical Activities throughout the work package were not identified since no PMTs were required to validate the system configuration after maintenance. Also, the planning standards for OPCC work were not put into the work package, such as having additional verification, technical oversight, and supervisory oversight.

An additional example of a lack of adherence to proper work planning practices was identified that was similar in nature to the turbine front standard work. The inspectors determined that these items together (along with other equipment issues that did not have operational consequences) were indicative of programmatic issues with the licensee failing to follow the Maintenance Planning and Planning of OPCC Tasks procedures. The additional example is described below.

On December 20, 2018, it was identified that a leak on the Unit 3 electro-hydraulic control (EHC) skid had degraded significantly to a steady stream of approximately 10 gallons per day (from 2 gallons per day). At this time, the decision was made to emergently down power the unit to affect repairs to a leaking fitting on the suction line that leads to the accumulators on the EHC skid. An equipment cause evaluation was performed and determined that one of the causes of the event was maintenance leadership missed an opportunity for proper work order instruction challenge and oversight to support execution. During the prior refueling outage (October 2018), the EHC system had maintenance performed on it by supplemental employees which included replacing this fitting. The work package for this work was not considered a Level 1 work package and the EHC system was not flagged as an operationally

critical system or component. However, further investigation revealed that the EHC system was, in fact, classified as an OPCC back in 2009 but the information for the system was not updated appropriately to account for this. Due to those facts, the package did not receive extensive reviews or challenges during the work planning process. Another cause identified for the leak was that the wrong material was selected for the fitting due to a lack of procedural guidance. There was operating experience available for proper material selection that was not incorporated into the work planning process. If the work package had been categorized differently, the more robust work planning standards of ensuring proper parts that satisfy form, fit, and function and work packages that contain minimal reliance on skill of the craft, would have been included in the work planning process. Also, additional supervisor oversight and reviews would have been required prior to and during the work.

Corrective Actions: For the turbine trip root cause, the licensee implemented corrective actions to prevent recurrence (CAPRs) which included updating the model work orders for maintenance on turbine front standards to ensure all steps had proper level of detail for work execution with minimal reliance on skill of the craft and added PMT steps for verifying proper oil flow for the front standard components. Another corrective action for this issue included developing a "Key Steps" process where all OPCC work orders, as a minimum, will have steps identified that require supervisor sign-offs and oversight, because of the execution significant or risk significant nature of the step.

For the EHC leak issue, the licensee implemented a Supplemental Worker Oversight Plan to improve work order challenges and increase the level of oversight at the time of work execution. Another corrective action for this issue included developing procedural guidance, including material selection and appropriate tightening methods, for flared fittings used in the EHC system.

Corrective Action References: ARs 4204937 and 4247636

Performance Assessment:

Performance Deficiency: The inspectors determined that the licensee's failure to follow procedures MA-AA-716-010, Maintenance Planning, and MA-AA-716-010-1015, Planning Operational Critical Component (OPCC) Tasks, was a performance deficiency. Specifically, on two separate occasions, equipment failures on OPCC systems occurred that caused operational transients (either needed emergent down powers for repair or caused a plant trip). The causes of the equipment failures were determined to be inadequate work instructions. The aforementioned procedures delineate the requirements for the level of detail needed in Level 1 work packages and also needed for OPCC work activities.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Procedure Quality attribute of the Initiating Events cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, on two separate occasions, equipment failures on OPCC systems, caused by inadequate work instructions, occurred that caused operational transients (either needed emergent down powers for repair or caused a plant trip).

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The finding was screened against the Initiating Events cornerstone and determined to be of very low safety significance (Green) because even though one of the events caused a reactor trip, mitigating equipment

relied upon to transition the plant from the onset of the trip to a stable shutdown condition was not lost.

Cross-Cutting Aspect: H.2 - Field Presence: Leaders are commonly seen in the work areas of the plant observing, coaching, and reinforcing standards and expectations. Deviations from standards and expectations are corrected promptly. Senior managers ensure supervisory and management oversight of work activities, including contractors and supplemental personnel. Specifically, for the events related to this finding, it was identified that management oversight of the work planning and execution processes was lacking and contributed to the events that occurred. It was determined that oversight of supplemental workers was lacking as a whole, including reviewing work packages and performing supervision of field activities. The licensee generated corrective actions from these events, as well as others, to address the intrusiveness, standards, and expectations of supervisors going forward and clearly defining their roles and responsibilities in the work planning process.

Enforcement:

Inspectors did not identify a violation of regulatory requirements associated with this finding.

Observation: Loss of Power to all Security Equipment due to UPS Battery Failure	71152

On November 4, 2018, power for critical security equipment was being transferred from the security diesel generator back to its normal power supply. As part of this evolution, an uninterruptible power supply (UPS) carries the loads for a certain period of time. It was during this time on the UPS system that a loss of power occurred to all the loads being carried by the UPS. Appropriate compensatory measures were put into place, power was restored after the initial inspection of equipment, and an equipment cause analysis was performed after the event. Two causes were identified during the causal review: 1) the licensee failed to properly monitor the UPS battery conditions which prevented identification of the degraded battery and 2) improper technical rigor was used during the engineering change that replaced the batteries after a similar failure occurred in 2014. The inspectors reviewed the supporting information for these cause determinations and concluded the most likely causes were failure to properly monitor the UPS battery conditions and inappropriate corrective actions taken for previously identified conditions (i.e. battery environment) from the 2014 failure. The licensee also had operating experience available in the 2014 and subsequent time frames to be able to identify that the batteries were not being maintained properly from both environmental conditions and from monitoring and control perspectives. The licensee agreed with the inspectors that their actions taken from previous events could have mitigated, if not prevented, this failure and are taking appropriate actions to incorporate the lessons learned into their CAP process. The inspectors reviewed the licensee's corrective actions for this event and determined that they were written to address the identified causes properly and were executed in a timely manner in accordance with their safety significance. There was a performance deficiency identified by the inspectors for this event. It will be documented in Inspection Report 2019-0411.

Observation: Review of Root Cause for Unit 2 Turbine Trip	71152

On Thursday, May 9, 2019, Dresden Unit 2 turbine tripped on low oil pressure which resulted in a reactor SCRAM. The turbine was inspected and found to have severe damage to the spline interface between the Main Gear Quill Shaft and the High Pressure turbine rotor. This led to a loss of power transfer between the main turbine and the Main Shaft Oil Pump

(MSOP) which supplies bearing header pressure at rated speed, thus causing the low oil trip.

The licensee performed a root cause analysis subsequent to this event to review the turbine inspection information, prior work history for the main turbine, and relevant operating experience. It was identified that the cause of the spline damage was due to oil starvation because of an improperly fabricated gasket that blocked oil lubrication feeding the Quill Shaft. The root cause was determined to be improper work order instructions that lacked detail needed to prevent human error during installation of the Quill Shaft Oil Nozzle. The contributing cause was determined to be inadequate supervision which failed to catch the missing work step details and provide intrusive observations during the work activity. The inspectors reviewed the work order and the licensee's procedures for work and maintenance planning and determined that the root cause was reasonable. The work order instructions contained one step for the installation of the oil spray nozzle, which simply instructed workers to "install the oil spray nozzle…and verify the nozzle is centered." The actual work needed to complete this step involved identifying the proper gasket and fabricating it appropriately to fit the oil block, verifying proper oil flow after installation, and aligning the nozzle to ensure the oil lubrication travels to all the correct components. Also, it was identified that a post-maintenance test (PMT) was never completed for the work (all work collectively) on the turbine front standard which could have included verifying proper lubrication of components. The licensee determined that a PMT was not standard practice for this type of work activity. .

The licensee implemented corrective actions to prevent recurrence (CAPRs) which included updating the model work orders for maintenance on turbine front standards to ensure all steps had proper level of detail for work execution with minimal reliance on skill of the craft and added PMT steps for verifying proper oil flow for the front standard components. The inspectors concluded that these CAPRs seemed appropriately focused to address the root cause and preclude repetition. The CAPRs were also being implemented in a timely fashion prior to start of the next refueling outage when turbine front standard work will be conducted. Another corrective action included developing a "Key Steps" process where all operationally critical (OPCC) work orders, as a minimum, will have steps identified that require supervisor sign-offs and oversight, because of the execution significant or risk significant nature of the step. This action addressed both the root cause and the contributing cause. The inspectors will ensure the effectiveness of this corrective action when reviewing work orders for the next refueling outage to ensure the process is utilized appropriately.

The licensee also performed an extent of cause and extent of condition review for this event. It was determined that the work order for the turbine front standard work was classified as a Level 1 work package on an OPCC component. Per the licensee's work and maintenance planning processes, Level 1 package should include sufficient detail with minimal reliance on skill of the craft and can include Critical Activities to ensure a high level of maintenance work execution. As corrective actions to address this, the licensee reinforced the standards for planning and reviewing Level 1 OPCC work packages and performed a comprehensive review of other work on the turbine and generator systems prior to the next refueling outage to ensure Critical Activities were identified for component work that had the potential to impact the proper operation of the systems once returned to service (i.e. ensuring design features that could block or resist flow were properly fabricated and assembled). The licensee also shared this operating experience with the other sites within the fleet that could be impacted by work on GE turbines done by supplemental workers. The inspectors determined that the licensee appropriately performed the extent of condition and cause assessments, although it was noted that other systems, not just the turbine and generator systems, could be considered Level 1 OPCC activities that could be completed by

supplemental workers and should be considered when reviewing work packages for identifying Critical Activities and Key Steps. This was discussed with the licensee and these work packages are currently under review prior to the next refueling outage. The inspectors determined that the corrective actions for the extent of cause and condition seemed reasonable, were being implemented in a timely manner, and were appropriately shared within the fleet as operating experience to address any potential generic implications when conducting this type of maintenance.

This event and cause evaluation was reviewed by the inspectors for a potential performance deficiency. A finding was identified for failure to provide adequate work instructions to perform the work, as described by the identified root cause above. This finding is documented in the results section.

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On October 8, 2019, the inspectors presented the integrated inspection results to Mr. P. Karaba and other members of the licensee staff.
- On October 3, 2019, the inspectors presented the Exit Meeting for EP Inspection per IP 71114, Attachment 4 inspection results to Mr. L. Baker, EP Fleet Programs Manager and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.04Q	Corrective Action Documents	2509721	Water Leaking Out of Capped End of 2/3-4399-41B	06/02/2015
		4144225	Isolation Condenser 2-1301-3 Valve Troubleshooting	06/04/2018
		4231262	Solenoid Buzzing on 2-1301-20 Valve	03/19/2019
		4277181	OPS Services Crew Clock Reset - Tagout Special Instructions	09/03/2019
	Drawings	M-27	Diagram of Core Spray Piping	AAN
		M-28	Diagram of Isolation Condenser Piping	LR
		M-51	Diagram of High Pressure Coolant Injection Piping	CV
		M-51	High Pressure Coolant Injection System and Instrumentation	05
	Miscellaneous	Tagout: 02-43-2019043-001	Disassemble & Inspect 2-4399-73, Iso Fill Check Valve	09/03/2019
	Procedures	DOP 1300-M1/E1	Unit 2 Isolation Condenser System Checklist	22
		DOP 1400-E1	Unit 2 Core Spray System Electrical Checklist	04
		DOP 1400-M1	Unit 2 Core Spray System	24
		DOP 2300-M1/E1	Unit 2 HPCI System Checklist	39
		DOS 1300-02	Isolation Condenser Valve Operability Check	21
71111.04S	Corrective Action Documents	1671923	TBCCW HX SW Inlet Vlv Leaking	06/17/2014
		2603789	U2 TBCCW TCV Tube Track Support for Air Lines Not Secured	12/22/2015
		2647884	Degraded Flex Hose for 3A CB Casing Eqz ISO Valves	03/30/2016
		2729005	MO 2-3903-B Will Not Close From Remote Control Switch	10/17/2016
		4059747	TBCCW Piping at 3B Cond Pump in Contact - Needs Support	10/02/2017
		4165056	U3 EHC TBCCW TCV has Corrosion	08/17/2018
		4190724	3-3903-A Did Not Operate From the Control Room	11/01/2018
		4191332	3A TBCCW HX Tube Side Vent Plugged	11/02/2018
		4191334	3B TBCCW HX Vent Line Plugged	11/02/2018
		4193329	Packing Leak Noted on 3-3903-B	11/09/2018
		4216616	Packing Leak on U2 'B' TBCCW HX SW Inlet Valve	02/02/2019
		4231347	3B TBCCW Heat Exchanger Tube Plugging	03/20/2019
		4231399	3B TBCCW Heat Exchanger Flange Corrosion	03/20/2019

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		4249402	3-3399-451B 3B TBCCW HX Tube Side Drn Vlv Leaking By	05/15/2019
		4264483	2A TBCCW Pump Seal Leak	07/16/2019
		4265165	3B RBCCW HC TCV is Full Open and Bouncing	07/18/2019
	Engineering Changes	622648	RBCCW/TBCCW Tube Plugging Evaluation	01/2018
	Procedures	DOP 3700-M2/E2	Unit 2 RBCCW System Checklist	17
		DOP 3800-1	Unit 3 Turbine Building Closed Cooling Water System Checklist	14
		DOP 3800-M1	Unit 2 Turbine Building Closed Cooling Water System Checklist	15
71111.05A	Fire Plans	FZ N/A	Administration Building, 1st Floor	2
	Procedures	OP-AA-201-003	Fire Drill Performance	17
71111.05Q	Corrective Action Documents	4277837	Work Not Performed Due to Leaky Isolation	09/09/2019
	Drawings	M-23	Diagram of Fire Protection Piping	AJ
	Fire Plans	FZ 1.1.2.3	Unit 2 Reactor Building General Area, Elevation 545’	5
		FZ 8.2.1B	Unit 3 Condensate Pumps Floor, Elevation 469’	3
		FZ 8.2.2B	Unit 3 CCSW Pumps Floor, Elevation 495’	3
		FZ 8.2.5.C	Unit 2/3 EHC Reservoir Area Elevation 517'	3
		FZ 8.2.5.C	Unit 2/3 Cond. Demin. Area Elevation 517'	2
		FZ 8.2.6.C	Unit 2/3 Lube Oil Reservoir Area Elev. 534'	3
		FZ 8.2.6.C	Unit 2/3 Heat Exchanger Area Elevation 534'	5
		FZ 8.2.6A	Unit 2 Reactor Feed Pump Ventilation and Hydrogen Seal Oil Area, Elevation 538’	6
	Miscellaneous	Tagout: 00-41-2019041-005	2/3 Cable Tunnel Fire Protection Strainer Inspection and Misc. Work	09/09/2019
	Procedures	OP-AA-201-007	Fire Protection System Impairment Control	0
		OP-AA-201-009	Control of Transient Combustible Material	23
71111.07A	Corrective Action Documents	4268275	FME in 2A SDC HX 2-1003-A	07/31/2019
		4274841	FM Retrieved From 2C SDC Heat Exchanger	08/27/2019
		4282295	Results of SPC 4268275-04	07/31/2019
	Miscellaneous		Eddy Current Examination Final Report for 2A Shutdown Cooling Heat Exchanger	July 2019

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Procedures	DTP 75	Heat Exchanger Inspection Program	00
		ER-AA-310-1002	Service Water Heat Exchanger Inspection Guide	8
	Work Orders	00847755	Eddy Current Test on 2A SDC HX	08/20/2011
		01477606	Eddy Current Test 2A SDC HX	07/30/2019
71111.11Q	Corrective Action Documents	4281544	Steam Leak From 3B1 FW Heater Upstream of 3-3607A	09/23/2019
		4281563	Unexpected Alarm 903-3 F-1, Area Rad Monitor Downscale	09/23/2019
		4281573	U3 CRD H-06 Failure to Settle During Downpower	09/23/2019
	Miscellaneous		LORT Simulator Guide with DEP Opportunity 19-01A	08/29/2019
	Procedures	DGP 01-01	Unit Startup	197
71111.12	Corrective Action Documents	4082328	AEER Thermostat Not Controlling Proper AEER Temp	12/08/2017
		4140956	U1 125 VDC Battery Terminal Corrosion	05/24/2018
		4166399	U2/3 BOP 250 VDC Batt Sys Trouble	08/22/2018
		4172858	U2 250VDC Charger DC Voltmeter	09/13/2018
		4175775	U1 125 VDC Battery Discrepancy Found During Quarterly Surveillance	09/22/2018
		4183312	250 V Voltmeter at 903-8 Requires Calibration	10/13/2018
		4183443	Compressor Trip Leads to DOA Entry (DOA 5750-01)	10/14/2018
		4184691	AEER Condensing Unit Trip	10/17/2018
		4186708	Aux Electric Equipment Room A/C Unit Keeps Tripping	10/23/2018
		4187463	U3 250 VDC Battery Surveillance Descrepancies	10/25/2018
		4189223	'B' AEER Compressor Not Running	10/30/2018
		4193837	U2 250 VDC Batt Ground With U3 HPCI AOP Running	11/11/2018
		4196472	U3 Alt Batt Elevated Intercell Resistance Reading	11/20/2018
		4197461	U3 250VDC Cell 110 Voltage Low	11/25/2018
		4197708	ETB Vent Performance Challenging U2 TS Battery Temperatures	11/26/2018
		4199704	TR-86 System Battery Has a Degraded Intercell Plate	12/03/2018
		4202901	MRule Function 5714-1 Needs (a)(1) Determination	12/13/2018
		4203895	TR-86 Relay House Battery Issues	12/17/2008
		4204924	Corrosion on U1 Batteries	12/20/2018
		4204986	U1 125 VDC Has 1 Cell With Voltage Low	12/20/2018
		4205733	'B' AEER Compressor Found Tripped	12/25/2018
		4206067	AEER HVAC B Compressor Needs Eval Due To Trip On	05/27/2018

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Low Oil	
		4207078	U2 125 VDC Battery Ground - Unexpected Alarm	12/31/2018
		4207290	U3 250V Battery System Cable Insulation Cracked	01/01/2019
		4207616	Battery Cell Specific Gravities Found High	01/02/2019
		4209140	U3 125 VDC Ground	01/08/2019
		4209145	U3 24/28V A Negative Cell 4 Low Volts	01/08/2019
		4209605	Entered DOA 5750-01 for AEER Ventilation Failure	01/10/2019
		4212946	U2 125 VDC Battery Ground	01/22/2019
		4222849	Unexpected Alarm 902-8 C-9, U2 125 VDC Batt Ground	02/23/2019
		4224966	Unexpected Alarm: U2 125 VDC Ground	02/28/2019
		4225117	U2 125 VDC Ground Alarm, 902-8 C-9	03/01/2019
		4225524	Unexpected Alarm: Unit 2 125 VDC Ground Alarm	03/01/2019
		4226960	Unexpected Alarm 9902-8 C-9, U2 125 VDC Batt Ground	03/06/2019
		4234155	Unknown Substance Found Floating in Cell of Battery	03/29/2019
		4234682	U1 B 125VDC Charger	03/30/2019
		4236853	P-105B 1B Battery Charger Could Not Maintain Correct Voltage	04/05/2019
		4247556	DOA 5750-01 Entry for AEER Temp Hi	05/08/2019
		4250039	Corrosion Found on U1 125VDC Batteries	05/18/2019
		4252768	U3 125VDC Discharge Rate High Alarm	05/30/2019
		4254008	Unexpected Alarm 903-8 C-9, 125 VDC Batt Ground	06/03/2019
		4255478	U3 125 VDC Batt Ground	06/08/2019
		4259821	Corrosion Identified During Battery Surveillance	06/27/2019
		4262209	U3 125 VDC Battery Ground	07/06/2019
		4262260	2/3 Service Water Pump Packing Degraded	07/06/2019
		4262914	Unexpected Alarm 903-8 C-9, 125 VDC Batt Ground	07/09/2019
		4264658	U1 125 VDC Battery Terminal Corrosion	07/17/2019
		4266014	U2 125 VDC Ground Alarm	07/22/2019
		4267550	Unexpected Alarm: U3 125 VDC Batt Ground	07/28/2019
		4268532	2A LPCI Room Cooler Inspection and Testing	07/31/2019
		4272610	2B Service Water Pump Mechanical Seal Leakage Excessive	08/16/2019
		4273689	Quality Issue from EagleBurgmann Repair Facility	08/22/2019

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Drawings	DR-PSA-005.16	Figure 2-6, ECCS Room Cooling Water/Diesel Generator Cooling Water	7
	Miscellaneous		Maintenance Rule System Basis Document for Dresden Unit 2, 39-1; Unit 0, 39-2; Unit 3, 39-2	08/12/2019
			Maintenance Rule System Basis Document for Dresden Unit 3, OOS-39-3	08/12/2019
			Maintenance Rule System Basis Document for Dresden Unit 2, 15-8	08/13/2019
			Maintenance Rule System Basis Document for Dresden Unit 2, Systems 83-1, 83-2, and 83-3	07/31/2019
			U0 Auxiliary Electric Equipment Room HVAC Maintenance Rule a(1) Action Plan	0
			Maintenance Rule System Basis Document for Dresden Unit 3, Systems 83-1, 83-2, and 83-3	07/31/2019
		DCR EC 618991	Design Consideration Summary: Service Water Pump Mechanical Seal VTIP D1171 Revision	000
		DCR EC 628838	Design Considerations Summary: Addition of Eagle Bergman Seals to the VTIP D1171 for Usage on Service Water Pumps	000
		DCS EC 401788	Install 2/3 Service Water Pump Open Line Shaft Design with Greene Tweed	000
		Eagle Burgmann Mechanical Seal (M.S.)	Manufacturer Operating Manual	7.0
		Flowserve Durametallic PSS III, Split Seal	Installation Instructions from Manufacturer	
	Procedures	ER-AA-320	Maintenance Rule Implementation Per NEI 18-10	00
		ER-AA-320	Maintenance Rule Implementation per NEI 18-10	00
		ER-AA-320-1001	Maintenance Rule 18-10 - Scoping	00
		ER-AA-320-1003	Maintenance Rule 18-10 - Failure Definition	00
		ER-AA-320-1004	Maintenance Rule 18-10 - Performance Monitoring and Dispositioning Between (a)(1) and (a)(2)	00
		ER-AA-320-1004	Maintenance Rule 18-10 - Performance Monitoring and	01

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Dispositioning Between (a)(1) and (a)(2)	
		ER-AA-320-1006	Maintenance Rule 18-10 - Expert Panel Roles and Responsibilities	00
		OP-AA-108-112	Plant Status and Configuration	11
		OP-AA-108-112-1001	Response to Identified Component Mispositionings	5
71111.13	Corrective Action Documents	4246346	3-1705-16B Spiked Causing RBV Trip and SBGT Auto-Start	05/04/2019
		4255645	Water Leak Between 2A Stator Pump and Head Tank	06/10/2019
		4261968	3A SW Pump Packing Leak	07/05/2019
		4262149	2B Service Water Pump Mechanical Seal Leakage Excessive	07/05/2019
		4262637	2A CRD Pump Inboard Seal Leak	07/08/2019
		4262824	Water Inside 2A CRD Feed Pump Breaker Cubicle	07/09/2019
		4263043	2/3 SW Pump Breaker Closing Springs Did Not Discharge on R/O	07/10/2019
		4263049	Breaker does not Indicate Disconnected when Disconnected	07/10/2019
		4263271	2/3 Service Water Pump Overcurrent Relay	07/11/2019
		4263438	3B Service Water Pump Seal Leak	07/11/2019
		4266695	U2 SWC Leak Upstream of 2-7400-Y-85 and 2-7400-Y-87	07/24/2019
		4267145	Extent of Condition for U2 SWC Leak. PI 2-7400-YGA9	07/26/2019
		4267145	Extent of Condition for U2 SWC Leak. Remove PI 2-7400-YGA9	07/26/2019
		4267147	Extent of Condition for U2 SWC Leak. Remove PI 3-7400-YGA8	07/26/2019
		4267158	Extent of Condition for U2 SWC Leak. Remove PI 3-7400-YGA9	07/26/2019
		4267161	Extent of Condition for U2 SWC Leak. PI 2-7400-YGA8	07/26/2019
		4268629	Excessive Packing Leakage on 3A SWP	08/01/2019
		4269595	Unexpected Alarm - U2 Fuel Pool CH B Rad Hi	08/05/2019
		4269658	Corp Eng Evaluate Fleet Fuel Pool Rad Monitor Trip Logic	08/05/2019
		4269675	902(3)-3 E-16, RX Building Fuel Pool CH B Rad Hi DAN Enhancement	08/05/2019
		4276469	Unexpected Alarm - U3 Fuel Pool CH A Rad Hi	09/03/2019

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		4276578	RB Vent Stack System Flow Rate Monitor INOP	09/03/2019
		4276626	Unexpected Alarm 903-3 C-16, RX Bldg Fuel Pool Ch A Rad Hi	09/03/2019
		4277614	L1202 Trip Post-Job Critique	09/03/2019
	Drawings		Schematic Diagram 345KV Switchyard Annunciator Panel 923-2	Y
		M-22A	P&ID Stator Cooling System	I
	Miscellaneous		Protected Equipment Lists for Unit 2 and Unit 3 Risk Significant Systems	
	Procedures	DAN 902(3)-7 B-10	Stator Clg PP Trip	12
		DAN 903-3 C-16	RX Bldg Fuel Pool Ch A Rad Hi	16
		DAN 923-2 A-2	GCB 3-4 Trip	9
		DAN 923-2 A-3	GCB 4-5 Trip	9
		DAN 923-2, A-5	Line 1202 Transfer Trip	8
		DOA 7400-01	Failure of the Stator Coolant System	38
		OP-AA-108-117	Protected Equipment Program	5
		OP-DR-201-012-1001	Dresden On-line Fire Risk Management	6
		WC-DR-104-1001	Dresden 345KV Switchyard Configuration Risk Assessment	8
	Work Orders	04946790	Excessive Packing Leakage on 3A SWP	08/05/2019
		04947812	Troubleshoot and Repair U2 Fuel Pool CH B Radiation High Alarm	08/05/2019
		04956357	Unexpected Alarm - U3 Fuel Pool CH A Rad Hi	09/03/2019
71111.15	Corrective Action Documents	4209140	U3 125 VDC Ground	01/08/2019
		4212946	U2 125 VDC Battery Ground	01/22/2019
		4217329	Unexpected Alarm, U3 125 VDC Ground, Annunciator 903-8 C-9	02/05/2019
		4218106	903-8 C-9 U3 125 VDC Battery Ground During DES 0700-03	02/07/2019
		4224966	Unexpected Alarm: U2 125 VDC Ground	02/28/2019
		4225117	U2 125 VDC Ground Alarm, 902-8 C-9	03/01/2019
		4225524	Unexpected Alarm: Unit 2 125 VDC Ground Alarm	03/01/2019
		4225524	Unexpected Alarm: Unit 2 125 VDC Ground Alarm	03/01/2019

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		4226960	Unexpected Alarm 902-8 C-9, U2 125 VDC Batt Ground	03/06/2019
		4229076	Unexpected Alarm 902-8 C-9, U2 125 VDC Batt Ground	03/13/2019
		4249714	Unexpected Alarm 902-8 C-9, U2 125 VDC Batt Ground	05/16/2019
		4252768	U3 125 VDC Discharge Rate High Alarm	05/30/2019
		4254008	Unexpected Alarm 903-8 C-9, 125 VDC Batt Ground	06/03/2019
		4256427	Low Pressure at Valve 3-151-77A (PI 3-1501-61A) CCSW to HX	06/12/2019
		4261991	Follow-up Investigation on IR 4256427	06/12/2019
		4262209	U3 125 VDC Battery Ground	07/06/2019
		4263744	EP Exercise Identifies Unanalyzed Condition	07/12/2019
		4267550	Unexpected Alarm: U3 125 VDC Batt Ground	07/28/2019
		4270286	Pressure Gauge Out of Tolerance During Power Labs Calibration	08/07/2019
		4270818	Unexpected Alarm 902-8 C-9 U2 125 VDC Battery Ground	08/09/2019
	Engineering Changes	345321	Evaluate the Impact of Additional Weight due to Replacing Hex Nuts with Hydraulic Nuts and Perform the Owner Acceptance Review of the Vendor Report	0
	Operability Evaluations	00064004345	Containment Cooling Service Water (CCSW) System Water Hammer/Loss of Keep-Fill Analysis	03/21/2001
	Procedures	DAN 902(3)-8 C-9	U2/3 125 VDC Battery Ground	09
		DOP 6900-07	125 VDC Ground Detection - Unit 3	40
71111.18	Corrective Action Documents	4273402	3B FPC Pump Trip During Train Swap	08/21/2019
		4283066	Unexpected Alarm 902-7 B-5 DEHC and 902-6 A-3 Level High	09/28/2019
	Drawings	12E-3548	Schematic Diagram Fuel Pool Cooling Pump Alarm Circuit and Indication	S
		M-362	Diagram of Fuel Pool Cooling Piping	BG
		M-373	Diagram of Fuel Pool Filter & Demineralizing Piping	AG
	Engineering Changes	627310	Modify U3 A&B Fuel Pool Cooling Pump Trips	01
		627311	Modify U2 A&B Fuel Pool Cooling Pump Trips	1
		629532	Defeat the Automatic Turbine Trip From the 2C Moisture Separator High Level	000

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Procedures	CC-AA-112	Temporary Configuration Changes	27
		DAN 902(3)-5 B-8	Moisture Separator Lvl Hi-Hi	14
		DAN 902(3)-7 B-5	Turbine Control Minor Trouble	13
		DAN 9902(3)-6 A-3	Unit 3 Moist Separator Lvl Hi	06 and 07
	Work Orders	04889934	Modify U2B Fuel Pool Cooling Pump Trips	08/26/2019
		04889935	Modify U3A Fuel Pool Cooling Pump Trips	08/21/2019
		04889936	Modify U3B Fuel Pool Cooling Pump Trips EC 627310	08/20/2019
		04964530	Defeat the Automatic Turbine Trip From the 2C Moisture Separator High Level Switches	09/28/2019
71111.19	Corrective Action Documents	4250799	U3 EDG Lube Oil Gallery Sightglass	05/21/2019
		4257556	U3 EDG Lower Lube Sightglass Still Empty 2 Shifts After	06/17/2019
		4267142	Incorrect Gaskets Installed on 2/3 DFP Oil Cooler	06/26/2019
		4268385	4.0 Critique - 2/3 DFP Capacity Run	07/27/2019
		4272885	2/3B Iso Cond M/U Pump Failed to Start Initially	08/19/2019
		4273328	Crack on Valve Cover	08/19/2019
		4273472	Increased Fuel Leakage Past 2/3B IC MU PP Inj Vent Valve	08/21/2019
		4273517	Overfilling of 2/3B ISO Condenser Coolant	08/21/2019
		4273842	Fuel Leak from Casing Vent on B ISCO Cond. Diesel Engine	08/21/2019
		4276621	dPIS 3-0261-34A Found OOT	09/04/2019
		4279832	U3 EDG Exhaust Manifold Cylinder #8 Temp High	09/16/2019
		4279835	U3 EDG Exhaust Manifold Cylinder #17 Temp Low	09/16/2019
		4280590	4.0 Critique on U3 EDG Work	09/19/2019
		4285704	Documentation of SFRA Testing of H3 Winding	09/26/2019
	Drawings	203LN001-001	Low Pressure Coolant Injection System and Instrumentation	02
		203LN001-002	LPCI Initiation Logic	01
		203LN001-003	LPCI LOOP Select Logic	02
		20700LN001-001	Unit 2 Isolation Condenser System	03
		20700LN001-011	Isolation Condenser Makeup Pump System	01
		233LN001-001	Fuel Pool Cooling System	04
		233LN006-001	Primary Containment Atmosphere Monitoring	02
		M-478	Diagram of Diesel Generator Lube Oil Piping	1
	Procedures	DIS 1500-06	LPCI System Recirculation Loop Break Detection	19

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		DOS 1300-05	2/3 A(B) Isolation Condenser Makeup Pump Capacity Test	10
		MA-MW-773-035	Nuclear Operational Analysis Department Testing of Power Transformers	3
	Work Orders	01032433-01	D3 10Y PM Recirc Loop Brk LPCI Injection DPIS 34A Replacement	09/04/2019
		01930470	D2/3 2Y Com 'B' Iso Cond Make-up Pump Capacity Test	08/21/2019
		04811173	PMT Replaced Pump	07/27/2019
		04915930-01	Diesel Generator Fast Start Operability Surv.	09/17/2019
		04924706	D2/3 Qtr Com 'B' Iso Con Make-up Pump Operability	08/21/2019
		04933408-03	Replace U3 D/G Lube Oil Cooler Outlet Check Valve	09/17/2019
		04933409-02	WR to install Ultrasonic Flowmeter U2 EDG Pre-Lube Oil Line	09/16/2019
		04962865-13	Elec Testing of Main Power Transformer 3	09/25/2019
71111.20	Corrective Action Documents	4281463	MPT 3 Oil Leak Identified	09/23/2019
		4281514	U2 and U3 Main Generator Output Spikes	09/23/2019
		4281858	D3F52 LL - Storage Requirements for MPT Transformer Bushings	09/24/2019
		4282111	U3 MPT TR 3 Neutral H0 Bushing as Found	09/25/2019
		4282233	U3 Main Turbine Turning Gear Will Not Engage	09/25/2019
		4282235	U3 Turbine Bearing Lift Pump Trip Alarm	09/25/2019
		4282614	903-7 B-5 Turbine Control Minor Trouble	09/26/2019
		4282910	U3 Main Turbine Bearing #1 Thermocouple 3-5600-T1 Degraded	09/27/2019
		4283118	3B RFP Discharge Valve Failed to Open During Pump Start	09/28/2019
		4283235	Unexpected Alarm 903-3 A-2, MN Steam Line Rad Hi	09/28/2019
		4283285	Furmanite Box Leaking in U3 RFP Room	09/29/2019
	Engineering Changes	443003	Fabricate Expansion Plate for Dresden U3 MPT	
	Miscellaneous	OP-AA-10-117	Protected Equipment List for Unit 3 TR32	09/24/2019
	Work Orders	04938495	Replace VSVA Card 3-5650-31-5-S1-10	09/25/2019
		04962865	Repair/Replace U3 MPT High Side Neutral Bushing	09/25/2019
71111.22	Corrective Action Documents	4175530	SJAE Anomalies Noted during HPCI Surveillance on Unit 2	09/20/2018
		4177295	Unit 2 HPCI Oil	09/26/2018

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		4179417	U3 HPCI Surveillance 4.0 Critique	09/12/2018
		4278206	U2 1125VDC Ground Alarm	09/10/2019
		4281159	Crew 4 Clock Reset - U2 HPCI IST Run 4.0 Critique	09/18/2019
	Procedures	DES 8300-58	Unit 2 125 Volt Main Battery Modified Performance Test	21
		DIS 0260-12	Reactor Core Flow Calibrated Transmitter Calibration	04
		DOS 6600-08	Diesel Generator Cooling Water Pump Quarterly and Comprehensive/Preservice Test for Operational Readiness and In-Service Test (IST) Program	64
	Work Orders	04678506-01	D3 24M TS RX Core Flow Calibrated Transmitter CAL	07/24/2019
		04706728	D3 2Yr Diesel Generator Cooling Water Pump Comprehensive Test for IST Program	09/16/2019
		04936060-01	D2 Qtr TS HPCI Pump Oper Test and IST Surv	09/18/2019
71114.04	Miscellaneous	Evaluation Number 18-45	Exelon Nuclear Standardized Radiological Emergency Plan, Revision 30	02/14/2019
71114.06	Corrective Action Documents	4273314	3rd Quarter 2019 Drill Issue	08/20/2019
		4283661	3Q19 EP Drill Unsatisfactory Demonstration Criteria	09/30/2019
	Miscellaneous		3rd Quarter 2019 Emergency Preparedness Full Drill Manual	
71151	Miscellaneous		Unit 2 and Unit 3 MSPI Validation Packages for HPCI, ISO, LPCI, Emergency AC Power, EDG and SDC	July 1, 2018 - June 30, 2019
		NEI 99-02	Regulatory Assessment PI Guidance	7
71152	Corrective Action Documents	4204937	EHC Leakage Has Degraded Further	12/20/2018
		4247636	Blocked Quill Oil Passage Causes Turbine Trip and RX Scram	05/09/2019
		4249933	Adverse Trend in Equipment Performance Since D3R25	05/17/2019
		4270769	Trend in Maintenance Work Planning Deficiencies	08/09/2019
	Procedures	ER-AA-200-1001	Equipment Classification	4
		ER-AA-2004	System Vulnerability Review Process	5 and 10
		MA-AA-716-010	Maintenance Planning	21 and 26
		MA-AA-716-010-1015	Operational Critical Component Work (OPCCW) Process	0, 5, and 6
	Work Orders	01081964	Turbine Front Standard Mechanical Inspect/Maint	11/11/2013
		01799328	Stem/Insp Overhaul Intern Overhaul ACT for FW Reg B	11/01/2018

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		04606118	3B EHC Discharge Pipe Leaking at Tee to Accumulator Rack	10/29/2018