



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION I  
2100 RENAISSANCE BOULEVARD, SUITE 100  
KING OF PRUSSIA, PENNSYLVANIA 19406-2713

November 9, 2021

Mr. David P. Rhoades  
Senior Vice President  
Exelon Generation Company, LLC  
President and Chief Nuclear Officer  
Exelon Nuclear  
4300 Winfield Road  
Warrenville, IL 60555

SUBJECT: PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3 –  
INTEGRATED INSPECTION REPORT 05000277/2021003 AND  
05000278/2021003

Dear Mr. Rhoades:

On September 30, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Peach Bottom Atomic Power Station, Units 2 and 3. On October 15, 2021, the NRC inspectors discussed the results of this inspection with Mr. Matthew Herr, Site Vice President, 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 involved a violation of NRC requirements. We are treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violation or the significance or severity of the violation documented in this inspection report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC Resident Inspector at Peach Bottom Atomic Power Station, Units 2 and 3.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; and the NRC Resident Inspector at Peach Bottom Atomic Power Station, Units 2 and 3.

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 Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

Jonathan E. Greives, Chief  
Projects Branch 4  
Division of Operating Reactor Safety

Docket Nos. 05000277 and 05000278  
License Nos. DPR-44 and DPR-56

Enclosure:  
As stated

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SUBJECT: PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3 –  
INTEGRATED INSPECTION REPORT 05000277/2021003 AND  
05000278/2021003 DATED NOVEMBER 9, 2021

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**U.S. NUCLEAR REGULATORY COMMISSION  
Inspection Report**

Docket Numbers: 05000277 and 05000278

License Numbers: DPR-44 and DPR-56

Report Numbers: 05000277/2021003 and 05000278/2021003

Enterprise Identifier: I-2021-003-0023

Licensee: Exelon Generation Company, LLC

Facility: Peach Bottom Atomic Power Station, Units 2 and 3

Location: Delta, PA 17314

Inspection Dates: July 1, 2021 to September 30, 2021

Inspectors: S. Rutenkroger, Senior Resident Inspector  
P. Boguszewski, Resident Inspector  
E. Andrews, Health Physicist  
T. Corcoran, Project Engineer  
J. DeBoer, Senior Emergency Preparedness Inspector  
N. Mentzer, Reactor Inspector  
C. Swisher, Project Engineer  
A. Turilin, Reactor Inspector

Approved By: Jonathan E. Greives, Chief  
Projects Branch 4  
Division of Operating Reactor Safety

Enclosure

## SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee’s performance by conducting an integrated inspection at Peach Bottom Atomic 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

Safety Relief Valve Inoperability Due to Nitrogen Leakage from Braided Hose Wear			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000277/2021003-01 Open/Closed	[H.7] - Documentation	71153
The inspectors identified a self-revealing Green finding and associated non-cited violation (NCV) of Title 10 of the <i>Code of Federal Regulations</i> (10 CFR) Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings.” Specifically, stainless steel (SS) braided flexible hoses associated with safety relief valve (SRV) ‘71K’ failed due to a dislodged support clip that was not installed properly because the work instructions lacked sufficient detail and therefore were not appropriate to the circumstances.			

### Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
LER	05000277/2-2021-02	LER 2-2021-002-00 for Peach Bottom Atomic Power Station, Unit 2, SRV Inoperability Due to Nitrogen Leakage from Braided Hose Wear	71153	Closed

## PLANT STATUS

Unit 2 began the inspection period at rated thermal power (RTP). On September 17, 2021, the unit was down powered to 70 percent for a planned control rod sequence exchange and friction testing, turbine valve testing, and waterbox inlet valve cycling. The unit was returned to RTP the following day. The unit remained at or near RTP for the remainder of the inspection period.

Unit 3 began the inspection period at RTP. On July 9, 2021, the unit was down powered to 65 percent for a planned control rod pattern adjustment for all rods out end of cycle operation and was returned to RTP the following day. Other than end of cycle coast down, the unit remained at or near RTP for the remainder 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 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. Starting on March 20, 2020, in response to the National Emergency declared by the President of the United States on the public health risks of the coronavirus (COVID-19), resident and regional inspectors were directed to begin telework and to remotely access licensee information using available technology. During this time, the resident inspectors performed periodic site visits each week, increasing the amount of time on site as local COVID-19 conditions permitted. As part of their onsite activities, resident inspectors conducted plant status activities as described in IMC 2515, Appendix D; observed risk significant activities; and completed on site portions of IPs. In addition, resident and regional baseline inspections were evaluated to determine if all or a portion of the objectives and requirements stated in the IP could be performed remotely. If the inspections could be performed remotely, they were conducted per the applicable IP. In some cases, portions of an IP were completed remotely and on site. The inspections documented below met the objectives and requirements for completion of the IP.

## REACTOR SAFETY

### 71111.04 - Equipment Alignment

#### Partial Walkdown Sample (IP Section 03.01) (4 Samples)

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

- (1) Unit 3 'A' and 'C' division of high-pressure service water (HPSW) during planned work on 'B' and 'D' HPSW on August 24, 2021
- (2) Unit 3 'C' residual heat removal (RHR) system during planned work on 'B' and 'D' HPSW on August 31, 2021
- (3) Unit 3 'B' and 'D' division of HPSW after the completion of planned work on 'B' and 'D' HPSW on September 2, 2021

- (4) Unit common 'E-1' emergency diesel generator (EDG) during 'E-3' EDG maintenance on September 30, 2021

#### 71111.05 - Fire Protection

##### Fire Area Walkdown and Inspection Sample (IP Section 03.01) (5 Samples)

The inspectors evaluated the implementation of the fire protection program by conducting a walkdown and performing a review to verify program compliance, equipment functionality, material condition, and operational readiness of the following fire areas:

- (1) PF-132 and PF-132A, Unit common diesel generator building, general area, and upper level on July 8, 2021
- (2) PF-144, Units 2 and 3 circulating water pump structure, general area on August 10, 2021
- (3) PF-117 and PF-127, Units 2 and 3 turbine building emergency battery switchgear rooms on August 16, 2021
- (4) PF-12B, Unit 3 reactor building closed loop cooling water room on August 31, 2021
- (5) PF-5A, Unit 2 'A' and 'C' core spray rooms on September 24, 2021

#### 71111.06 - Flood Protection Measures

##### Cable Degradation (IP Section 03.02) (1 Sample)

The inspectors evaluated cable submergence protection in:

- (1) Manholes (MH) MH-065, MH-25B, and MH-26C on August 20, 2021

#### 71111.07A - Heat Sink Performance

##### Annual Review (IP Section 03.01) (1 Sample)

The inspectors evaluated readiness and performance of:

- (1) Unit common, 'E-4' EDG air coolant heat exchanger annual summer cleaning on July 21, 2021

#### 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 a scheduled downpower and subsequent power ascension of Unit 3 for removal of feedwater heaters from service for end of cycle coastdown on August 11, 2021

##### Licensed Operator Requalification Training/Examinations (IP Section 03.02) (1 Sample)

- (1) The inspectors observed and evaluated licensed operator requalification training in the simulator on September 27, 2021

## 71111.12 - Maintenance Effectiveness

### Maintenance Effectiveness (IP Section 03.01) (1 Sample)

The inspectors evaluated the effectiveness of maintenance to ensure the following structures, systems, and components (SSCs) remain capable of performing their intended function:

- (1) Unit 3 HPSW on September 9, 2021

## 71111.13 - Maintenance Risk Assessments and Emergent Work Control

### Risk Assessment and Management Sample (IP Section 03.01) (5 Samples)

The inspectors evaluated the accuracy and completeness of risk assessments for the following planned and emergent work activities to ensure configuration changes and appropriate work controls were addressed:

- (1) Unit 3 'A' RHR planned testing on July 7, 2021
- (2) Unit 3 'B' and 'D' HPSW planned modification outage on August 24, 2021
- (3) Unit 3 'B' and 'D' HPSW risk informed completion time for planned maintenance to upgrade the 'B' and 'D' division of HPSW on August 26, 2021
- (4) Unit common, 'E-3' EDG planned maintenance with a focus on Unit 2 action green risk and systems on September 27, 2021
- (5) Unit common, 'E-3' EDG planned maintenance with a focus on Unit 3 action green risk and systems on September 30, 2021

## 71111.15 - Operability Determinations and Functionality Assessments

### Operability Determination or Functionality Assessment (IP Section 03.01) (4 Samples)

The inspectors evaluated the licensee's justifications and actions associated with the following operability determinations and functionality assessments:

- (1) Unit common, EDG 'E-3' unsatisfactory backlash readings on governor drive gears on June 23, 2021
- (2) Notification from transmission system operator that inadequate transmission facility trip contingency voltage is predicted on July 7, 2021
- (3) Unit 3 HPSW pipe hanger found with a gap between the support and the pipe on August 25, 2021
- (4) Unit common, standby gas treatment exhaust fan '0CV020' backdraft damper was found open on August 31, 2021



### 71111.18 - Plant Modifications

#### Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (1 Sample)

The inspectors evaluated the following temporary or permanent modification:

- (1) Unit 3 temporary configuration change for the reactor water clean-up pump trip logic on closure of the suction valve on August 26, 2021

### 71111.19 - Post-Maintenance Testing

#### Post-Maintenance Test Sample (IP Section 03.01) (3 Samples)

The inspectors evaluated the following post-maintenance test activities to verify system operability and functionality:

- (1) Unit 2 'A' battery charger '2AD003-1' after internal components replacement on July 27, 2021
- (2) Unit common diesel driven fire pump following planned vendor overhaul on August 31, 2021
- (3) Unit 3 HPSW pumps 'B' and 'D' after restoring the system from planned maintenance on September 1, 2021

### 71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

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

- (1) Unit 3 RHR loop 'A' logic system functional test performed on July 7, 2021
- (2) Unit common, 'E-3' EDG monthly surveillance performed on August 3, 2021
- (3) Unit 2 response time test of the main steam isolation valve closure on scram signal with 'A' channel of the reactor protection system on August 17, 2021

#### RCS Leakage Detection Testing (IP Section 03.01) (1 Sample)

- (1) Unit 3 monitored for increased drywell unidentified leakage on August 9, 2021

#### FLEX Testing (IP Section 03.02) (1 Sample)

- (1) Unit common FLEX EDG 3-year preventive maintenance full load runs on August 4, 2021

### 71114.06 - Drill Evaluation

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

- (1) The inspectors observed a focused area emergency preparedness drill conducted on July 27, 2021

Drill/Training Evolution Observation (IP Section 03.02) (1 Sample)

The inspectors evaluated:

- (1) The inspectors observed a full scope emergency preparedness drill conducted on August 3, 2021

**RADIATION SAFETY**

71124.05 - Radiation Monitoring Instrumentation

Walkdowns and Observations (IP Section 03.01) (8 Samples)

The inspectors evaluated the following radiation detection instrumentation during plant walkdowns:

- (1) Area radiation monitors throughout Unit 2 and Unit 3
- (2) Argos-5 personal contamination monitors
- (3) Continuous air monitors throughout Unit 2 and Unit 3
- (4) Drywell high-range radiation monitors
- (5) PM-12 gamma portal monitors
- (6) Portable instruments in a "ready for use" state
- (7) Small article monitors
- (8) Whole body counters

Calibration and Testing Program (IP Section 03.02) (13 Samples)

The inspectors evaluated the calibration and testing of the following radiation detection instruments:

- (1) Eberline AMS-4, SN 334568
- (2) Eberline RO20AA, SN 11963
- (3) Eberline RO20AA, SN 12594
- (4) Eberline RO-20, SN 005178
- (5) Ludlum-3, SN 333597
- (6) Ludlum-3, SN 320418
- (7) Ludlum-3, SN 269079
- (8) Ludlum 3030P, SN 264772
- (9) Ludlum-177, SN 273161
- (10) Ludlum-177, SN 319270
- (11) Ludlum-177, SN 319273
- (12) MPG BAK-2270, SN 6612-111
- (13) MPG BAK-2270, SN 6618-069

Effluent Monitoring Calibration and Testing Program Sample (IP Sample 03.03) (2 Samples)

The inspectors evaluated the calibration and maintenance of the following radioactive effluent monitoring and measurement instrumentation:

- (1) Unit 2 reactor building vent exhaust radiation monitors, RIS-2-17-425A, RIS-2-17-425B, RIS-2-17-425C, and RIS-2-17-425D

- (2) Unit 3 refuel floor vent exhaust radiation monitors, RIS-3-17-458A, RIS-3-17-458B, RIS-3-17-458C, and RIS-3-17-458D

71124.08 - Radioactive Solid Waste Processing & Radioactive Material Handling, Storage, & Transportation

Radioactive Material Storage (IP Section 03.01) (2 Samples)

- (1) Inspectors evaluated the licensee's performance in controlling, labeling and securing radioactive materials in the Low Level Radioactive Waste Storage Facility
- (2) Inspectors evaluated the licensee's performance in controlling, labeling and securing radioactive materials in the Radiological Controlled Area South Yard

Radioactive Waste System Walkdown (IP Section 03.02) (2 Samples)

- (1) Inspectors walked down accessible portions of the solid radioactive waste systems and evaluated system configuration and functionality
- (2) Inspectors walked down accessible portions of the liquid radioactive waste systems and evaluated system configuration and functionality

Waste Characterization and Classification (IP Section 03.03) (2 Samples)

- (1) The inspectors evaluated the licensee's characterization and classification of radioactive waste associated with waste shipment number PW-21-0022
- (2) The inspectors evaluated the licensee's characterization and classification of radioactive waste associated with waste shipment number PW-20-0016

Shipment Preparation (IP Section 03.04) (1 Sample)

- (1) The sample was not able to be completed due to a radioactive shipment not being available at the time of the inspection

Shipping Records (IP Section 03.05) (4 Samples)

The inspectors evaluated the following non-excepted radioactive material shipments through a record review:

- (1) Radioactive waste shipment number PW-19-0040, UN 3321, Radioactive material 7, low specific activity (LSA-II)
- (2) Radioactive waste shipment number PW-20-0016, UN 3321, Radioactive material 7, low specific activity (LSA-II)
- (3) Radioactive waste shipment number PW-21-0020, UN 3321, Radioactive material 7, low specific activity (LSA-II)
- (4) Radioactive waste shipment number PW-21-0022, UN 3321, Radioactive material 7, low specific activity (LSA-II)

## **OTHER ACTIVITIES – BASELINE**

### 71151 - Performance Indicator Verification

The inspectors verified Exelon's performance indicator submittals listed below for the period October 1, 2020 through September 30, 2021:

#### MS07: High-Pressure Injection Systems (IP Section 02.06) (2 Samples)

- (1) Unit 2 high-pressure injection systems
- (2) Unit 3 high-pressure injection systems

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

- (1) Unit 2 heat removal systems
- (2) Unit 3 heat removal systems

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

- (1) Unit 2 RHR systems
- (2) Unit 3 RHR systems

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

- (1) Unit 2 cooling water support systems
- (2) Unit 3 cooling water support systems

### 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 (CAP) related to the following issues:

- (1) Unit 2 RHR motor-operated valve (MOV) MO-2-10-034B material failure of anti-rotation key
- (2) Unit 2 Inboard Isolation Valve (AO-2-07B-2511) Failed Rendering Hardened Containment Vent System Non-Functional on April 19, 2020

### 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 report (LER):

- (1) LER 05000277/2021-002-00, SRV Inoperability Due to Nitrogen Leakage (ADAMS Accession No.: ML21196A485)

The inspection conclusions associated with this LER are documented in this report under Inspection Results Section.

## INSPECTION RESULTS

Observation: Unit 2 Inboard Isolation Valve (AO-2-07B-2511) Failed Rendering Hardened Containment Vent System Non-Functional	71152
<p>The inspectors reviewed Exelon's evaluation and corrective actions associated with the April 19, 2020, control room "Torus Vent Valves Open" alarm, as documented under AR 04339435. The inspectors concluded that Exelon had taken timely and appropriate actions in accordance with Exelon procedure PI-AA-125, "CAP Procedure," and 10 CFR Part 50, Appendix B. The inspectors determined that Exelon's associated failure analysis, cause evaluations (CAPE), extent of condition, operating experience review, and past functionality assessment based on equipment bench testing were sufficiently thorough to support their conclusions. Exelon's assigned corrective actions addressed the underlying cause (dimensional tolerance of woodruff key and keyways), were aligned with engineering evaluations, adequately tracked, appropriately documented, and completed as scheduled. Based on the documents reviewed, redundant system walkdowns with this valve type, and discussions with engineering personnel, the inspectors noted that Exelon staff identified problems and entered them into the CAP at an appropriate threshold in accordance with their procedures.</p>	

Observation: Unit 2 RHR Motor-operated Valve (MOV) MO-2-10-034B Material Failure of Anti-rotation Key	71152
<p>The inspectors reviewed a problem related to the Unit 2 RHR MOV MO-2-10-034B involving material failure of its anti-rotation key. Exelon staff identified the problem on October 5, 2020, during pump testing when the valve did not open. The inspectors determined that Exelon staff entered the problem into their CAP under issue report (IR) 04374639, promptly repaired and retested the valve returning it to service, and performed a CAPE (04374639-17).</p> <p>Exelon engineering staff concluded the problem resulted from excessive stem to plug clearance which allowed the valve plug to tilt and "catch" the seat guide on closure and then damage the anti-rotation key, which subsequently prevented valve opening during testing. Exelon staff concluded the non-vertical installation of this valve also contributed to the problem. Corrective actions involved valve stem-to-disc design clearance changes, the installation of a replacement stem and disc, and a recommendation for additional action to consider modifying the torque switch bypass setting. Exelon staff identified three other similar non-vertical installed valves could be affected and examined their anti-rotation keys to verify satisfactory condition. The inspectors observed Exelon's corrective actions were aligned with their engineering evaluation, appropriately documented, and were being tracked. Operability reviews declared the valve inoperable and returned to service within the applicable technical specification (TS) action statement.</p> <p>The inspectors concluded that, in general, Exelon staff completed timely and appropriate actions in accordance with their Exelon procedures PI-AA-120, "Issue Identification and Screening" and PI-AA-125, "CAP Procedure." Exelon procedure PI-AA-125-1003, "Corrective Action Program Evaluation Manual," notes an effective Extent of Condition Evaluation will ensure the right actions and organizational focus are in place to "minimize other similar conditions." The inspectors concluded that while Exelon staff promptly confirmed the anti-rotation keys for other similar valves were functional to address the "extent of condition" and they identified longer term corrective actions, a key verification check or other suitable short term action was not being completed to minimize this condition from recurring in the interim.</p>	

Based on the documents reviewed and discussions with engineering personnel, the inspectors noted that, in general, Exelon personnel identified problems and entered them into the CAP at a low threshold.

**Safety Relief Valve Inoperability Due to Nitrogen Leakage from Braided Hose Wear**

Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000277/2021003-01 Open/Closed	[H.7] - Documentation	71153

The inspectors identified a self-revealing Green finding and associated non-cited violation (NCV) of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings." Specifically, stainless steel (SS) braided flexible hoses associated with safety relief valve (SRV) '71K' failed due to a dislodged support clip that was not installed properly because the work instructions lacked sufficient detail and therefore were not appropriate to the circumstances.

Description: PBAPS Unit 2 has 11 SRVs that provide reactor pressure vessel overpressure protection, of which 5 are part of the automatic depressurization system (ADS). The ADS is an emergency core cooling system that is automatically initiated as a back up to high-pressure coolant injection (HPCI) to depressurize the reactor pressure vessel so that low pressure coolant injection systems can inject to cool the core and limit excessive fuel temperatures. The Unit 2 ADS consists of five air/nitrogen accumulators, associated isolation check valves, and air/nitrogen piping from the check valves to the accumulators and from the accumulators to the five ADS SRV's solenoid valves. The Unit 2 '71K' SRV was modified on November 5 to 11, 2016, to relocate its solenoid valve 'SV-071K' due to vibration-caused issues which added two SS braided flexible hoses routing the nitrogen supply to the solenoid valve and from the solenoid valve to the SRV.

On March 21, 2021, Exelon identified an increase in runtime hours for the Unit 2 nitrogen compressors which was later determined to be caused by a leak located within the drywell. On May 18, 2021, Exelon conducted a drywell entry and identified that the ADS SRV '71K' flexible hoses upstream and downstream of the solenoid valve were fretted with through-wall holes. Exelon determined that a nitrogen supply tubing clamp had failed which allowed the two SS braided hoses to move into contact with each other and fail from wear and abrasion caused by system induced vibration. Exelon determined the through-wall condition was present and statistically significant on March 5, 2021, based on an analysis of compressor runtimes.

As a result, Exelon submitted LER 2-2021-002-00, "SRV Inoperability Due to Nitrogen Leakage from Braided Hose Wear," on July 16, 2021, for a condition not allowed by TSs and a loss of safety function for the ADS system, based on subsequent analysis of the leakage. Exelon also performed a cause evaluation. Exelon determined that engineering change request (ECR) 16-00350, to relocate 'SV-071K' to isolate it from system vibration, was inadequate with respect to analysis and design of the tubing and supports, which was performed in November 2016. Specifically, not all drawings and design standards were included as required, and the drawings that were included lacked sufficient detail for how to construct and install the tubing support and stated, "support tubing from accumulator and at SRV per engineering direction."

On October 20, 2018, SRV '71K' and its associated solenoid valve were replaced as part of

corrective maintenance for a suspected bellows leak. Finally, on October 25, 2020, SRV '71K' and its associated solenoid valve were replaced again as part of the scheduled preventive maintenance. Exelon reviewed the work orders performed in 2018 and 2020 and found no details or installation instructions for routing or supporting the tubing and no references to tubing support specifications or drawings. In addition, there was no record indicating the hoses were replaced and no details about disconnecting or reconnecting the nitrogen lines or supports associated with them. However, Exelon concluded that based on three distinct wear marks on the Unistrut, that it is likely that the clamp for the supply tubing of 'SV-2016-071K' was located/re-installed further and further away from the supported end of the cantilevered Unistrut support in 2018 and 2020. As a result, the angle that the clamp was installed became larger (exceeding design specifications), and the clamp was subjected to higher and higher operational vibration levels which resulted in the clamp loosening and then falling off the Unistrut within six months of operation.

The inspectors reviewed Exelon's records and the cause evaluation and determined the timelines and conclusions were reasonable. The inspectors also concluded that the engineering design change was inadequate, the work order instructions were inadequate, and the documentation of work performed was inadequate.

Corrective Actions: Exelon's corrective actions on May 18, 2021, included replacing the two SS braided flexible hoses and modifying the flexible hose connections and routing such that the hoses will remain apart even if not restrained by the clamp.

Corrective Action References: IR 4424199

Performance Assessment:

Performance Deficiency: The inspectors determined that Exelon's failure to establish and implement maintenance work instructions appropriate to the circumstances by not providing sufficient detail to route, clamp, and install SS braided flexible hoses associated with SRV '71K' was reasonably within their ability to foresee and correct and should have been prevented and therefore was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Equipment Performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the flexible hoses fretting through-wall prevented SRV '71K' from operating to reduce reactor pressure vessel pressure during events.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The inspectors screened this finding for safety significance and determined that the finding was of very low safety significance (Green). Specifically, although the function of the '71K' SRV was lost for a time that exceeded the allowed TS outage time, the probabilistic risk analysis (PRA) function of ADS was not lost with four remaining ADS SRVs and six remaining non-ADS SRVs. Therefore, the degraded condition did not represent a loss of the PRA function for a train or a system and screens to Green.

Cross-Cutting Aspect: H.7 - Documentation: The organization creates and maintains complete, accurate and up-to-date documentation. The inspectors determined the finding has a cross-cutting aspect in the area of Human Performance, Documentation. Specifically, the

referenced common language in NUREG-2165, "Safety Culture Common Language," includes the example "Design documentation, procedures, and work packages are complete, thorough, accurate, and current," and Exelon failed to create and maintain sufficient documentation throughout this process, first with the design documentation in the ECR in 2016, then in the development and implementation of the associated work orders in 2018 and 2020, and finally with the documentation of work performed in 2016, 2018, and 2020.

Enforcement:

Violation: 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed and implemented by documented instructions, procedures, or drawings, of a type appropriate to the circumstances. Contrary to the above, from November 5, 2016, to May 18, 2021, activities affecting quality were not prescribed and implemented by documented instructions, procedures, and drawings, of a type appropriate to the circumstances. Specifically, the work instructions for the fabrication, routing, and installation of the tubing, clamps, and supports for the SS braided flexible hoses for SRV '71K' and its associated solenoid valve were not appropriate to the circumstances since they lacked sufficient detail to accomplish proper installation and were activities affecting quality. In addition, TS 3.5.1 requires for one ADS valve inoperable that the valve be restored to an operable status within 14 days, or the unit be placed in Mode 3 in the next 12 hours. Contrary to this, the ADS valve '71K' was not operable for a time that exceeded 14 days and the unit was not placed in Mode 3 since the valve was inoperable from about March 5, 2021, through May 18, 2021.

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

## **EXIT MEETINGS AND DEBRIEFS**

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

- On July 16, 2021, the inspectors presented the PI&R Hardened Torus Vent Valve Debrief inspection results to Ms. Amy Huber, Sr. Regulatory Engineer, and other members of the licensee staff.
- On July 23, 2021, the inspectors presented the PI&R 2B RHR MOV anti-rotation key failure inspection results to Mr. Matthew Rector, Regulatory Assurance Manager, and other members of the licensee staff.
- On July 30, 2021, the inspectors presented the radioactive solid waste processing and radioactive material handling, storage and transportation inspection results to Mr. Matthew Rector, Regulatory Assurance Manager, and other members of the licensee staff.
- On September 17, 2021, the inspectors presented the radiation monitoring instrumentation inspection results to Mr. Matthew Herr, Site Vice President, and other members of the licensee staff.
- On October 15, 2021, the inspectors presented the integrated inspection results to Mr. Matthew Herr, Site Vice President, and other members of the licensee staff.



### **THIRD PARTY REVIEWS**

Inspectors reviewed Institute of Nuclear Power Operations reports that were issued during the inspection period.

**DOCUMENTS REVIEWED**

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.04	Procedures	COL 10.1.A-3A	"RHR System Setup for Automatic Operation Loop A"	Revision 21
71111.05	Procedures	PF-117	Unit 2 Turbine Building, Emergency Battery Switchgear Rooms, Elevation 135'-0"	Revision 11
		PF-127	Unit 3 Turbine Building, Emergency Battery Switchgear Rooms, Elevation 135'-0"	Revision 11
		PF-132	Diesel Generator Building, General Area – Elevation 127'-0"	Revision 9
		PF-132A	Diesel Generator Building, General Area (Upper Level)	Revision 4
		PF-144	Circulating Water Pump Structure – General Area	Revision 7
71111.06	Corrective Action Documents	04438979, 04441542, 04441547		
	Work Orders	01497874		
71111.07A	Corrective Action Documents	AR 02717440-02		
	Procedures	ER-AA-340-1002	"Service Water Heat Exchanger Inspection Guide"	Revision 10
	Work Orders	05062088-01, 05062088-02, 05062088-08		
71111.11Q	Procedures	AO 1E.4-3	Planned Removal of the Fifth or Fourth Stage Feedwater Heaters from Service During End of Cycle Coastdown	Revision 28
		GP-5-3	Power Operations	Revision 15
		OP-AA-20	Conduct of Operations Process Description	Revision 1
		SO 2A.1.D-3	Operation of the Recirc Pump Speed Control System	Revision 20
71111.12	Corrective Action Documents	04422952, 04442169, 04442523, 04442622		
	Miscellaneous		Engage Health SR Service Water	
	Work Orders	05183208		
71111.13	Corrective Action Documents	IR 4442598		
	Miscellaneous	Paragon RMTS	PB3_PRD_Z_007_RICT	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		Report	WW2134 – 3B/D HPSW RICT Review	
	Procedures	ER-PB-600-2001	"Peach Bottom RICT System Guidelines"	Revision 1
71111.15	Corrective Action Documents	04437761		
		AR 04442523		
		IR 4431014		
		IR 4443607		
	Drawings	HSO-3260	HP Service Water	Revision 5
	Miscellaneous	EC 634956		
	Procedures	CC-AA-309-101	Engineering Technical Evaluation	Revision 16
		ER-AA-600-1042	On-line Risk Management	Revision 13
		M-052-002	"Diesel Engine Maintenance"	Revision 56
		SE-16	Grid Emergency	Revision 18
		SE-16	Attachment D: Contingency Issues	Revision 3
WC-AA-101		On-Line Work Control Process	Revision 31	
	WC-AA-101-1006	On-line Risk Management and Assessment	Revision 4	
Work Orders	05181736			
71111.18	Corrective Action Documents	AR 04426127		
	Miscellaneous	ECN	634522	
		TCC	21-0048	
	Procedures	HU-AA-1212	"Technical Task Risk/Rigor Assessment, Pre-Job Brief, Independent Third-Party Review, and Post-Job Review"	Review 11
		IP-ENG-001	"Standard Design Process"	Revision 2
		SO 12.7.B-3	"RWCU System Restoration After Isolation"	Revision 2
71111.19	Corrective Action Documents	04437494		
		AR 04443036		
	Procedures	M-057-014	Cyberex 125 Volt Battery Charger Maintenance	Revision 18
		ST-M-57B-761-2	Battery Charger 2AD003-1 and 2AD003-2 Capability Test	Revision 8
		ST-O-032-301-3	"HPSW Pump, Valve, and Flow Functional and Inservice Test"	Revision 40
		ST-O-37D-340-2	"Diesel Driven Fire Pump Flow Rate Test"	
Work Orders	04234158, 05108396,			

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		05177990		
		4861874-01, 4861874-02, 4861874-03		
71111.22	Corrective Action Documents	04439594		
		AR 2648765		
	Miscellaneous Procedures		Chemistry and Gamma Spec. Analysis	
		RT-O-020-100-3		Revision 2
		SI2M-60F-RT23-A4M2	"Response Time Test of MSIV Closure Scram Channel A"	Revision 1
		SO 39.1.A	Flex Generator Startup and Shutdown	Revision 4
		ST-I-010-100-3	RHR Loop 'A' Logic System Functional Test	Revision 25
	Work Orders	5014569		
	5131909, 5131910, 5131911			
	5168509			
71124.05	Corrective Action Documents	4415109		
	Procedures	RP-AA-700-1235	Operation and Calibration of the PM-12 Gamma Portal Monitor	5
		RP-AA-700-1239	Operation and Calibration of the Model SAM-12 Small Articles Monitor	6
		RP-AA-800	Control, Inventory, and Leak Testing of Radioactive Sources	10
71124.08	Corrective Action Documents	04269107		
		04329294		
	Corrective Action Documents Resulting from Inspection	04437507		
	Procedures	RP-AA-600	Radioactive Material/Waste Shipments	Revision 18
71152	Corrective Action Documents	01206317	Surveillance Frequency Control Program, Assign 10, Inflatable Seal Valves from 8Y to 12Y - SR 3.6.1.3.16 ST-M-007-440-2(3) Current frequency is 96 months. Proposed	04/22/2011

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			frequency is 144 months.	
		01410761	AO-2511 Exceeded Stroke Time Limit	09/09/2012
		4339435	Received the "Torus Vent Valves Open' Alarm"	04/29/2020
		A0127590	PMC-13-089919, U/2 Boot Seal Valve PMCR - 4R to 6R	
	Engineering Changes	EC-632926	Confirm new torque key dimensions are adequate	Revision 1
	Miscellaneous	6280-M117-64-1	Vendor Manual - Type 9200 T-Ring Butterfly Valve	10/01/1985
	Procedures	CC-PB-118	Peach Bottom Implementation of Diverse and Flexible Coping Strategies (FLEX) and Spent Fuel Pool Instrumentation Program	Revision 13
		M-040-002	Fisher Type 9200 T-Ring Butterfly Valve Maintenance	Revision 12
		M-040-002	Fisher Type 9200 T-Ring Butterfly Valve Maintenance	Revision 13
	Work Orders	01470811	Torus 18-inch Vent Inboard Isolation Valve to SBTG/ATMOS-OPER	07/14/2020
		04247914	AO-2-07B-2511-OP: PM Replace T-Ring/Access's/Booster Relay	10/08/2020
		04842474	ST-O-007-440-2, PCIS Containment Atmospheric Control and Drywell Ventilation Valves Inservice Test	10/14/2018
		5035700	AO-2-07B-2511 PFIN Support Resting / Repair COV Arm	06/16/2020
		C0219014	MO-2-10-034B Inbody Repair	05/01/2007
		C0244596	Investigate/Rework/Replace Assoc. Components on A0-2-07B-2511	01/03/2013
R0922217		AO-2-07B-2511-OP: OP PM, Replace T-Ring/Access's	11/15/2010	