



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION I
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PA 19406-2713

March 5, 2019

Mr. Bryan C. Hanson
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 – NRC TEMPORARY
INSTRUCTION 2515/191, INSPECTION OF THE IMPLEMENTATION OF
MITIGATION STRATEGIES AND SPENT FUEL POOL INSTRUMENTATION
ORDERS AND EMERGENCY PREPAREDNESS
COMMUNICATION/STAFFING/MULTI-UNIT DOSE ASSESSMENT PLANS
INSPECTION REPORT 05000277/2018012 AND 05000278/2018012**

Dear Mr. Hanson:

On December 13, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Peach Bottom Atomic Power Station (Peach Bottom), Units 2 and 3 and the team discussed the preliminary results of this inspection with Mr. Steve Hesse, Engineering Director, and other members of your staff. During this discussion, your staff provided additional information they wanted considered by the NRC. In-office review of the additional information continued by the NRC after the conclusion of the on-site inspection, and a telephone exit meeting was conducted on February 8, 2019, with Mr. Pat Navin, Site Vice President, and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented one finding of very low safety significance (Green) in this report. The 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 I, and the NRC Resident Inspector at Peach Bottom.

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

Sincerely,

/RA/

Marc S. Ferdas, Team Lead
Technical Support and Assessment Team
Division of Reactor Projects

Docket Numbers: 50-277 and 50-278
License Numbers: DPR-44 and DPR-56

Enclosure:
Inspection Report 05000277/2018012 and
05000278/2018012

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DOCUMENT NAME: G:\DRP\BRANCH4\Inspection Reports\Peach Bottom\2018\2018012 - TI 191\TI 191 - Peach Bottom - final.docx
 ADAMS ACCESSION NUMBER: **ML19065A010**

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

Docket Numbers: 50-277 and 50-278

License Numbers: DPR-44 and DPR-56

Report Numbers: 05000277/2018012 and 05000278/2018012

Enterprise Identifier: I-2018-012-0021

Licensee: Exelon Generation Company, LLC

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

Location: Delta, PA

Inspection Dates: December 10, 2018 to December 13, 2018

Inspectors: L. McKown, Resident Inspector (Team Lead)
C. Cahill, Senior Reactor Analyst
P. Ott, Operations Engineer

Approved By: Marc S. Ferdas, Team Lead
Technical Support and Administrative Team
Division of Reactor Projects

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring Exelon's performance at Peach Bottom Atomic Power Station, Units 2 and 3 by conducting Temporary Instruction 2515/191, "Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans," 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 <http://www.nrc.gov/NRR/OVERSIGHT/ASSESS/index.html> for more information. NRC-identified and self-revealing findings, violations, and additional items are summarized in the table below.

List of Findings and Violations

Failure to Evaluate and Track Functionality of Spent Fuel Pool Instrument Level Indicator			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Reactor Safety – Barrier Integrity	Green FIN 05000278/2018012-01	P.2 – PI – Evaluation	TI 2515/191
<p>The team identified a finding (FIN) of very low safety significance (Green) associated with implementation of CC-PB-118, "Peach Bottom Implementation of Diverse and Flexible Coping Strategies (FLEX) and Spent Fuel Pool Instrumentation (SFPI) Program," wherein Exelon did not maintain the DC backup power for SFPI Channel 'A' (LI-3-19-001A) within availability and reliability administrative limits at Unit 3 following identification of adverse conditions on April 6, 2018, and September 3, 2018. This condition would have rendered the channel non-functional during a loss of AC power to the bus until offsite resource availability was reasonably assured.</p>			

INSPECTION SCOPES

This inspection was conducted using the appropriate portions of the Temporary Instruction (TI) in effect at the beginning of the inspection unless otherwise noted. Currently approved TIs 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>. Documents reviewed by inspectors are listed in the documents reviewed section of this report. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

OTHER ACTIVITIES – TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL

TI 2515/191 - Inspection of the Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans

The inspectors verified plans for complying with NRC Orders EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," (ADAMS Accession No. ML12056A045) and EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," (ADAMS Accession No. ML12054A679) are in place and are being implemented by the licensee. Additionally, the inspection verified implementation of staffing and communications information provided in response to the March 12, 2012, request for information letter (ADAMS Accession No. ML12053A340) and multi-unit dose assessment information provided per COMSECY-13-0010, "Schedule and Plans for Tier 2 Order on Emergency Preparedness for Japan Lessons Learned," dated March 27, 2013 (ADAMS Accession No. ML12339A262).

- (1) Based on samples selected for review, the inspectors verified that the licensee satisfactorily implemented appropriate elements of the Diverse and Flexible Coping Strategies (FLEX) as described in the plant specific submittals and the associated safety evaluation (ADAMS Accession No. ML18113A334) and determined that the licensee is in compliance with NRC Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events." The inspectors verified the licensee satisfactorily:
 - a) Developed and issued FLEX Support Guidelines (FSGs) to implement the FLEX strategies for postulated external events;
 - b) Integrated their FSGs into their existing plant procedures such that entry into and departure from the FSGs were clear when using existing plant procedures;
 - c) Protected FLEX equipment from site-specific hazards;
 - d) Developed and implemented adequate testing and maintenance of FLEX equipment to ensure their availability and capability;
 - e) Trained their staff to assure personnel proficiency in the mitigation of beyond-design basis events; and

- f) Developed the means to ensure the necessary off-site FLEX equipment would be available from off-site locations.
- (2) Based on samples selected for review, the inspectors verified that the licensee satisfactorily implemented appropriate elements of the FLEX strategy as described in the plant specific submittals and the associated safety evaluation (ADAMS Accession No. ML18113A334) and determined that the licensee is in compliance with NRC Order NRC Order EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation." (ADAMS Accession No. ML12054A679). The inspectors verified the licensee satisfactorily:
- a) Installed the spent fuel pool (SFP) instrumentation sensors, cabling, and power supplies to provide physical and electrical separation as described in the plant specific submittals and safety evaluation;
 - b) Installed the SFP instrumentation display in the location, environmental conditions, and accessibility as described in the plant specific submittals;
 - c) Trained their staff to ensure personnel proficiency with the maintenance, testing, and use of the SFP instrumentation; and
 - d) Developed and issued procedures for maintenance, testing, and use of the reliable SFP instrumentation.
- (3) The inspectors reviewed information provided in the licensee's multi-unit dose submittal and in response to the NRC's March 12, 2012, request for information letter (ADAMS Accession No. ML12053A340), and verified that the licensee satisfactorily implemented enhancements pertaining to Near-Term Task Force Recommendation 9.3 response to a large scale natural emergency event that results in an extended loss of all AC power to all site units and impedes access to the site. The inspectors verified the following:
- a) The licensee satisfactorily implemented required staffing changes to support a multi-unit extended loss of AC power (ELAP) scenario;
 - b) Emergency Preparedness (EP) communications equipment and facilities are sufficient for dealing with a multi-unit ELAP scenario; and
 - c) The licensee implemented multi-unit dose assessment capabilities (including releases from SFPs) using the licensee's site-specific dose assessment software and approach.

The inspectors verified that non-compliances with requirements and standards identified during the inspection were entered into the licensee's corrective action program as appropriate.

This TI is considered closed.

INSPECTION RESULTS

Failure to Evaluate and Track Functionality of Spent Fuel Pool Instrument Level Indicator			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Reactor Safety – Barrier Integrity	Green FIN 05000278/2018012-01	P.2 – PI – Evaluation	TI 2515/191
<p>The team identified a finding (FIN) of very low safety significance (Green) associated with implementation of CC-PB-118, “Peach Bottom Implementation of Diverse and Flexible Coping Strategies (FLEX) and Spent Fuel Pool Instrumentation (SFPI) Program,” wherein Exelon did not maintain the DC backup power for SFPI Channel ‘A’ (LI-3-19-001A) within availability and reliability administrative limits at Unit 3 following identification of adverse conditions on April 6, 2018, and September 3, 2018. This condition would have rendered the channel non-functional during a loss of AC power to the bus until offsite resource availability was reasonably assured.</p> <p>Description: Exelon captured in a condition report (IR 4123700) on April 6, 2018, that the battery status lights on SFPI Channel ‘A’ (LI-3-19-001A) at Peach Bottom Unit 3 indicated a problem with the DC backup power source. The inspectors noted that the impact upon the FLEX/SFPI function was not evaluated by the licensee; and a deficiency tag was hung in the field noting a degraded condition with the battery. On September 3, 2018, the licensee continued to observe the battery status lights indicating a problem on the SFPI channel. A second deficiency tag was hung in the field and it appeared that the impact on the FLEX/SFPI function was not evaluated. On December 12, 2018, during walkdowns of SFPI across both units, the inspectors observed the two deficiency tags and inquired as to the impact to the FLEX/SFPI functions.</p> <p>Based upon the team’s questions, the licensee determined that the Unit 3 SFPI Channel ‘A’ level indicator would not function following a loss of AC power to the associated bus as the replaceable batteries used for instrument channel power did not have sufficient capacity to maintain the level indication function until offsite resource could be assured. The licensee found that since initial discovery in April a replacement battery was not procured. Therefore, the degraded condition was not corrected.</p> <p>Consistent with the findings of the Commission in NRC Order EA-12-051, the industry observed within Nuclear Energy Institute 12-02, “Industry Guidance for Compliance with NRC Order EA-12-051,” that responders were without reliable instrumentation to determine water level in the SFP and that this, in turn, caused concerns that the pool may have boiled dry, resulting in fuel damage. The events at Fukushima demonstrated the confusion and misapplication of resources that can result from beyond-design-basis external events when adequate instrumentation is not available. Nuclear Energy Institute 12-02 further provides guidance to implement the requirements of EA-12-051 that onsite generators used as an alternate power source and replaceable batteries used for instrument channel power shall have sufficient capacity to maintain the level indication function until offsite resource availability is reasonably assured.</p> <p>Exelon developed FLEX and SFP Instrumentation Program, CC-PB-118, Revision 0 using Nuclear Energy Institute 12-02 to meet the commitments established under EA-12-051. CC-PB-118, Attachment 7, “Spent Fuel Pool Level Indication,” provides specific administrative limits on availability and reliability of SFPI channels. Action ‘A’ directs when one required channel is not functional, restore the channel to functional status within a</p>			

completion time of 90 days. Per action 'C' if the channel cannot be restored within the required completion time the licensee was required to immediately "Initiate an IR to enter the condition into the corrective action program. Identify the equipment out of service time is greater than the specified allowed time, develop and implement an alternate method of monitoring, determine the cause of the non-functionality, and the plans and schedule for restoring the instrument channel(s) to functional status." Following identification of the condition in April and September, Exelon did not act in accordance with either required action 'A' or 'C' with the established completion times. While the team observed that Exelon had developed procedures which could eventually restore power to the affected SFPI bus using a FLEX generator following a loss of AC, this capability does not dismiss the SFPI replacement battery capacity requirements established by EA-12-051 and committed under CC-PB-118.

Corrective Actions: Upon discovery by the NRC, the licensee entered this issue into their corrective action program, initiated compensatory actions to increase monitoring of the non-degraded channel until the replacement of the battery, and restoration of function by replacement of the battery prior to the team's departure from the site on December 13, 2018.

Corrective Action References: IR 4123700, 4169678, 4202471

Performance Assessment:

Performance Deficiency: The inspectors found that Exelon not meeting the SFPI availability and reliability administrative limits established in accordance with CC-PB-118 following identification of adverse conditions on April 6, 2018, and September 3, 2018, until restored on December 13, 2018, was a performance deficiency reasonably within the licensee's capability to foresee and prevent.

Screening: This finding was more than minor in accordance with Inspection Manual Chapter (IMC) 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," dated January 1, 2018, as, if left uncorrected, the performance deficiency had the potential to lead to a more significant safety concern. Specifically, since discovery in April 2018, re-identification in September, until evaluation and restoration in December 2018, the Unit 3 'A' Channel SFPI degraded replaceable batteries used for instrument channel power did not have sufficient capacity to maintain the level indication function until offsite resource availability could be reasonably assured as intended under Order EA-12-051 commitments to ensure availability and reliability of spent fuel pool instrumentation. Furthermore, Exelon did not perform the required actions associated with this condition before the expiration of the required completion times established within the licensee's FLEX and SFP Instrumentation Program, CC-PB-118.

Significance: The inspectors assessed significance of this condition in accordance with IMC 0609, Appendix O, "Significance Determination Process for Mitigating Strategies and Spent Fuel Pool Instrumentation (Orders EA-12-049 and EA-12-051)," and the finding screened to be of very low safety significance (Green), as the finding is associated with spent fuel pool level instrumentation required by Order EA-12-051.

Cross-Cutting Aspect: This finding has a cross-cutting aspect in the Problem Identification and Resolution cross-cutting area associated with Evaluation, in that having identified a degraded condition, Exelon did not classify, prioritize, and evaluate the UPS battery status lights on SFPI Channel 'A' according to their safety significance. (P.2)

Enforcement: The inspectors did not identify a violation of regulatory requirements associated with this finding.

EXIT MEETINGS AND DEBRIEFS

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

On December 13, 2018, the team presented the preliminary FLEX inspection results to Mr. Steve Hesse, Engineering Director, and other members of the licensee staff. During this discussion, the licensee staff provided additional information they wanted considered by the NRC. In-office review of the additional information continued by the NRC after the conclusion of the on-site inspection, and a telephonic exit meeting was conducted on February 8, 2019, with Mr. Pat Navin, Site Vice President, and other members of the licensee staff.

DOCUMENTS REVIEWEDProcedures

CC-PB-118, Peach Bottom Implementation of Diverse and Flexible Coping Strategies (FLEX) and Spent Fuel Pool Instrumentation Program, Revision 8
 CC-AA-118, Diverse and Flexible Coping Strategies (FLEX), Spent Fuel Pool Instrumentation (SFPI), and Hardened Containment Vent System (HCVS) Program Document, Revision 3
 EP-AA-110-200, Dose Assessment
 EP-AA-112-100-F-01, Shift Emergency Director Checklist
 EP-AA-112-200-F-01, Station Emergency Director Checklist
 EP-AA-112-400-F-01, Nuclear Duty Office Checklist
 EP-AA-112-400-F-02, Corporate Emergency Director Checklist
 FSG-010-2, Aligning FLEX Generator To Panel 2AS1061 and for Fuel Oil Transfer, Revision 001
 FSG-011-3, Aligning FLEX Generator To Panel 3BS1061, Revision 001
 FSG-012-3, ELAP DC Load Shed, Revision 002
 FSG-013-2, ELAP AC Load Alignment, Revision 000
 FSG-020, Deploying Alternate Radio Communications Antenna, Revision 001
 FSG-032-3, Establishing HPCI/RCIC/Sump Room Ventilation, Lighting and Water Removal, Revision 000
 FSG-039-3, Aligning the FLEX Pump from the ECT to 3A HPSW, Revision 002
 FSG-040-2, Aligning the FLEX Pump from the ECT to RHR, Revision 002
 FSG-041-3, Aligning the FLEX Pump from Pump Bay to HPSW, Revision 004
 FSG-042-3, RPV, Torus, and Fuel Pool Makeup Using the FLEX Pump, Revision 004
 FSG-043-3, Defeating RCIC Interlocks, Revision 000
 FSG-060, Transitioning from FLEX Equipment to National SAFER Response Center (NSRC) Equipment, Revision 002
 SE-11, Sheet 1, Loss of Off-Site Power, Revision 17
 SE-11, Sheet 5, Loss of Off-Site Power, Revision 17
 SE-11, Sheet 6, Loss of Off-Site Power, Revision 18
 SE-11, Attachment T, DC Load Shedding, Revision 19
 SO 39.8.A, FLEX Equipment Routine Inspection, Revision 3
 T-101, RPV Control, Revision 22
 T-102, Sheet 1, Primary Containment Control, Revision 23
 T-103, Secondary Containment Control, Revision 21
 T-200J-3, Peach Bottom Unit 3 Containment Venting via the Torus Hardened Vent

Condition Reports (*initiated in response to inspection)

04123700	04169678	04202178*	04202471*
04202472*	04202507*	04202557*	04202746*

Maintenance Orders/Work Orders

04647846	04647637	04798987	04851149
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Miscellaneous

Vision Master Task List for Non-Licensed Operator
 Class 3 Powered Industrial Truck Lab Evaluation
 Class 7 Powered Industrial Truck Lab Evaluation