



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 23, 2015

Mr. Bryan Hanson
President and Chief Nuclear Officer
Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3 - REPORT FOR THE AUDIT REGARDING IMPLEMENTATION OF MITIGATING STRATEGIES AND RELIABLE SPENT FUEL POOL INSTRUMENTATION RELATED TO ORDERS EA-12-049 AND EA-12-051 (TAC NOS. MF0845, MF0846, MF0849, AND MF0850)

Dear Mr. Hanson:

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design-Basis External Events" and Order EA-12-051, "Order to Modify Licenses With Regard To Reliable Spent Fuel Pool Instrumentation," (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML12054A736 and ML12054A679, respectively). The orders require holders of operating reactor licenses and construction permits issued under Title 10 of the *Code of Federal Regulations* Part 50 to submit for review, Overall Integrated Plans (OIPs) including descriptions of how compliance with the requirements of Attachment 2 of each order will be achieved.

By letter dated February 28, 2013 (ADAMS Accession No. ML13059A305), Exelon Generation Company, LLC (Exelon, the licensee), submitted its OIP for Peach Bottom Atomic Power Station, Units 2 and 3 (PBAPS), in response to Order EA-12-049. By letters dated August 28, 2013, February 28, 2014, August 28, 2014, February 27, 2015, and August 28, 2015 (ADAMS Accession Nos. ML13246A412, ML14059A222, ML14241A252, ML15058A263, and ML15245A364, respectively), Exelon submitted its first five six-month updates to the OIP. By letter dated August 28, 2013 (ADAMS Accession No. ML13234A503), the NRC notified all licensees and construction permit holders that the staff is conducting audits of their responses to Order EA-12-049 in accordance with NRC Office of Nuclear Reactor Regulation (NRR) Office Instruction LIC-111, "Regulatory Audits" (ADAMS Accession No. ML082900195). This audit process led to the issuance of the PBAPS interim staff evaluation (ISE) dated November 22, 2013 (ADAMS Accession No. ML13220A105), and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13059A390), the licensee submitted its OIP for PBAPS, in response to Order EA-12-051. By letter dated June 24, 2013 (ADAMS Accession No. ML13171A354), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated July 19, 2013, August 28, 2013, February 28, 2014, August 28, 2014, February 27, 2015, and August 28, 2015 (ADAMS Accession Nos. ML13200A343, ML13241A039, ML14059A227, ML14241A303, ML15058A254, and ML15243A099, respectively), the licensee submitted its RAI responses and first five six-month

updates to the OIP. The NRC staff's review to date led to the issuance of the PBAPS ISE and RAI dated October 30, 2013 (ADAMS Accession No. ML13295A303). By letter dated March 26, 2014 (ADAMS Accession No. ML14083A620), the NRC notified all licensees and construction permit holders that the staff is conducting in-office and onsite audits of their responses to Order EA-12-051 in accordance with NRC NRR Office Instruction LIC-111, as discussed above.

The ongoing audits allow the staff to review open and confirmatory items from the mitigation strategies ISE, RAI responses from the spent fuel pool instrumentation (SFPI) ISE, the licensee's integrated plans, and other audit questions. Additionally, the staff gains a better understanding of submitted and updated information, audit information provided on e-portals, and preliminary Overall Program Documents/Final Integrated Plans while identifying additional information necessary for the licensee to supplement its plan and staff potential concerns.

In support of the ongoing audit of the licensee's OIPs, as supplemented, the NRC staff conducted an onsite audit at PBAPS from June 22 – 25, 2015, per the audit plan dated May 6, 2015 (ADAMS Accession No. ML15119A292). The purpose of the onsite portion of the audit was to provide the NRC staff the opportunity to continue the audit review and gain key insights most easily obtained at the plant as to whether the licensee is on the correct path for compliance with the Mitigation Strategies and SFPI orders. The onsite activities included detailed analysis and calculation discussion, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, staging and deployment of offsite equipment, and physical sizing and placement of SFPI equipment.

The enclosed audit report provides a summary of the activities for the onsite audit portion. Additionally, this report contains an attachment listing all open audit items currently under NRC staff review.

If you have any questions, please contact me at 301-415-2833 or by e-mail at Peter.Bamford@nrc.gov.

Sincerely,



Peter J. Bamford, Senior Project Manager
Orders Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket Nos. 50-277 and 50-278

Enclosure:
Audit report

cc w/encl: Distribution via Listserv



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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AUDIT REPORT BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO ORDERS EA-12-049 AND EA-12-051 MODIFYING LICENSES
WITH REGARD TO REQUIREMENTS FOR
MITIGATION STRATEGIES FOR BEYOND-DESIGN-BASIS EXTERNAL EVENTS
AND RELIABLE SPENT FUEL POOL INSTRUMENTATION
EXELON GENERATION COMPANY, LLC
PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3
DOCKET NOS. 50-277 AND 50-278

BACKGROUND AND AUDIT BASIS

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design-Basis External Events" and Order EA-12-051, "Order to Modify Licenses With Regard To Reliable Spent Fuel Pool Instrumentation," (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML12054A736 and ML12054A679, respectively). Order EA-12-049 directs licensees to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool (SFP) cooling capabilities in the event of a beyond-design-basis external event (BDBEE). Order EA-12-051 requires, in part, that all operating reactor sites have a reliable means of remotely monitoring wide-range SFP levels to support effective prioritization of event mitigation and recovery actions in the event of a BDBEE. The orders require holders of operating reactor licenses and construction permits issued under Title 10 of the *Code of Federal Regulations* Part 50 to submit for review, Overall Integrated Plans (OIPs) including descriptions of how compliance with the requirements of Attachment 2 of each order will be achieved.

By letter dated February 28, 2013 (ADAMS Accession No. ML13059A305), Exelon Generation Company, LLC (Exelon, the licensee), submitted its OIP for Peach Bottom Atomic Power Station, Units 2 and 3 (PBAPS), in response to Order EA-12-049. By letters dated August 28, 2013, February 28, 2014, August 28, 2014, February 27, 2015, and August 28, 2015 (ADAMS Accession Nos. ML13246A412, ML14059A222, ML14241A252, ML15058A263, and ML15245A364, respectively), Exelon submitted its first five six-month updates to the OIP. By letter dated August 28, 2013 (ADAMS Accession No. ML13234A503), the NRC notified all licensees and construction permit holders that the staff is conducting audits of their responses to Order EA-12-049 in accordance with NRC Office of Nuclear Reactor Regulation (NRR) Office

Enclosure

Instruction LIC-111, "Regulatory Audits" (ADAMS Accession No. ML082900195). This audit process led to the issuance of the PBAPS interim staff evaluation (ISE) dated November 22, 2013 (ADAMS Accession No. ML13220A105), and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13059A390), the licensee submitted its OIP for PBAPS, in response to Order EA-12-051. By letter dated June 24, 2013 (ADAMS Accession No. ML13171A354), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated July 19, 2013, August 28, 2013, February 28, 2014, August 28, 2014, February 27, 2015, and August 28, 2015 (ADAMS Accession Nos. ML13200A343, ML13241A039, ML14059A227, ML14241A303, ML15058A254, and ML15243A099, respectively), the licensee submitted its RAI responses and first five six-month updates to the OIP. The NRC staff's review to date led to the issuance of the PBAPS ISE and RAI dated October 30, 2013 (ADAMS Accession No. ML13295A303). By letter dated March 26, 2014 (ADAMS Accession No. ML14083A620), the NRC notified all licensees and construction permit holders that the staff is conducting in-office and onsite audits of their responses to Order EA-12-051 in accordance with NRC NRR Office Instruction LIC-111, as discussed above.

The ongoing audits allow the staff to review open and confirmatory items from the mitigation strategies ISE, RAI responses from the spent fuel pool instrumentation (SFPI) ISE, the licensee's integrated plans, and other audit questions. Additionally, the staff gains a better understanding of submitted and updated information, audit information provided on e-portals, and preliminary Overall Program Documents (OPDs)/Final Integrated Plans (FIPs) while identifying additional information necessary for the licensee to supplement its plan and staff potential concerns.

In support of the ongoing audit of the licensee's OIPs, as supplemented, the NRC staff conducted an onsite audit at PBAPS from June 22 – 25, 2015, per the audit plan dated May 6, 2015 (ADAMS Accession No. ML15119A292). The purpose of the onsite portion of the audit was to provide the NRC staff the opportunity to continue the audit review and gain key insights most easily obtained at the plant as to whether the licensee is on the correct path for compliance with the Mitigation Strategies and SFP Instrumentation (SFPI) orders. The onsite activities included detailed analysis and calculation discussion, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, staging and deployment of offsite equipment, and physical sizing and placement of SFPI equipment.

Following the licensee's declarations of order compliance, the NRC staff will evaluate the OIPs, as supplemented, the resulting site-specific OPDs/FIPs, and, as appropriate, other licensee submittals based on the requirements in the orders. For Order EA-12-049, the staff will make a safety determination regarding order compliance using the Nuclear Energy Institute (NEI) guidance document NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide" issued in August, 2012 (ADAMS Accession No. ML12242A378), as endorsed, by NRC Japan Lessons-Learned Directorate (JLD) interim staff guidance (ISG) JLD-ISG-2012-01 "Compliance with Order EA-12-049, 'Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events'" (ADAMS Accession No. ML12229A174) as providing one acceptable means of meeting the order requirements. For Order EA-12-051, the staff will make a safety determination regarding order compliance using

the NEI guidance document NEI 12-02, Revision 1, "Industry Guidance for Compliance with NRC Order EA-12-051, 'To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation'" (ADAMS Accession No. ML12240A307), as endorsed, with exceptions and clarifications, by NRC ISG JLD-ISG-2012-03 "Compliance with Order EA-12-051, 'Reliable Spent Fuel Pool Instrumentation'" (ADAMS Accession No. ML12221A339) as providing one acceptable means of meeting the order requirements. Should the licensee propose an alternative strategy or other method deviating from the guidance, additional staff review will be required to evaluate if the alternative strategy complies with the applicable order.

AUDIT ACTIVITIES

The onsite audit was conducted at the PBAPS facility from June 22 - 25, 2015. The NRC audit team staff was as follows:

Title	Team Member
Team Lead/Project Manager	Peter Bamford
Technical Support	Joshua Miller
Technical Support	Kerby Scales
Technical Support	Michael Levine
Technical Support	Khoi Nguyen
Technical Support	Bruce Heida

The NRC staff executed the onsite portion of the audit per the three part approach discussed in the May 6, 2015, plan, to include conducting a tabletop discussion of the site's integrated mitigating strategies compliance program, a review of specific technical review items, and discussion of specific program topics. Activities that were planned to support the above included detailed analysis and calculation discussions; walk-throughs of strategies and equipment laydown; visualization of portable equipment storage and deployment; staging and deployment of offsite equipment; and physical sizing and placement of SFPI equipment.

AUDIT SUMMARY

1.0 Entrance Meeting (June 22, 2015)

At the audit entrance meeting, the NRC staff audit team introduced itself followed by introductions from the licensee's staff. The NRC audit team provided a brief overview of the audit's objectives and anticipated schedule.

2.0 Integrated Mitigating Strategies Compliance Program Overview

Per the audit plan and as an introduction to the site's program, the licensee provided a presentation to the NRC audit team titled "Peach Bottom Atomic Power Station NRC On-site Audit for Implementation of Mitigating Strategies and Reliable Spent Fuel Pool instrumentation June 22, 2015." The licensee provided an overview of its strategy to maintain core cooling, containment, and SFP cooling in the event of a BDBEE, and the plant modifications being done in order to implement the strategies. The licensee also presented an overview of the FLEX equipment storage facilities, the FLEX equipment

that would be stored there, the interface with the National SAFER Response Center (NSRC), and information regarding communications, procedures, and training. The presentation included an overview of the spent fuel pool level indication modifications.

3.0 Onsite Audit Technical Discussion Topics

Based on the audit plan, and with a particular emphasis on the Part 2 "Specific Technical Review Items," the NRC staff technical reviewers conducted interviews with licensee technical staff, site walk-downs, and detailed document reviews for the items listed in the plan. Results of these technical reviews that require additional information from the licensee or are still under NRC review are documented in the audit item status tables in Attachments 3 and 4, as discussed in the Conclusion section below.

3.1 Reactor Systems Technical Discussions and Walk-Downs

The NRC staff met with licensee staff to discuss the amount of leakage from the reactor recirculation pump seals, the use of the Reactor Core Isolation Cooling (RCIC) system to maintain reactor pressure vessel (RPV) level, the availability of water sources, and the heatup of the torus due to steam release from the RPV. The NRC staff reviewed the analysis and flow calculations along with applicable procedures. The auditors reviewed the licensee's strategy for utilizing raw water sources (emergency cooling tower basin and the Susquehanna River), including water filtration and monitoring of core parameters to ensure adequate cooling. The NRC staff also walked down the licensee's strategies and reviewed plant procedures for implementing the core cooling and makeup strategies.

3.2 Electrical Technical Discussions and Walk-Downs

- a. The NRC staff reviewed the calculations on extending battery life based on load shedding, and walked down the battery rooms to evaluate strategies for hydrogen and temperature control. The NRC staff also walked down panels used for load shedding to evaluate feasibility and timing.
- b. The NRC staff walked down connection points and locations for the FLEX diesel-driven electrical generators (DGs). In order to support the licensee's Phase 2 strategy, two DGs (480 volt, 500 kilowatt, one per unit) will be deployed to supply electrical equipment necessary for the mitigating strategies implementation. The licensee will have a backup DG available. The two primary DGs will be stored in the robust FLEX storage building being constructed on the PBAPS site and one backup DG will be stored in a second FLEX storage building that is not designed to withstand all of the site hazards (see section 3.4 for further discussion).

3.3 SFPI Technical Discussions and Walk-Downs

The NRC staff walked down level probe, transmitter, electronics, pull box, and display locations for the SFP level instrumentation, along with the associated cable runs. The NRC staff also reviewed the associated calibration, maintenance, and test procedures for the SFP level instrumentation.

3.4 Other Technical Discussion Areas and Walk-Downs

- a. The NRC staff toured the area where the FLEX storage buildings will be located. The licensee plans on having two storage buildings. The robust (N) FLEX storage building is designed to survive all site hazards, except a postulated flood event. Therefore, for a flooding scenario, the licensee will utilize the expected warning time and pre-deploy its FLEX equipment to an area elevated above the expected floodwaters. The commercial (N+1) storage building is generally constructed to American Society of Civil Engineers (ASCE) standard 7-10. The N+1 building is not designed to the site tornado protection standards. The N+1 building is located in the owner controlled area and has a longer deployment path as compared to the robust building. The NRC staff identified that the PBAPS FLEX equipment storage configuration is not consistent with the tornado wind/missile hazard reasonable protection configurations described in the NEI guidance contained in Section 7.3.1 of NEI 12-06. Section 7.3.1.1.a describes a configuration where FLEX equipment is reasonably protected in a structure designed to withstand the tornado wind/missile hazard. The N+1 building is not hardened against tornado hazards and, therefore, does not meet the guidance contained in NEI 12-06, Section 7.3.1.1.a.

In NEI 12-06, Sections 7.3.1.1.b and 7.3.1.1.c describe configurations where FLEX equipment is reasonably protected against tornado hazards by an adequate separation distance and orientation. The licensee did not propose building separation and orientation as justification for meeting the provisions of NEI 12-06 for tornado hazards.

In NEI 12-06, Section 11.3.3 states the following:

FLEX mitigation equipment should be stored in a location or locations informed by evaluations performed per Sections 5 through 9 such that no one external event can reasonably fail the site FLEX capability (N).

In NEI Section 10.1, "Aggregation of FLEX Strategies," includes the following:

Provision of at least N+1 sets of portable on-site equipment stored in diverse locations or in structures designed to reasonably protect from applicable BDBEEs is essential to provide reasonable assurance that N sets of FLEX equipment will remain deployable to assure success of the FLEX strategies.

Per the guidance above, it is essential to reasonably protect N+1 sets of FLEX equipment from all applicable BDBEEs to reasonably assure that N sets (FLEX capability, per section 11.3.3) will remain deployable after the BDBEE. The PBAPS FLEX equipment storage configuration does not protect the N+1 set of FLEX equipment from the applicable BDBEE tornado hazard. Therefore, the PBAPS FLEX equipment storage configuration does not meet the guidance contained in NEI 12-06, Section 10.1, in that it only affords reasonable protection from all applicable BDBEEs for N sets of FLEX equipment, not N+1 sets, as stipulated in the NEI guidance as described above.

The NRC staff further identified that the PBAPS FLEX storage configuration would not support the maintenance and testing provisions contained in Section 11.5.3 of NEI 12-06. Specifically, section 11.5.3.b states:

Portable equipment may be unavailable for 90 days provided that the site FLEX capability (N) is available.

Should an item of FLEX equipment be made unavailable in the N-building, the site FLEX capability (N) would no longer be available to mitigate a tornado related BDBEE. The corresponding N+1 item of FLEX equipment is not considered to be reasonably protected against the tornado hazard, and therefore, is not reasonably assured to be available or remain deployable to assure success of the FLEX strategies. The remaining available and deployable FLEX equipment, reasonably protected in the N-building, would be less than the site FLEX capability (N). Therefore, the PBAPS FLEX equipment storage configuration would not meet the condition included in NEI 12-06, Section 11.5.3.b (site FLEX capability (N) is available) stipulated for the allowance of the 90-day portable equipment unavailability.

By letter dated August 28, 2015, the licensee acknowledged the proposed storage configuration as an alternative approach to NEI 12-06, revision 0, and submitted an alternative justification. The alternative, in part, describes the licensee's plan to enact a 45-day allowed out-of-service time when equipment in the robust storage building is unavailable. The NRC staff is evaluating the alternative for acceptability.

The NRC staff walked down equipment haul routes from the FLEX storage buildings to the designated deployment sites, and walked down haul routes from designated staging areas for equipment that will be delivered from the NSRC.

- b. The NRC staff walked down the FLEX strategies for core cooling and SFP inventory functions. This included the point of deployment for the portable FLEX pumps, hose routing and deployment connection points (primary and alternate). Regarding core cooling (RPV makeup), the licensee's proposed strategy did not include provisions to inject through separate trains as stipulated in NEI 12-06, Table C-1. The licensee is pursuing establishing a pathway for injection through a separate train.
- c. The NRC staff reviewed the strategy that will be implemented by the licensee to refuel the installed and portable diesel-powered FLEX equipment. The NRC staff reviewed the instructions for refueling the equipment as well as the equipment needed to perform the refueling. Additionally, the staff reviewed the licensee's procedures for ensuring adequate fuel quality.
- d. The licensee's cooldown strategy relies on operation of the RPV safety relief valves (SRVs). The NRC staff reviewed the capability to operate the SRVs during an extended loss of alternating current power (ELAP).

- e. The NRC staff reviewed the licensee's plans to ensure adequate communications, lighting, personnel access, and equipment access, to successfully implement the strategies. The NRC staff interviewed plant personnel responsible for these areas, and observed lighting and communication features during plant walkdowns.

4.0 Exit Meeting (June 25, 2015)

The NRC staff audit team conducted pre-exit and exit meetings with licensee staff following the completion of the onsite review activities. The NRC staff highlighted items still under review and noted that the results of the onsite audit trip will be documented in this report. Items that require additional information from the licensee or are still under NRC review are detailed in Attachments 3 and 4 of this report.

CONCLUSION

The NRC staff completed all three parts of the May 6, 2015, onsite audit plan. Each audit item listed in Part 2 of the plan was reviewed by NRC staff members while on site. In addition to the list of NRC and licensee onsite audit staff participants in Attachment 1, Attachment 2 provides a list of documents reviewed during the onsite audit portion.

In support of the continuing audit process as the licensee proceeds towards orders compliance for this site, Attachments 3 and 4 provide the status of all open audit review items that the NRC staff is evaluating in anticipation of issuance of a combined safety evaluation (SE) for both the mitigation strategies (MS) and SFPI orders. Attachments 3 and 4 include items remaining from the onsite audit, as well as any items that are being reviewed exclusively in the NRC offices, or have been added since the onsite audit. The five sources for the audit items are as follows:

- a. MS ISE open Items (OIs) and confirmatory items (CIs)
- b. MS audit questions (AQs)
- c. Licensee-identified Overall Integrated Plan (OIP) Open Items
- d. SFPI RAIs
- e. Additional SE needed information

While this report notes the completion of the onsite portion of the audit per the audit plan dated May 6, 2015, the ongoing audit process continues, as per letters dated August 28, 2013, and March 26, 2014, to all licensees and construction permit holders for both orders.

Additionally, while Attachments 3 and 4 provide a progress snapshot of the NRC staff's review of the licensee's OIPs, as supplemented, and as augmented in the audit process, the status and progress of the NRC staff's review may change based on licensee plan changes, resolution of generic issues, and other NRC staff concerns not previously documented. Changes in the NRC staff's review process will be communicated in the ongoing audit process.

Attachments:

1. NRC and Licensee Staff Onsite Audit Participants
2. Onsite Audit Documents Reviewed
3. PBAPS MS/SFPI SE Audit Items currently under NRC staff review and requiring licensee input
4. PBAPS MS/SFPI SE Audit Items currently under NRC staff review but not requiring licensee input

Onsite Audit Participants

NRC Staff:

Peter Bamford	NRR/JLD/JOMB
Joshua Miller	NRR/JLD/JERB
Kerby Scales	NRR/JLD/JERB
Khoi Nguyen	NRR/JLD/JERB
Michael Levine	NRR/JLD/JCBB
Bruce Heida	NRR/JLD/JCBB

PBAPS Staff:

Dan Dullum	Licensing
Eric Gwin	Fukushima Projects Site Lead
Jesse Lucas	Senior Engineer
David Tureck	Shift Operations Superintendent
David Torres	Manager, Security Training
Jon Haney	Lead Installation Representative
John Kandt	Security Specialist
William Nelle	Senior Regulatory Specialist
Issac Hines	Project Manager
Bob McConaughay	Fukushima Projects Operations Lead
Dale Chapman	Project Manager
Joseph Zack	Senior Instrument and Controls Engineer
Joseph Hanley	Senior Operations Training Instructor
Steve Melick	Operations Shift Supervisor
Austin Tran	Electrical Engineer
Michael Nowoswiat	Electrical Engineer
John Murren	Principal Installation Representative
Sailaja Mokkalapati	Engineer III

Documents Reviewed

FLEX Support Guidelines (FSGs)

FSG-003, "Pre-staging FLEX Equipment," Rev. 0

FSG-010-2, "Aligning FLEX Generator to FLEX Fuel Oil Transfer Pump," Rev. 0

FSG-010-3, "Aligning FLEX Generator to Panel 3AS1061," Rev. 0

FSG-011-3, "Aligning FLEX Generator to Panel 3BS1061," Rev. 0

FSG-012-3, "ELAP DC Load Shed," Rev. 0

FSG-013-3, "ELAP AC Load Alignment," Rev. 0

FSG-031-3, "Establishing Battery Room Ventilation," Rev. 0

FSG-032-3, "Establishing HPCI/RCIC/Sump Room Ventilation, Lighting, and Water Removal," Rev. 0

FSG-045-3, "Obtaining Transmitter Instrument Readings," Rev. 0

FSG-060, "Transitioning from FLEX Equipment to Safer Equipment," Rev. 0

Procedures

SE-11, "Loss of Offsite Power with No D/G's Available", Sheet 5, Rev. 14

CC-PB-118, "Peach Bottom Implementation of Diverse and Flexible Coping Strategies (FLEX) and Spent Fuel Pool Instrumentation System," Rev 0,

SE-4, "Flood-Procedure", Rev. 36 (Draft)

SE-3, "Loss of Conowingo Pond," Rev.23

SE-10, "Bypass of SV-8130A," Attachment 12

CC-AA-118, "Diverse and Flexible Coping Strategies (FLEX) and spent Fuel Pool Instrumentation Program Document," Rev. 0

ST-0-098-0IN-3, "Daily Surveillance Log Mode 1, 2, or 3," Data Sheet 1, Rev. 55

IC-11-00660, "Calibration of ABB/K-TEKMT5000 Series Spent Fuel Pool Level Instrumentation System," Rev. 0 (Draft)

T-103, "Secondary Containment Control," Rev. 20 (Draft)

OU-AA-103, "Shutdown Safety Management Program," Rev. 15

Calculations/Analyses

PB-MISC-010, "MAAP Analysis to Support FLEX Initial Strategy," Rev. 2

PB-MISC-014, "Use of MAAP in Support of FLEX Implementation," Rev. 0

PM-1173, "PBAPS FLEX Makeup Analysis in Response to NRC Order EA-12-049," Rev. 8

PM-1159, "RCIC Room Heat Up Analysis for Extended Loss of AC Power (ELAP)," Rev. 1

PM-426, "Control Room Heat Up During Station Blackout," Rev. 1

PM-736, "Battery Room Hydrogen Concentration," Rev. 3

PE-0301, "FLEX Electrical Loading and Voltage Drop," Rev. 8

PS-1115, "Seismic Analysis of the SFP Primary Mounting Bracket Units 2 & 3," Rev. 0

PS-1116, "Seismic Analysis of the SFP Backup Mounting Bracket Units 2 & 3," Rev. 0

PM-1176, "NEI 12-02 Spent Fuel Pool Doses," Rev. 0

PM-1177, "Radiological Doses in the Vicinity of the Spent Fuel Pool at Reduced Water Level," Rev. 0

BYR13-187, "Radiological Doses in the Vicinity of the Spent Fuel Pool at Reduced Water Level," Rev. 9

Drawings

E-1717, "Single Line Meter and Relay Diagram, E334 & E434 EMERG L.C. and E334-R-B, E434-R-B, E334-R-D, & E434-R-D Reactor MCC 440V Unit 3," Rev. 67

E-1715, "Single Line Meter and Relay Diagram, E134 & E234 EMERG. L.C., E134-W-A & E234-R-B Reactor MCC, and E134-T-B & E234-T-B Turbine MCC 440V," Rev. 78

E-1615, "Single Line Meter and Relay Diagram, E124 & E224 EMERG L.C., E124-R-B & E224-R-B Reactor MCC, and E124-T-B & E224-T-B Turbine MCC 440V. Unit 2," Rev. 81

E-1617, "Single Line Meter and Relay Diagram, E324 & E424 EMERG L.C. and E324-R-B, E424-W-A, E324-R-D, & E424-R-D Reactor MCC 440V Unit 2," Rev. 73

S-226, "Reactor Building Spent Fuel Pool Floor Plan & Detail," Rev. 14

E5407, "Spent Fuel Pool Level Schematic Diagram Unit 2," Sheet 1, Rev. 0

E5408, "Spent Fuel Pool Level Schematic Diagram Unit 3," Sheet 1, Rev. 0

E5407, "Spent Fuel Pool Level Schematic Diagram Unit 2," Sheet 1, Rev. 0

E5408, "Spent Fuel Pool Level Schematic Diagram Unit 3," Sheet 1, Rev. 0

E-26 SH.1 of 3, "Single Line Diagram 125/250 VDC System Unit 2," Rev. 84

E-26 SH.2, "Single Line Diagram 125/250 VDC System Unit 2," Rev. 62

E-27 SH.1 of 3, "Single Line Diagram 125/250 VDC System Unit 3," Rev. 77

E-27 SH.2 of 3, "Single Line Diagram 125/250 VDC System Unit 3," Rev. 43

Other Documents:

Specification 151871-DC-C-00001-0, "Exelon FLEX Storage Buildings", Rev 0

Geosystems Consultants Inc. Project No. 2013G368, "Geotechnical Investigation Liquefaction Potential Analysis Peach Bottom Atomic Power Station," July 2014

EPRI Technical Report 3002002749, "Technical Basis for Establishing Success Timelines in Extended Loss of AC Power Scenarios in Boiling Water Reactors Using MAAP4 – A Guide to MAAP Thermal-Hydraulic Models," dated February 2014

PBAPS Updated Final Safety Analysis Report, Rev. 25

ECR 13-00507, "U3 FLEX - Electrical Connections to E-LC'S," Rev. 0

ECR 13-00508, "Fukushima Modification – Spent Fuel Pool Instrument," Rev. 0

ECR 13-00279, "Diesel Fuel Oil Supply – Fukushima Mech. Mod Common Unit," Rev. 0

"SAFER Response Plan for Peach Bottom Atomic Power Station," Rev. 1, dated June 15, 2015

DBD P-S-18, "Instrument Air and Nitrogen Systems," Rev. 17

DBD P-T-01, "Structural," Rev. 9

Specification NE-00164, "Specification for Environmental Service Conditions – Peach Bottom Atomic Power Stations Units 2 & 3," Rev. 6

LTR-SEE-II-13-47, "Determination if the Proposed Spent Fuel Pool Level Instrumentation Can be Sloshed Out of the Spent Fuel Pool During a Seismic Event," Rev. 0

EQ-QR-269, "Design Verification Testing Summary Report for the Spent Fuel Pool Instrumentation System," Rev. 2

Westinghouse Report WNA-TR-03149-GEN, "Automation and Field Services (AFS) SFPIS Standard Product Final Summary Design Verification Report," Rev. 1

Corrective Action Program Process Items

Assignment Report 02440131, Assignments 67, 68, 70, 71-78, 81

Issue Reports 2440131-16, 21, 64, and 66

Action Request A1893550-42

PBAPS

Mitigation Strategies/Spent Fuel Pool Instrumentation Safety Evaluation Audit Items:

Audit Items Currently Under NRC Staff Review and Requiring Licensee Input

Audit Item Reference	Item Description	Licensee Input Needed
CI 3.1.2.A	Flood Warning Time and Persistence	Licensee is researching available documentation for warning time and persistence for the current flooding analysis of record. Provide confirmation that warning time and persistence in current analysis of record supports the planned strategy and make the supporting documentation available for NRC review on the ePortal.
CI 3.2.1.4.A	Portable/FLEX pump characteristics, required flow rates, and supporting calculations	The staff found several minor inconsistencies between the calculation and associated FLEX pump alignment and FSGs (e.g., little or no margin in modeled hose lengths, no modeling of suppression pool make-up concurrent with SFP cooling even though procedures may allow that configuration). In addition, the calculation expressly states that the FLEX pump does not have the capability to provide concurrent flow to the RPV and SFP under several conditions. The licensee stated that it will revise the calculation and its procedures to address each concern and to show that the FLEX pump will have the capability to provide concurrent flow to the RPV and SFP when needed. Make the revised calculation and FSGs, as appropriate, available for NRC review on the ePortal.
AQ.40	Battery Room Temperature	Complete calculation for battery room temperatures during an ELAP and make available for NRC review on the ePortal.
OIP.9	Timeline walk through will be completed for the FLEX pump installations when the detailed design and site strategy is finalized.	Complete walkthrough and make a summary of results for NRC review on the ePortal and provide confirmation of completion in a future six-month update.
OIP.11	The 6-month update dated August 28, 2013, indicates the core thermal power used in the Exelon analysis was 3517 MWT [megawatts-thermal] (maximum power prior to plant extended power uprate).	Update the appropriate calculations for the current licensed power level and make available for NRC review on the ePortal. Provide confirmation that the uprated power level has been incorporated into the overall strategy in a future six-month update.

Audit Item Reference	Item Description	Licensee Input Needed
SE.10	Provide a detailed discussion on the capability of equipment in primary containment (the SRV locations in particular), the reactor building (RCIC pump room), the main control room, and the electrical switchgear rooms, to perform their expected functions under ELAP conditions (i.e., temperature, pressure, radiation, humidity, etc.) for an indefinite period.	Complete evaluation and make available for NRC review on the ePortal.
SE.12	The PBAPS strategy for RPV makeup contains flow paths that do not have the flexibility inherent in NEI 12-06 as specified in Table 3-1 and Appendix C, Table C-1. Specifically, the two identified flow paths are mutually independent in terms of FLEX pump suction source and FLEX pump discharge connections to their respective plant systems. In addition, the flow paths share a common section of piping, as well as a single RPV injection point.	Develop an alternate RPV injection path and make the associated strategy changes available for NRC review. Reflect any future strategy changes in a six-month update and the final integrated plan.

PBAPS

Mitigation Strategies/Spent Fuel Pool Instrumentation Safety Evaluation Audit Items:

Audit Items Currently Under NRC Staff Review, But Not Requiring Further Licensee Input

Audit Item Reference	Item Description	Action
CI 3.1.1.1.A	FLEX Building Storage Configuration	NRC needs to review alternative proposal described in latest six-month update, dated August 28, 2015, for acceptability.
CI 3.2.4.4.B	Communications System Upgrades	NRC needs to evaluate change letter dated May 27, 2015, for acceptability.

updates to the OIP. The NRC staff's review to date led to the issuance of the PBAPS ISE and RAI dated October 30, 2013 (ADAMS Accession No. ML13295A303). By letter dated March 26, 2014 (ADAMS Accession No. ML14083A620), the NRC notified all licensees and construction permit holders that the staff is conducting in-office and onsite audits of their responses to Order EA-12-051 in accordance with NRC NRR Office Instruction LIC-111, as discussed above.

The ongoing audits allow the staff to review open and confirmatory items from the mitigation strategies ISE, RAI responses from the spent fuel pool instrumentation (SFPI) ISE, the licensee's integrated plans, and other audit questions. Additionally, the staff gains a better understanding of submitted and updated information, audit information provided on e-portals, and preliminary Overall Program Documents/Final Integrated Plans while identifying additional information necessary for the licensee to supplement its plan and staff potential concerns.

In support of the ongoing audit of the licensee's OIPs, as supplemented, the NRC staff conducted an onsite audit at PBAPS from June 22 – 25, 2015, per the audit plan dated May 6, 2015 (ADAMS Accession No. ML15119A292). The purpose of the onsite portion of the audit was to provide the NRC staff the opportunity to continue the audit review and gain key insights most easily obtained at the plant as to whether the licensee is on the correct path for compliance with the Mitigation Strategies and SFPI orders. The onsite activities included detailed analysis and calculation discussion, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, staging and deployment of offsite equipment, and physical sizing and placement of SFPI equipment.

The enclosed audit report provides a summary of the activities for the onsite audit portion. Additionally, this report contains an attachment listing all open audit items currently under NRC staff review.

If you have any questions, please contact me at 301-415-2833 or by e-mail at Peter.Bamford@nrc.gov.

Sincerely,

/RA/

Peter J. Bamford, Senior Project Manager
Orders Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket Nos. 50-277 and 50-278
Enclosure: Audit report

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