



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

August 29, 2016

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

SUBJECT: OYSTER CREEK NUCLEAR GENERATING STATION - REPORT FOR THE  
ONSITE AUDIT REGARDING IMPLEMENTATION OF MITIGATING  
STRATEGIES AND RELIABLE SPENT FUEL POOL INSTRUMENTATION  
RELATED TO ORDERS EA-12-049 AND EA-12-051 (CAC NOS. MF0823 AND  
MF0824)

Dear Mr. Hanson:

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" and Order EA-12-051, "Issuance of Order to Modify Licenses With Regard To Reliable Spent Fuel Pool Instrumentation [SFPI]," (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. ML13060A126), Exelon Generation Company, LLC (Exelon, the licensee) submitted its OIP for Oyster Creek Nuclear Generating Station (OCNGS), in response to Order EA-12-049. By letters dated August 28, 2013, February 28, 2014, August 28, 2014, February 27, 2015, August 28, 2015 and February 26, 2016 (ADAMS Accession Nos. ML13240A267, ML14059A220, ML14241A253, ML15058A378, ML15243A087 and ML16057A008, respectively), the licensee submitted its first six, 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 OCNGS interim staff evaluation (ISE) (ADAMS Accession No. ML14030A506) and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13059A266), the licensee submitted its OIP for OCNGS, in response to Order EA-12-051. By letter dated August 28, 2013 (ADAMS Accession No. ML13227A304), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated August 28, 2013, February 28, 2014, August 28, 2014, February 27, 2015, August 28, 2015 and February 26, 2016 (ADAMS Accession Nos. ML13241A038, ML14059A225, ML14241A297, ML15058A253, ML15243A094

and ML16057A004, respectively), the licensee submitted its RAI responses and first six, six-month updates to the OIP. The NRC staff's review to date led to the issuance of the OCNGS ISE and RAI dated November 8, 2013 (ADAMS Accession No. ML13268A031). 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 audit process, to include the in-office and onsite portions, allows the staff to assess whether it has enough information to make a safety evaluation of the Integrated Plans. The audit allows the staff to review open and confirmatory items from the mitigation strategies ISE, RAI responses from the SFPI ISE, the licensee's integrated plans, and other audit questions. Additionally, the staff gains a better understanding of submitted information, identifies additional information necessary for the licensee to supplement its plan, and identifies any staff potential concerns.

In support of the ongoing audit of the licensee's OIPs, including the supplements, the NRC staff conducted an onsite audit at OCNGS from May 2 to May 5, 2016, per the audit plan dated March 28, 2016 (ADAMS Accession No. ML16074A292). 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 a successful path for compliance with the Mitigation Strategies and SFPI orders. The onsite activities included detailed analysis and calculation discussions, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, review of staging and deployment of offsite equipment, and review of installation details for 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 for OCNGS currently under NRC staff review.

B. Hanson

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If you have any questions, please contact me at 301-415-3204 or by e-mail at John.Hughey@nrc.gov.

Sincerely,

A handwritten signature in black ink that reads "John D. Hughey". The signature is written in a cursive style with a large, looping initial "J".

John D. Hughey, Project Manager  
Orders Management Branch  
Japan Lessons-Learned Division  
Office of Nuclear Reactor Regulation

Docket No.: 50-219

Enclosure:  
Audit Report

cc w/encl: Distribution via Listserv



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

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  
OYSTER CREEK NUCLEAR GENERATING STATION  
DOCKET NO. 50-219

BACKGROUND AND AUDIT BASIS

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design-Basis External Events" and Order EA-12-051, "Issuance of 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. ML13060A126), Exelon Generation Company, LLC (Exelon, the licensee) submitted its OIP for Oyster Creek Nuclear Generating Station (OCNGS, Oyster Creek), in response to Order EA-12-049. By letters dated August 28, 2013, February 28, 2014, August 28, 2014, February 27, 2015, August 28, 2015 and February 26, 2016 (ADAMS Accession Nos. ML13240A267, ML14059A220, ML14241A253, ML15058A378, ML15243A087 and ML16057A008, respectively), the licensee submitted its first six, 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

Enclosure

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 OCNGS interim staff evaluation (ISE) (ADAMS Accession No. ML14030A506) and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13059A266), the licensee submitted its OIP for OCNGS, in response to Order EA-12-051. By letter dated August 28, 2013 (ADAMS Accession No. ML13227A304), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated August 28, 2013, February 28, 2014, August 28, 2014, February 27, 2015, August 28, 2015 and February 26, 2016 (ADAMS Accession Nos. ML13241A038, ML14059A225, ML14241A297, ML15058A253, ML15243A094 and ML16057A004, respectively), the licensee submitted its RAI responses and first six, six-month updates to the OIP. The NRC staff's review to date led to the issuance of the OCNGS ISE and RAI dated November 8, 2013 (ADAMS Accession No. ML13268A031). 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 audit process, to include the in-office and onsite portions, allows the staff to assess whether it has enough information to make a safety evaluation of the Integrated Plans. The audit allows 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 ePortals, and preliminary Overall Program Documents (OPDs)/Final Integrated Plans (FIPs) while identifying additional information necessary for the licensee to supplement its plan and address staff potential concerns.

In support of the ongoing audit of the licensee's OIPs, including the supplements, the NRC staff conducted an onsite audit at OCNGS from May 2 to May 5, 2016, per the audit plan dated March 28, 2016 (ADAMS Accession No. ML16074A292). 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 a successful path for compliance with the Mitigation Strategies order and the SFPI order. The onsite activities included detailed analysis and calculation discussions, walk-throughs of strategies and equipment laydown, visualization of portable equipment storage and deployment, review of staging and deployment of offsite equipment, and review of installation details for 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" Revision 0, issued in August 2012 (ADAMS Accession No. ML12242A378), or Revision

2, issued in December 2015 (ADAMS Accession No. ML16005A625). These guidance documents are 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'" Revision 0 (ADAMS Accession No. ML12229A174), and Revision 1 (ADAMS Accession No. ML15357A163), with certain clarifications, as providing an 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 OCNCS from May 2, 2016, through May 5, 2016. The NRC audit team staff was as follows:

<b>Title</b>	<b>Team Member</b>	<b>Organization</b>
Team Lead/Project Manager	John Hughey	NRR/JLD
Technical Support – Electrical	Kerby Scales	NRR/JLD
Technical Support – Reactor Systems	Joshua Miller	NRR/JLD
Technical Support – Balance of Plant	On Yee	NRR/JLD
Technical Support – Containment / Ventilation	Brian Lee	NRR/JLD
Technical Support – SFPI	Duc Nguyen	NRR/JLD

The NRC staff executed the onsite portion of the audit per the three part approach discussed in the March 28, 2016, plan, to include conducting a tabletop discussion of the site's integrated mitigating strategies (MS) 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 (May 5, 2016)

At the onsite 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 describing the site's strategies to meet the NRC orders. The licensee presented a review 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. Also reviewed were the design and location of the storage facilities for the FLEX equipment, the interface with the National SAFER [Strategic Alliance for FLEX Emergency Response] Response Centers (NSRCs), and the SFPI modification.

## 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 review for the items listed in the plan. Results of these technical reviews and any additional review items needed from the licensee are documented in the audit item status table in Attachment 3, 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 recirculation pump seals, the use of the isolation condenser to remove decay heat, the use of the portable FLEX pump to maintain reactor pressure vessel (RPV) level, and the availability of water sources. The NRC staff reviewed the analyses and flow calculations along with applicable procedures, including the plant parameters that will be monitored to indicate the potential for reactor core damage. The NRC staff also walked down the licensee's strategies and reviewed plant procedures for implementing the core cooling and makeup strategies. The NRC staff also reviewed the modeling of an extended loss of alternating current power (ELAP) event and the actions needed to mitigate the event, including the computer code used for the ELAP analysis and input parameters assumed to generate the results of the analysis.

### 3.2 Electrical Technical Discussions and Walk-Downs

The NRC staff reviewed the calculations regarding battery life and the sizing of FLEX generators in addition to walking down the procedure steps for electrical load shedding. The NRC staff also walked down the main control room, low voltage switchgear rooms, high voltage switchgear rooms, and battery rooms to evaluate strategies for hydrogen control and temperature control due to heat generating electrical equipment. The NRC staff reviewed the isolation and interactions of electrical power sources regarding the protection of Class 1E equipment from faults in portable FLEX equipment and the design elements that ensure multiple electrical sources do not attempt to simultaneously power electrical buses. The NRC staff also walked down panels used for load shedding to evaluate feasibility and timing. Lastly, the NRC staff conducted a walk-through of portable FLEX diesel generator (DG) procedures, to include power pathways, areas where manual actions are required, and electrical isolation.

### 3.3 SFPI Technical Discussions and Walk-Downs

The NRC staff walked down instrument, transmitter, electronics, and display locations for the SFP level instrumentation, along with the associated cable runs. In addition, the NRC staff noted that the licensee had completed design calculations and drawings detailing the installation of the SFPI components.

### 3.4 FLEX Equipment Storage Configuration Discussion Areas and Walk-Downs

The FLEX storage configuration has two outdoor storage locations on concrete pads, each with a set of FLEX equipment, with the exception of the FLEX vehicles and debris removal equipment. The licensee stated that the separation of the two locations is sufficient to ensure that a tornado would not damage both sets of equipment. In the event of a hurricane, a set of FLEX equipment will be moved to storage locations that are protected from hurricane winds.

The FLEX vehicle with debris removal equipment currently does not have a protected storage location. The licensee stated that they would either provide protected storage or have a second debris removal vehicle stored in a separate location.

### 3.5 Other Technical Discussion Areas and Walk-Downs

- a. The NRC staff reviewed the licensee's plans to ensure adequate communications, lighting, personnel access, and equipment access, to successfully implement the strategies. The staff interviewed plant personnel responsible for these areas, and observed lighting and communication needs during plant walkdowns.
- b. The NRC staff reviewed the licensee's SAFER Response Plan. The response plan identified equipment staging areas, as well as off-site transportation methods and primary and alternate travel routes. The response plan also provides direction for utilizing helicopters for delivering equipment and material to the site.
- c. The NRC staff walked down the FLEX strategies for core cooling, RPV inventory, and SFP cooling functions. This included the point of deployment for the portable FLEX pumps, hose routing, and deployment connection points (primary and alternate). The NRC staff also identified that the licensee had performed hydraulic analyses to evaluate pump sizing and location relative to the water flow necessary to perform the associated functions.
- d. The NRC staff reviewed the strategy that will be implemented by the licensee to refuel the portable diesel-powered FLEX equipment and ensure adequate fuel quality. The NRC staff reviewed the instructions for refueling the equipment, as well as the equipment needed to perform the refueling.

- e. The NRC staff identified that the development of the FLEX maintenance and testing program is in progress. The program includes consideration of shelf life and acceptance criteria, manufacturer's recommendations and plant practices, as well as consideration of the Electric Power Research Institute preventative maintenance templates.
- f. The NRC staff confirmed that the licensee had performed deployment path and debris removal evaluations to address the site capability to deploy FLEX equipment, within the plant Protected Area (PA), to mitigate the applicable BDBEEs.
- g. The NRC staff reviewed documentation regarding the implementation of FLEX-related training at OCNGS. A site training plan has been developed and is being implemented.

#### 4.0 Exit Meeting (May 5, 2016)

The NRC staff audit team conducted an exit meeting with licensee staff following the closure of onsite audit activities. The NRC staff highlighted items reviewed and noted that the results of the onsite audit trip will be documented in this report. The NRC staff also discussed the remaining open items with the licensee and information needed for closure. The open items are listed in Attachment 3 of this report.

### CONCLUSION

The NRC staff completed all three parts of the March 28, 2016, 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, Attachment 3 provides 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 MS and SFPI orders. The five sources for the audit items referenced below are as follows:

- a. ISE Open Items (OIs) and Confirmatory Items (CIs)
- b. Audit Questions (AQs)
- c. Licensee-identified OIP Open Items
- d. SFPI RAIs
- e. Additional information needed to support the SE

The attachments provide audit information as follows:

- a. Attachment 1: List of NRC staff and licensee staff audit participants
- b. Attachment 2: List of documents reviewed during the onsite audit
- c. Attachment 3: MS/SFPI SE Audit Items currently under NRC staff review  
(licensee input needed, as noted)

While this report notes the completion of the onsite portion of the audit per the audit plan dated March 28, 2016, the ongoing audit process continues, as per the letters dated August 28, 2013, and March 26, 2014, to all licensees and construction permit holders for both orders.

Additionally, while Attachment 3 provides a list of currently open items, 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 review will be communicated in the ongoing audit process.

Attachments:

1. NRC and Licensee Staff Onsite Audit Participants
2. Onsite Audit Documents Reviewed
3. MS/SFPI Audit Items currently under NRC staff review

## Onsite Audit Participants

### NRC Staff:

John Hughey	NRR/JLD/JOMB
Duc Nguyen	NRR/JLD/JERB
Kerby Scales	NRR/JLD/JERB

On Yee	NRR/JLD/JCBB
Joshua Miller	NRR/JLD/JERB
Brian Lee	NRR/JLD/JCBB

### OCNGS Staff:

Ralph Ritter	Team Lead
Dave Yatko	Engineering
Jennifer Eng	Engineering
Bob Peck	Engineering
Michael Lang	Operations
Steve Dunsmuir	Operations
Thomas Lonsdale	Regulatory Compliance
Rehiner Dutes	Regulatory Compliance
Jeronimo Jimenez	Regulatory Compliance

## Documents Reviewed

- C-1302-735-E320-050, Rev. 0: Oyster Creek Batteries A, B, and C Hydrogen Calculation.
- C-1302-917-E310-002, Hydraulic Analysis for FLEX Implementation.
- C-1302-157-E310-010, Emergency Diesel Generator Vault Security Wall Slope Stability Analysis.
- CN-PEUS-15-08, Seismic Analysis of the SFP Primary and Backup Mounting Brackets at Oyster Creek Nuclear Generating Station.
- Calculation 15050-M4-001, Rev. 2, Upper Cable Spreading Room Temperature Without Any Ventilation.
- EQ-QR-269, WNA-TR-03149-GEN, Seismic qualification of other components of SFPIS.
- OC-MISC-010, MAAP Analysis to Support Initial FLEX Strategy.
- Nexus Report 12-4159.OCGS, Rev. 0: Exelon Corporation Oyster Creek Generating Station (OCGS) Battery Coping Evaluation Report.
- UFSAR Appendix 2.3A, The Berkley Township Tornado: A Reassessment of the Tornado Hazard Probability for Oyster Creek Nuclear Generating Station.
- UFSAR Appendix 2.5-A, Investigation of Stability Characteristics of Soils in the Canal Banks.
- "SAFER Response Plan for Oyster Creek Station," Rev. 001, dated 9/18/2015.
- CC-OC-118-1001, Diverse and Flexible Coping Strategies (FLEX) and Spent Fuel Pool Instrumentation Program.
- CC-OC-118-1003, Rev. 3, Special Congested Area Plan – Oyster Creek Nuclear Generating Station, dated 10/9/2015.
- OP-OC-108-109-1001, Severe Weather Preparation TRM for Oyster Creek.
- ECR-14-00027, Outdoor Storage Structures for the Portable FLEX Equipment.
- ECR-14-00389, Rev. 2, Reliable Spent Fuel Pool Level Instrumentation (Fukushima).
- BR 3000, Rev. 14: Electrical Power System Key One Line Diagram.
- BR 3001C, Rev. 1: 4160 V System One Line Diagram, 4160 V Emergency SWGR Bus 1C & 1D.
- BR 3002 (Sh. 2 of 4), Rev. 13: 480 V System One Line Diagram, 460 V Unit Substation 1A2 & 1B2.
- BR 3013 (Sh. 1 of 2), Rev. 14: AC Vital Power System One Line Diagram, Vital MCC 1A2 and 1B2.
- DJP 3C-251-15-0001 Rev. 0, Primary Wide Range Spent Fuel Pool Level Instrumentation Arrangement, Shs. 1, 2, 3, and 4.
- DJP 3C-251-15-0002, Rev. 0, Secondary Wide Range Spent Fuel Pool Level Instrumentation Loop Diagram, Shs. 1, 2, 3, and 4.
- DJP 3C-251-42-0001, Rev. 0, Primary Wide Range Spent Fuel Pool Level Instrumentation Loop Diagram" Shs 1, and 2.
- DWG 3139, Reactor Building Conduit Plan El. 75' – 3".
- DWG 3140, Reactor Building Conduit Plan El. 95' – 3".
- DWG 3141, Reactor Building Conduit Plan El. 119' – 3".
- GU 3E-153-02-006, General Arrangement Reactor BLDG Plan Floor El. 119 ft. – 3 in.
- AR# 02656136-09, Protect the refueling truck or have a spare truck.

- AR# 02656138 – FLEX Protection Matrix Document.
- AR# 02656138-02, Check valves in the OIP are drawn incorrectly.
- AR# 02656138-08, Develop administrative controls for portable lighting.
- AR# 02656138-09, Provide additional debris removal vehicle or protect the current vehicle.
- AR# 02656138-10, Add debris removal tools to the FLEX program.
- AR# 02656138-11, Prepare GOTHIC calculation to evaluate the heat-up rate for the Main Control Room.
- AR# 01672697-24, Develop administrative program to ensure FLEX pathways remain clear.
- AR# 01672697-34, Create FSG for Communications Plan.
- AR #01672697-36, Revise procedure OP-OC-108-109-1001 to reflect severe weather conditions.
- AR# 01672697-53, Develop procedures to ensure the SFP hoses and vent path are established.
- AR #01672697-54, Incorporate guidance in accordance with NEI 12-06, Section 7.3.2 step 5, into a procedure.
- AR# 02386806, Rev. X: Fukushima FLEX Electrical Mitigation Strategy Tech Eval.
- SA-AA-111, Rev. 16, Heat Stress Control.
- ABN-36, Rev. Draft: FLEX: Loss of Offsite Power & Station Blackout (Plant Control).
- FSG-OC-01, Rev. Draft: Operation of the FLEX Portable Pump.
- FSG-OC-04, Rev. Draft: DC Load Shed.
- FSG-OC-05, Rev. Draft: Debris Removal and FLEX Equipment Deployment.
- FSG-OC-06, Rev. Draft: Deployment of FLEX 480V Cables and Connection to USS 1A2/1B2
- FSG-OC-07, Rev. Draft: Line Up of USS 1A2/1B2 for Re-powering from FLEX Generator.
- FSG-OC-08, Rev. Draft: Diesel Fuel Oil Transfer – Post BDBEE.
- FSG-OC-12, Rev. Draft: Energizing Load Breakers on FLEX 500 KW DG – Post BDBEE.

**Oyster Creek Nuclear Generating Station  
Mitigation Strategies/Spent Fuel Pool Instrumentation Safety Evaluation Audit Items:  
Audit Items Currently Under NRC Staff Review, Requiring Licensee Input As Noted**

<b>Audit Item Reference</b>	<b>Item Description</b>	<b>Licensee Input Needed</b>
ISE CI 3.2.4.2.A	Confirm that battery room ventilation to address high/low temperatures and prevention of hydrogen buildup is appropriately addressed during the detailed design process.	Licensee to provide analysis of the battery rooms to the NRC staff.
ISE CI 3.2.4.8.B	Confirm the technical basis for the generator sizing is completed with acceptable results.	Licensee to provide voltage drop information for the FLEX generators to the NRC staff.
AQ 18	The Integrated Plan does not contain sufficient analytical results to support the conclusions that the predictions of the code(s) used are consistent with expected plant behavior and that core cooling would be maintained by performing the identified actions within their time constraints. Provide, on the portal, the relevant calculations that demonstrate adequate core cooling for NRC staff review (e.g., reactor pressure vesselwater level, pressure and temperature, etc.)	NRC staff is reviewing the licensee's MAAP analyses.
AQ 19	The licensee identified that four out of five recirculation pumps will be isolated at 3 hours post ELAP and the electromagnetic relief valves are not used when the isolation condensers are utilized. The licensee did not identify what the assumed recirculation pump seal leakage was or the basis of the assumption.	NRC staff is reviewing the leakage rate calculations for the recirculation pump seals and justification for 10 gallons per minute (gpm) vs. 25 gpm leakage.
AQ 39	Because the strategy and associated support analyses have not been completed, there is insufficient information to conclude that the habitability limits of the	Licensee to demonstrate through analysis that the heat-up rate for the Main Control Room during an ELAP will be maintained habitable to support

Audit Item Reference	Item Description	Licensee Input Needed
	control room will be maintained in all Phases of an ELAP. The staff needs to review postulated outside air temperature, the heat loads from personnel in the control room, and qualification of equipment used in mitigation.	operator actions. If procedures are used to document personnel actions, a description of what actions are taken should also be provided.
AQ 41	Provide information on the adequacy of the ventilation provided in the battery room to protect the batteries from the effects of extreme high and low temperatures.	Licensee to provide an analysis to evaluate the temperature changes in the battery rooms during an ELAP, and any procedures that direct action to be taken.
SE 5	<p>Discuss all areas of where local manual actions are credited in FLEX strategies</p> <p>Can operators safely enter these areas to complete necessary actions during extreme hot and cold hazard during an ELAP? (heat, cold, humidity, etc.) Are these actions feasible based on ELAP conditions and time constraints?</p> <p>Will sufficient lighting be available to complete tasks (e.g., portable lighting, headlamps, flashlights, etc.)</p> <p>Is communication with control room possible based on noise in area of local manual actions?</p> <p>Will portable ventilation be established? When will it be established?</p>	Licensee to provide an assessment of personnel habitability during an ELAP to demonstrate that plant personnel are able to perform necessary actions.
SE 9	The final timeline will be time validated once detailed designs are completed and procedures developed.	Licensee to provide a time validation of the timeline used to respond to an ELAP.

B. Hanson

- 2 -

If you have any questions, please contact me at 301-415-3204 or by e-mail at John.Hughey@nrc.gov.

Sincerely,

*/RA/*

John D. Hughey, Project Manager  
Orders Management Branch  
Japan Lessons-Learned Division  
Office of Nuclear Reactor Regulation

Docket No.: 50-219

Enclosure:  
Audit Report

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RidsNrrPMOysterCreek Resource  
RidsNrrLASLent Resource

RidsRgn1MailCenter Resource  
MHalter, NRR/JLD  
JHughey, NRR/JLD  
RidsAcrcsAcnw\_MailCTR Resource

**ADAMS Accession No. ML16214A329**

\* via e-mail

<b>OFFICE</b>	NRR/JLD/JOMB/PM	NRR/JLD/LA	NRR/JLD/JERB/BC	NRR/JLD/JCBB/BC
<b>NAME</b>	JHughey	SLent	SBailey *	JQuichocho *
<b>DATE</b>	08/08/2016	08/05/2016	08/10/2016	08/12/2016
<b>OFFICE</b>	NRR/JLD/JOMB/BC(A)	NRR/JLD/JOMB/PM		
<b>NAME</b>	MHalter	JHughey		
<b>DATE</b>	08/22/2016	08/29/2016		

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