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

October 8, 2014

Ms. Mary G. Korsnick
Chief Nuclear Officer and
Chief Operating Officer
Exelon Generation Company, LLC
100 Constellation Way, Suite 500P
Baltimore, MD 21202

SUBJECT: NINE MILE POINT NUCLEAR STATION, UNITS 1 AND 2 - PLAN FOR THE ONSITE AUDIT REGARDING IMPLEMENTATION OF MITIGATING STRATEGIES AND RELIABLE SPENT FUEL INSTRUMENTATION RELATED TO ORDERS EA-12-049 AND EA-12-051 (TAC NOS. MF1129, MF1130, MF1131, AND MF1132)

Dear Ms. Korsnick

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. ML13066A171), Exelon Generation, LLC, previously as Constellation Energy Nuclear Group, LLC (Exelon, the licensee) submitted its OIP for Nine Mile Point Nuclear Station, Units 1 and 2 (NMP), in response to Order EA-12-049. By letter dated March 8, 2013 (ADAMS Accession No. ML13074A056), Exelon submitted a complete revision of the OIP for NMP. By letters dated August 27, 2013, February 27, 2014 and August 26, 2014 (ADAMS Accession Nos. ML13254A278, ML14069A318, and ML14241A380, respectively), the licensee submitted its first three 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 NMP interim staff evaluation (ISE) and audit report (ADAMS Accession No. ML13225A584) and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13066A172), the licensee submitted its OIP for NMP in response to Order EA-12-051. By letter dated June 5, 2013 (ADAMS Accession No. ML13154A399), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated July 5, 2013, August 27, 2013, February 24, 2014 and August 26, 2014 (ADAMS Accession Nos. ML13197A220, ML13254A279, ML14069A180, and ML14241A016, respectively), the licensee submitted its RAI responses and first three six-month updates to the OIP.

The NRC staff's review to date led to the issuance of the NMP ISE and RAI dated November 15, 2013 (ADAMS Accession No. ML13281A205). 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 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. The audit's onsite portion will occur prior to declarations of compliance for the first unit at each site.

This document outlines the on-site audit process that occurs after ISE issuance as licensees provide new or updated information via periodic updates, update audit information on e-portals, provide preliminary Overall Program Documents/Final Integrated Plans, and continue in-office audit communications with staff while proceeding towards compliance with the orders.

The staff plans to conduct an onsite audit at NMP in accordance with the enclosed audit plan from November 3-7, 2014.

If you have any questions, please contact me at 301-415-5888 or by e-mail at Jason.Paige@nrc.gov.

Sincerely,

John D. Hughey for

Jason Paige, Project Manager
Orders Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket Nos.: 50-220 and 50-410

Enclosure:
Audit plan

cc w/encl: Mr. Christopher Costanzo
Vice President Nine Mile Point
Nine Mile Point Nuclear Station, LLC
P.O. Box 63
Lycoming, New York 13093

Distribution via Listserv

**Audit Plan**
**Nine Mile Point Nuclear Station, Units 1 and 2**

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. ML13066A171), Exelon Generation, LLC, previously as Constellation Energy Nuclear Group, LLC (Exelon, the licensee) submitted its OIP for Nine Mile Point Nuclear Station, Units 1 and 2 (NMP, or NMP1 and NMP2), in response to Order EA-12-049. By letter dated March 8, 2013 (ADAMS Accession No. ML13074A056), Exelon submitted a complete revision of the OIP for NMP. By letters dated August 27, 2013, February 27, 2014 and August 26, 2014 (ADAMS Accession Nos. ML13254A278, ML14069A318, and ML14241A380, respectively), the licensee submitted its first three 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 NMP interim staff evaluation (ISE) and audit report (ADAMS Accession No. ML13225A584) and continues with in-office and onsite portions of this audit.

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This document outlines the onsite audit process that occurs after ISE issuance as licensees provide new or updated information via periodic updates, update audit information on e-portals, provide preliminary Overall Program Documents (OPDs)/Final Integrated Plans (FIPs), and continue in-office audit communications with staff while proceeding towards compliance with the orders.

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 Nuclear Energy Institute (NEI) guidance document NEI 12-02, "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 SCOPE

As discussed, onsite audits will be performed per NRR Office Instruction LIC-111, "Regulatory Audits," to support the development of safety evaluations. Site-specific OIPs and OPDs/FIPs rely on equipment and procedures that apply to all units at a site, therefore, audits will be planned to support the "first unit at each site." On-site audits for subsequent units at a site will be on an as-needed basis.

The purpose of the audits is to obtain and review information responsive to the NMP OIPs, as supplemented, open and confirmatory items from the mitigation strategies ISE, RAI responses from the SFPI ISE, and to observe and gain a better understanding of the basis for the site's overall programs to ensure the licensee is on the correct path for compliance with the Mitigation Strategies and SFPI orders. These may include, but are not limited to:

- Onsite review and discussion for the basis and approach for detailed analysis and calculations (Orders EA-12-049, EA-12-051);

- Walk-throughs of strategies and laydown of equipment to assess feasibility, timing, and effectiveness of a given mitigating strategy or integration of several strategies (Order EA-12-049);

- Storage, protection, access, and deployment feasibility and practicality for onsite portable equipment (Order EA-12-049);

- Evaluation of staging, access, and deployment of offsite resources to include Regional Response Center (RRC) provided equipment (Order EA-12-049); and

- Review dimensions and sizing of the SFP area, placement of the SFP level instrumentation, and applicable mounting methods and design criteria (Order EA-12-051).

NRC AUDIT TEAM

| Title | Team Member |
|---|---|
| Team Lead/Project Manager | Jason Paige |
| Technical Support | Michael Levine |
| Technical Support | Prem Sahay |
| Technical Support | Stephen Wyman |
| Technical Support | Brett Titus |
| Technical Support | Joshua Miller |

NRC AUDIT TEAM – SUPPLEMENTAL MEMBERS

| Title | Team Member |
|---|---|
| Branch Chief | Stewart Bailey |

LOGISTICS

The audit will be conducted onsite at NMP on November 3-7, 2014. Entrance and exit briefings will be held with the licensee at the beginning and end of the audit, respectively, as well as daily briefings of team activities. Additional details will be addressed over the phone. A more detailed schedule is provided below.

A private conference room is requested for NRC audit team use with access to audit documentation upon arrival and as needed.

DELIVERABLES

An audit report/summary will be issued to the licensee within 45 days from the end of the audit.

INFORMATION NEEDS

- Materials/documentation provided in responses to open or confirmatory items and RAIs in the ISEs;
- OPD/FIP (current version), operator procedures, FLEX Support Guidelines (FSGs), operator training plans, RRC (SAFER) NMP Response Plan; and
- Materials/documentation for staff audit questions and/or licensee OIP identified open items as listed in the Part 2 table below

To provide supplemental input to the ongoing audit of documents submitted to the NRC and made available via e-portal, the onsite audit will have three components: 1) a review of the overall mitigating strategies for the site, including, if needed, walk-throughs of strategies and equipment laydown of select portions; 2) a review of material relating to open or confirmatory items and RAIs from the ISEs, staff audit questions, and licensee open items; and 3) additional specific issues requested by NRC technical reviewers related to preparation of a safety evaluation. Each part is described in more detail below:

Part 1 - Overall Mitigating Strategies and Program Review:

During the onsite audit, please be prepared to conduct a tabletop discussion of the site's integrated mitigating strategies and SFP instrumentation compliance program. This discussion should address the individual components of the plans, as well as the integrated implementation of the strategies including a timeline. The licensee team presenting this should include necessary representatives from site management, engineering, training, and operations that were responsible for program development, and will be responsible for training and execution.

Following the tabletop discussion, please be prepared to conduct walk-throughs of procedures and demonstrations of equipment as deemed necessary by NRC audit team members. Include representatives from engineering and operations that will be responsible for training and execution. At this time we expect, at a minimum, to walk-through the items below. Based on the tabletop presentations and audit activities, this list may change.

WALK-THROUGH LIST:

1. Walk-through a sample of strategies that will be delineated by specific NRC technical staff audit team members.

2. Walk-through of portable (FLEX) diesel generator (DG) procedures, to include power supply pathways, areas where manual actions are required, and electrical isolation.

3. Walk-through of building access procedures, to include any unique access control devices.

4. Strategy walk-through of transfer routes from staging and storage areas to deployment locations for both onsite and offsite equipment.

5. Strategy walk-through for core cooling and reactor coolant system (RCS) inventory, to include portable pumping equipment, flow paths, and water storage locations and the related reactor systems analysis and calculations.

6. Walk-through of communications enhancements.

7. Walk-through of SFP area, SFP instrumentation locations, and related equipment mounting areas. Assess the potential of electromagnetic interference (EMI).

Part 2 – Specific Technical Review Items:

During the visit, the following audit items will be addressed from the licensee's ISEs open items (OIs), confirmatory items (CIs), and SFPI RAIs; audit question list (AQ); licensee OIP, as supplemented, open items; and draft safety evaluation (SE) additional questions. Please provide documents or demonstrations as needed to respond to each item.

**Nine Mile Point, Unit 1***

*SFPI RAIs are the same for Unit 1 and 2 but are only listed under the Unit 1 questions.

| Audit Item Reference | Item Description |
|---|---|
| ISE OI 3.1.1.3.A | Discuss the seismic procedural interface consideration referenced in NEI 12-06, Section 5.3.3, Consideration 1, which considers the possible failure of seismically qualified electrical equipment by beyond-design-basis seismic events, and the need to provide a reference source for plant operators. |
| ISE OI 3.2.1.3.A | The coping strategies for maintaining core cooling were updated in the August 27, 2013, six-month update. However, the licensee has not yet updated the sequence of events timeline and the discussion of time constraints. Provide the updated sequence of events timeline and discuss the time constraints. |
| ISE CI 3.1.1.1.A AQ 1 | Discuss the design of the storage facility for FLEX equipment and the method selected for protection of equipment during a BDBEE. Also, discuss how large portable equipment will be secured for protection during a seismic hazard. |

| Audit Item Reference | Item Description |
|---|---|
| ISE CI 3.1.1.2.A AQ 35 | Provide deployment routes and any considerations to account for possible impacts due to debris and potential soil liquefaction. In addition, provide NMP1's plan to move equipment during a BDBEE, and restocking of supplies in the context of a flood with long persistence. |
| ISE CI 3.1.1.4.A | Provide the local staging areas, and the method to deliver the FLEX equipment to the site. |
| ISE CI 3.2.1.1.A<br>ISE CI 3.2.1.1.B<br>ISE CI 3.2.1.1.C<br>ISE CI 3.2.1.1.D<br>ISE CI 3.2.1.1.E | Provide justification that [Modular Accident Analysis Program] MAAP is an appropriate code for the simulation of an [extended loss of alternating current (ac) power] ELAP event. |
| ISE CI 3.2.1.2.A | Provide justification of the pressure dependence of the assumed recirculation system leakage rates and the recirculation pump seal leakage rates that were used in the ELAP analysis; whether the leakage was determined to be single-phase, two-phase, or steam at the donor cell; and how mixing of the leakage flow with the drywell atmosphere was modeled. |
| ISE CI 3.2.3.B | Provide verification if NMP1's plan is to implement a modification to remove water from the torus in Phase 3 using Regional Response Center equipment. |
| ISE CI 3.2.4.2.B AQ 30 | 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. |
| ISE CI 3.2.4.4.A | Provide a summary of the restoration of Emergency Lighting in Phase 2 that may be restored when Battery Board 12 is repowered. |
| ISE CI 3.2.4.4.B | Provide a status of the communication commitments as discussed in the April 24, 2013, NRC staff analysis (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13100A236). |
| ISE CI 3.2.4.6.A | Provide a calculation and basis for use of an extrapolated station blackout evaluation for Main Control Room habitability. |
| ISE CI 3.2.4.8.A AQ 55 | Provide specific details on the protection schemes to protect Class 1 E equipment from faults from the portable FLEX equipment. |
| ISE CI 3.2.4.8.B | a) Provide a summary of the sizing calculation for the FLEX and RRC supplied generators including ten small capacity generators rated 6 kVA each to show that they can supply the loads assumed in phases 2 and 3. Identify the type of generators, whether they are gas or diesel powered, and the voltage rating of small capacity generators. b) Identify all the loads which will be fed from each of the generators. c) Provide usable Single Line Diagrams showing the proposed connections of Phase 2 and 3 electrical equipment on the e-Portal. Include breaker and relay (protection) and equipment ratings on the Single Line Diagrams. |

| Audit Item Reference | Item Description |
|---|---|
| ISE CI 3.2.4.10.A | Exelon has not provided the basis and supporting details for the battery coping time analysis including load profiles, minimum required dc bus voltage and discussion of any reduction in defense-in-depth or redundancy resulting from load shedding. Provide the following information: a) the direct current (dc) load profile for the mitigating strategies to maintain core cooling, containment, and spent fuel pool cooling during all modes of operation; b) a detailed discussion on the loads that will be shed from the dc bus, the equipment location (or location where the required action needs to be taken), and the required operator actions needed to be performed and the time to complete each action. In your response, explain which functions are lost as a result of shedding each load and discuss any impact on defense in depth and redundancy; and c) the minimum voltage that must be maintained and the basis for the minimum voltage on the dc bus. |
| ISE CI 3.4.A | Provide information on the program or process to request RRC equipment. |
| ISE CI 3.4.B | Provide the sizing calculations of RRC FLEX equipment and the compatibility of RRC equipment to plant connection points. |
| AQ 2<br>AQ 44<br>AQ 50 | Protection of and access to new connection points-Exelon has identified their intention to install new FLEX 600VAC and 4160 VAC connection points to 600 VAC and 4160 VAC distribution centers, FLEX connection points to reactor feed water, emergency service water and spent fuel pool cooling systems and new FLEX dry hydrants in the intake structure. Consistent with NEI 12-06, Section 5.3.2, Consideration 2, describe if the referenced connection points will have access through seismically robust structures. |
| AQ 3 | Protection of vehicles-In its integrated plan, Exelon identified that one or more vehicles will be provided for refueling and delivery of portable equipment and clearing debris. Consistent with NEI 12-06, Section 5.3.2, Consideration 5, Section 6.2.3.2, Consideration 9, and Section 7.3.2, Consideration 4, describe how these vehicles will be reasonably protected from external events. |
| AQ 5 | Exelon's plan for the development of the mitigating strategies, as presented in the integrated plan, does not address the coping with failure of seismically qualified instruments because of a beyond-design-basis event as specified by NEI 12-06, section 5.3.3, Consideration 1. The licensee's integrated plan specifies that guidance to operators should be developed to identify critical operations to perform until alternate indications can be connected. It also specifies that the guidance include how to control critical equipment without control power. Describe the planned actions to cope with the loss of seismically qualified instrumentation. |
| AQ 6 | In its integrated plan, Exelon has provided insufficient information to support a conclusion that Considerations 2 and 3 of NEI 12-06, Section 5.3.3, will be taken into account in the development of the mitigating strategies. These considerations address the potential impacts of large internal flooding sources that are not seismically robust and do not require ac power and the potential reliance on ac power to mitigate ground water. Describe how Considerations 2 and 3 of NEI 12-06, Section 5.3.3 will be addressed. |

| Audit Item Reference | Item Description |
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| AQ 7 | Availability of debris clearing equipment.-In its integrated plan, Exelon has identified debris clearing equipment as an item of phase 3 response equipment. Exelon has indicated that the first equipment should begin to arrive from the RRCwithin 24 hours of being requested. Exelon has identified the time constraint for restoring electrical power to a control rod drive (CRD) pump and also to battery chargers using a portable/FLEX electrical generator. As discussed in NEI 12-06, Section 7.3.2, Consideration 3, deployment of equipment following a hurricane or tornado may involve the need to remove debris. NEI 12-06, Section 3.2.1.7 specifies that the strategies rely upon Principle 6, which states that strategies having a time constraint to be successful should be identified and a basis provided that the time can be reasonably met. Provide justification that the 8 hour time constraint for restoring power to a CRD pump and also to a battery charger using a portable/FLEX electrical generator can be met in the context of a high wind event such as a hurricane or tornado. |
| AQ 9 | Effects of high temperatures on portable equipment-In its integrated plan, Exelon has presented information on the heat up of a variety of enclosed rooms and spaces, but has presented no information on the potential effects of high ambient temperatures at the locations where portable equipment would operate in the event it is necessary to use the strategies. Discuss how the effects of high temperatures on portable equipment will be addressed. |
| AQ 13 | The licensee's 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 the relevant calculations that demonstrate adequate core cooling (e.g., reactor pressure vessel (RPV) water level, pressure and temperature, etc.) |
| AQ 16 | Exelon has not described how the coping strategies will be implemented, including their engineering basis, where there is a need to share facility resources, for example, where a single dry hydrant is providing cooling water to both NMP1 and NMP2. Identify shared resources and describe how they will be managed between the 2 units in a beyond-design-basis scenario. |
| AQ 17 | Consistent with NEI 12-06, Section 11.2 and equipment design criteria, provide supporting information concerning the required flow rates, the portable/FLEX pump characteristics, suction and discharge losses elevation differences and piping losses to allow verification that Exelon's plan will be a successful strategy for either the primary of alternate strategy. |
| AQ 24 | Provide the basis for establishing spent fuel pool cooling within the worst case required time limits and at the required flow rates. |
| AQ 33 | Provide details for placement of gasoline and diesel powered portable/FLEX equipment and Exelon's plans to ventilate indoor locations and monitor air quality in building locations that may be affected by their exhaust. |
| AQ 34 | Consistent with NEI 12-06, Section 3.2.2, Paragraph (12), address heat tracing for freeze protection of piping, instrument lines and equipment. |
| AQ 38 | Consistent with NEI 12-06, Section 11.5, provide justification how equipment will be maintained and tested, such as batteries, cables, and diesel generators. |

| Audit Item Reference | Item Description |
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| AQ 47 | The licensee states that, "at the initiation of the BDBEE, main steam isolation valves (MSIVs) automatically close, feed water flow to the reactor is lost, and ERVs automatically cycle to control pressure, causing reactor water level to decrease. Total reactor coolant pressure boundary leakage during an ELAP condition can be assumed to be less than 45 gallons per minute (gpm) (recirculation pump total seal leakage is less than or equal to 20 gpm plus 25 gpm Technical Specification total allowable leakage) extending overall coping time to 8 hours. Provide justification how inventory lost through the relief valves is accounted for. |
| AQ 48 | The strategy associated with energizing a 600 VAC power board via 600 VAC distribution center and restarting a CRD pump effectively replaces the capability to inject to the reactor in a short period of time following a loss of ac power event during an ELAP. Provide an evaluation that shows that this specific equipment and electrical distribution system can survive all the events encompassed in an ELAP event. |
| AQ 56 | Describe plans for supplying fuel oil to FLEX equipment (i.e., fuel oil storage tank volume, supply pathway, etc.). Also, explain how fuel quality will be assured if stored for extended periods of time. |
| SFPI RAI 1 | Confirm that the correct elevations for Level 2 at NMP1 and NMP2 are 321 ft. 11.5 in. and 335 ft. 11.9 in., respectively, and provide the information regarding specific requirements of the procedure controlling irradiated equipment or materials stored in the SFP, including details of the analysis to be performed to determine the projected dose rate impact and the appropriate Level 2 value as a result of the potential for irradiated material to be stored in the SFP in the future. |
| SFPI RAI 2 | Provide a final labeled sketch or marked-up plant drawing of the plan view of the SFP area for each unit, depicting the SFP inside dimensions, the planned locations/placement of the primary and back-up SFP level sensor, and the proposed routing of the cables that will extend from these sensors toward the location of the read-out/display device. |
| SFPI RAI 3 | Provide the results of the analyses used to verify the design criteria and methodology for seismic testing of the SFP instrumentation and the electronics units, including, design basis maximum seismic loads and the hydrodynamic loads that could result from pool sloshing or other effects that could accompany such seismic forces. |
| SFPI RAI 4 | For each of the mounting attachments required to attach SFP Level equipment to plant structures, describe the design inputs, and the methodology that was used to qualify the structural integrity of the affected structures/equipment. |
| SFPI RAI 5 | Provide information indicating (a) whether the 80 degree C rating for the sensor electronics is a continuous duty rating; and, (b) what will be the maximum expected ambient temperature in the room in which the sensor electronics will be located under BOB conditions in which there is no ac power available to run Heating Ventilation and Air Conditioning (HVAC) systems. |
| SFPI RAI 6 | Provide information indicating the maximum expected relative humidity in the room in which the sensor electronics will be located under BDB conditions, in which there is no ac power available to run HVAC systems, and whether the sensor electronics is capable of continuously performing its required functions under this expected humidity condition. |

| Audit Item Reference | Item Description |
|---|---|
| SFPI RAI 7 | Provide analysis of the maximum expected radiological conditions (dose rate and total integrated dose) to which the sensor and associated co-located electronic equipment will be exposed. Also, provide documentation indicating how it was determined that the electronics for this equipment is capable of withstanding a total integrated dose of $1X10^3$ Rads. Discuss the time period over which the analyzed total integrated dose was applied. |
| SFPI RAI 8 | Provide information describing the evaluation of the comparative sensor design, the shock test method, test results, and forces applied to the sensor applicable to its successful tests demonstrating that the referenced previous testing provides an appropriate means to demonstrate reliability of the sensor under the effects of severe shock. |
| SFPI RAI 9 | Provide information describing the evaluation of the comparative sensor design, the vibration test method, test results, and the forces and their frequency ranges and directions applied to the sensor applicable to its successful tests, demonstrating that the referenced previous testing provides an appropriate means to demonstrate reliability of the sensor under the effects of high vibration. |
| SFPI RAI 10 | Provide information describing the evaluation of the comparative display panel ratings against postulated plant conditions. Also, provide results of the manufacturer's shock and vibration test methods, test results, and the forces and their frequency ranges and directions applied to the display panel associated with its successful tests. |
| SFPI RAI 11 | Provide the results of seismic testing per IEEE 344-2004, to demonstrate the reliability of the components within the power and control panel with regard to shock and vibration effects. |
| SFPI RAI 12 | Provide analysis of the seismic testing results and show that the instrument performance reliability, following exposure to simulated seismic conditions representative of the environment anticipated for the SFP structures at Nine Mile Point, has been adequately demonstrated. |
| SFPI RAI 13 | Provide the NRC staff with the final configuration of the power supply source for each channel so that the staff may conclude that the two channels are independent from a power supply assignment perspective. |
| SFPI RAI 14 | Provide the results of the calculation depicting the battery backup duty cycle requirements demonstrating that its capacity is sufficient to maintain the level indication function until offsite resource availability is reasonably assured. |
| SFPI RAI 15 | Provide analysis verifying that the proposed instrument performance is consistent with these estimated accuracy normal and BDB values. Demonstrate that the channels will retain these accuracy performance values following a loss of power and subsequent restoration of power. |
| SFPI RAI 16 | Provide a list of the procedures addressing operation (both normal and abnormal response), calibration, test, maintenance, and inspection procedures that will be developed for use of the spent SFP instrumentation. The licensee is requested to include a brief description of the specific technical objectives to be achieved within each procedure. |

| Audit Item Reference | Item Description |
|---|---|
| SFPI RAI 17 | Provide the following:<br>a) Further information describing the maintenance and testing program the licensee will establish and implement to ensure that regular testing and calibration is performed and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. Include a description of the plans for ensuring that necessary channel checks, functional tests, periodic calibration, and maintenance will be conducted for the level measurement system and its supporting equipment.<br>b) Information describing compensatory actions when both channels are out-of-order, and the implementation procedures.<br>c) Additional information describing expedited and compensatory actions in the maintenance procedure to address when one of the instrument channels cannot be restored to functional status within 90 days. |
| SFPI RAI 18 | Provide a description of the in-situ calibration process at the SFP location that will result in the channel calibration being maintained at its design accuracy. |
| SE Review Item 1 | The NRC staff identified a concern with the level of accuracy of the FLEX instrumentation (such as Flukek, etc.) to ensure that electrical equipment remains protected (from an electrical standpoint - e.g., power fluctuations) and with the ability of this instrumentation to provide operators with accurate information. Identify the FLEX instrumentations that will be used to monitor portable FLEX electrical equipment and discuss their qualification and control. |
| SE Review Item 3 | The NRC staff understands that isolation condensers have typically been designed with baffles to prevent excessive moisture carryover in the exhausted steam. Clarify the design of the emergency condensers at NMP1 in this regard and identify what moisture carryover fraction is used in the calculations credited for the ELAP coping time. In addition, provide the technical basis for the carryover fraction assumed for the emergency condensers (e.g., performance tests). |
| SE Review Item 4 | Address the following items regarding the use of raw water sources for mitigating an ELAP event:<br>a) Discuss the quality of the water (e.g., suspended solids, dissolved salts) that will be used for primary makeup during ELAP events, accounting for the potential for increased suspended or dissolved material in some raw water sources during events such as flooding or severe storms.<br>b) Discuss whether instrumentation available during the ELAP event is capable of providing indication that inadequate core cooling exists for one or more fuel assemblies due to blockage at fuel assembly inlets or bypass leakage flowpaths.<br>c) As applicable, provide justification that the use of the intended raw water sources will not result in blockage of coolant flow across fuel assemblies and applicable bypass leakage flowpaths to an extent that would inhibit adequate core cooling. Or, if deleterious blockage at the core inlet cannot be precluded under ELAP conditions, then discuss alternate means for assuring the adequacy of adequate core cooling in light of available indications. For example, will ELAP mitigation procedures be capable of ensuring top-down cooling of the reactor core? |
| SE Review Item 5 | Provide information that appropriate human factors are applied for the implementation of the FLEX strategies. |

**Nine Mile Point, Unit 2**

| Audit Item Reference | Item Description |
|---|---|
| ISE OI 3.1.1.3.A | Discuss the seismic procedural interface consideration referenced in NEI 12-06, Section 5.3.3, Consideration 1, which considers the possible failure of seismically qualified electrical equipment by beyond-design-basis seismic events, and the need to provide a reference source for plant operators. |
| ISE OI 3.2.3.B | Provide a calculation to demonstrate that the assumed timeline is appropriate and that containment functions will be restored and maintained following an ELAP event. |
| ISE CI 3.1.1.1.A AQ 1 | Discuss the design of the storage facility for FLEX equipment and the method selected for protection of equipment during a BDBEE. Also, discuss how large portable equipment will be secured for protection during a seismic hazard. |
| ISE CI 3.1.1.2.A AQ 40 | Provide deployment routes and any considerations to account for possible impacts due to debris and potential soil liquefaction. In addition, provide NMP2's plan to move equipment during a BDBEE, and restocking of supplies in the context of a flood with long persistence. |
| ISE CI 3.1.1.4.A | Provide the local staging areas, and the method to deliver the FLEX equipment to the site. |
| ISE CI 3.2.1.1.A<br>ISE CI 3.2.1.1.B<br>ISE CI 3.2.1.1.C<br>ISE CI 3.2.1.1.D<br>ISE CI 3.2.1.1.E | Provide justification that MAAP is an appropriate code for the simulation of an ELAP event. |
| ISE CI 3.2.1.2.A | Provide justification of the pressure dependence of the assumed recirculation system leakage rates and the recirculation pump seal leakage rates that were used in the ELAP analysis; whether the leakage was determined to be single-phase, two-phase, or steam at the donor cell; and how mixing of the leakage flow with the drywell atmosphere was modeled. |
| ISE CI 3.2.2.A | Provide an evaluation of the refueling floor SFP area for steam and condensation, and vent pathway. |
| ISE CI 3.2.3.A | Provide an evaluation of containment structures to identify necessary actions to enable implementation of the strategy with running [reactor core isolation cooling] RCIC with elevated temperatures. |
| ISE CI 3.2.4.2.A AQ 34 AQ 35 | Provide analyses associated with the proposed strategies for ventilation and critical equipment cooling (e.g., RCIC and battery rooms). |
| ISE CI 3.2.4.4.A AQ 41 | Provide a summary of the restoration of Emergency Lighting that may be restored when a 600 Vac unit substation is repowered. |
| ISE CI 3.2.4.4.B | Provide a status of the communication commitments as discussed in the April 24, 2013, NRC staff analysis ( ADAMS Accession No. ML13100A236). |
| ISE CI 3.2.4.6.A | Provide a calculation and basis for use of an extrapolated station blackout evaluation for Main Control Room habitability. |
| ISE CI 3.2.4.8.A | Provide specific details on the protection schemes to protect Class 1 E equipment from faults from the portable FLEX equipment. |

| Audit Item Reference | Item Description |
|---|---|
| ISE CI 3.2.4.8.B<br>AQ 21<br>AQ 49 | Provide an updated summary of the sizing calculations for the FLEX generators. |
| ISE CI 3.2.4.9.A | Provide a summary of the refueling strategies for FLEX equipment. |
| ISE CI 3.2.4.10.A | Exelon has not provided the basis and supporting details for the battery coping time analysis including load profiles, minimum required DC bus voltage and discussion of any reduction in defense-in-depth or redundancy resulting from load shedding. Provide the following information: a) the dc load profile for the mitigating strategies to maintain core cooling, containment, and spent fuel pool cooling during all modes of operation; b) a detailed discussion on the loads that will be shed from the dc bus, the equipment location (or location where the required action needs to be taken), and the required operator actions needed to be performed and the time to complete each action. In your response, explain which functions are lost as a result of shedding each load and discuss any impact on defense in depth and redundancy; and c) the minimum voltage that must be maintained and the basis for the minimum voltage on the dc bus. |
| ISE CI 3.4.A | Provide information on the program or process to request RRC equipment. |
| ISE CI 3.4.B | Provide the sizing calculations of RRC FLEX equipment and the compatibility of RRC equipment to plant connection points. |
| AQ 2 | Protection of and access to new connection points-Exelon has identified their intention to install new FLEX 600 VAC and 4160 VAC connection points to 600 VAC and 4160 VAC distribution centers, FLEX connection points to reactor feed water, emergency service water and spent fuel pool cooling systems and new FLEX dry hydrants in the intake structure. Consistent with NEI 12-06, Section 5.3.2, Consideration 2, describe if the referenced connection points will have access through seismically robust structures. |
| AQ 3 | Protection of vehicles-In its integrated plan, Exelon identified that one or more vehicles will be provided for refueling and delivery of portable equipment and clearing debris. Consistent with NEI 12-06, Section 5.3.2, Consideration 5, Section 6.2.3.2, Consideration 9, and Section 7.3.2, Consideration 4, describe how these vehicles will be reasonably protected from external events. |
| AQ 4 | Exelon's plan for the development of the mitigating strategies, as presented in the integrated plan, does not address the coping with failure of seismically qualified instruments because of a beyond-design-basis event as specified by NEI 12-06, section 5.3.3, Consideration 1. The licensee's integrated plan specifies that guidance to operators should be developed to identify critical operations to perform until alternate indications can be connected. It also specifies that the guidance includes how to control critical equipment without control power. Describe the planned actions to cope with the loss of seismically qualified instrumentation. |

| Audit Item Reference | Item Description |
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| AQ 5 | In its integrated plan, Exelon has provided insufficient information to support a conclusion that Considerations 2 and 3 of NEI 12-06, Section 5.3.3, will be taken into account in the development of the mitigating strategies. These considerations address the potential impacts of large internal flooding sources that are not seismically robust and do not require ac power and the potential reliance on ac power to mitigate ground water. Describe how Considerations 2 and 3 of NEI 12-06, Section 5.3.3 will be addressed. |
| AQ 6 | Availability of debris clearing equipment.-In its integrated plan, Exelon has identified debris clearing equipment as an item of phase 3 response equipment. Exelon has indicated that the first equipment should begin to arrive from the RRC within 24 hours of being requested. Exelon has identified the time constraint for restoring electrical power to a CRD pump and also to battery chargers using a portable/FLEX electrical generator. As discussed in NEI 12-06, Section 7.3.2, Consideration 3, deployment of equipment following a hurricane or tornado may involve the need to remove debris. NEI 12-06, Section 3.2.1.7 specifies that the strategies rely upon Principle 6, which states that strategies having a time constraint to be successful should be identified and a basis provided that the time can be reasonably met. Provide justification that the 8 hour time constraint for restoring power to a CRD pump and also to a battery charger using a portable/FLEX electrical generator can be met in the context of a high wind event such as a hurricane or tornado. |
| AQ 8 | Effects of high temperatures on portable equipment-In its integrated plan, Exelon has presented information on the heat up of a variety of enclosed rooms and spaces, but has presented no information on the potential effects of high ambient temperatures at the locations where portable equipment would operate in the event it is necessary to use the strategies. Discuss how the effects of high temperatures on portable equipment will be addressed. |
| AQ 15 | Exelon has not described how the coping strategies will be implemented, including their engineering basis, where there is a need to share facility resources, for example, where a single dry hydrant is providing cooling water to both NMP1 and NMP2. Identify shared resources and describe how they will be managed between the 2 units in a beyond-design-basis scenario. |
| AQ 16<br>AQ 17 | Consistent with NEI 12-06, Section 11.2 and equipment design criteria, provide supporting information concerning the required flow rates, the portable/FLEX pump characteristics, suction and discharge losses elevation differences and piping losses to allow verification that Exelon's plan will be a successful strategy for either the primary of alternate strategy. |
| AQ 18 | The licensee states that the suppression pool is expected to rise to 230 degrees, above the recommended operating temperature of the RCIC pump. The licensee refers to a GE pinch study for operating RCIC with elevated temperatures. Provide adequate technical basis demonstrating RCIC pump operability with a suction temperature of 230°F. The staff requests the licensee provide an evaluation of how their RCIC pump compares with the one noted in the study and what if any effects of any differences. In addition, provide an evaluation of how venting containment, which will reduce suppression pool pressure, will affect the RCIC pump. |

| Audit Item Reference | Item Description |
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| AQ 19 | The Licensee states that they will bypass room temperature trips of the RCIC pump, and that the RCIC pump can operate without dc. The staff requests the licensee to provide the supporting documentation for staff review. |
| AQ 26 | On page 19 of 79 of the integrated plan, the licensee states that RCIC automatically starts with suction from the non-seismically qualified condensate storage tank (CST) if available. If in the event of an ELAP, the CST is significantly damaged, provide information that supports the switchover instrumentation will remain operational and that the injection to the RPV will remain uninterrupted. The discussion should include whether switch-over function is automatic, fail-safe, and whether function logic and hardware, related piping, valves, SSCs to support the switchover function are of safety grade and are qualified for all criteria. If not, then justify how switchover from CST to Suppression Pool will be assured in ELAP conditions if the CSTs are unavailable. |
| AQ 28 | Provide the basis for establishing spent fuel pool cooling within the worst case required time limits and at the required flow rates. |
| AQ 36 | Provide details for placement of gasoline and diesel powered portable/FLEX equipment and Exelon's plans to ventilate indoor locations and monitor air quality in building locations that may be affected by their exhaust. |
| AQ 39 | Consistent with NEI 12-06, Section 3.2.2, Paragraph (12), address heat tracing for freeze protection of piping, instrument lines and equipment. |
| AQ 54 | Describe plans for supplying fuel oil to FLEX equipment (i.e., fuel oil storage tank volume, supply pathway, etc.). Also, explain how fuel quality will be assured if stored for extended periods of time. |
| SE Review Item 1 | The NRC staff identified a concern with the level of accuracy of the FLEX instrumentation (such as Flukek, etc.) to ensure that electrical equipment remains protected (from an electrical standpoint - e.g., power fluctuations) and with the ability of this instrumentation to provide operators with accurate information. Identify the FLEX instrumentations that will be used to monitor portable FLEX electrical equipment and discuss their qualification and control. |
| SE Review Item 2<br>AQ 20 | Address the following items regarding the use of raw water sources for mitigating an ELAP event:<br>a) Discuss the quality of the water (e.g., suspended solids, dissolved salts) that will be used for primary makeup during ELAP events, accounting for the potential for increased suspended or dissolved material in some raw water sources during events such as flooding or severe storms.<br>b) Discuss whether instrumentation available during the ELAP event is capable of providing indication that inadequate core cooling exists for one or more fuel assemblies due to blockage at fuel assembly inlets or bypass leakage flowpaths.<br>c) As applicable, provide justification that the use of the intended raw water sources will not result in blockage of coolant flow across fuel assemblies and applicable bypass leakage flowpaths to an extent that would inhibit adequate core cooling. Or, if deleterious blockage at the core inlet cannot be precluded under ELAP conditions, then discuss alternate means for assuring the adequacy of adequate core cooling in light of available indications. For example, will ELAP mitigation procedures be capable of ensuring top-down cooling of the reactor core? |

| Audit Item Reference | Item Description |
|---|---|
| SE Review Item 3 | Provide information that appropriate human factors are applied for the implementation of the FLEX strategies. |

Part 3 – Specific Topics for Discussion:

1. Draft of NMP's OPD/FIP

2. Reactor systems analyses to include a discussion of applicability to WCAP-17601-P, boron mixing, WCAP-17792-P, and Nuclear Safety Advisory Letter (NSAL) 14-1

3. Training

4. Portable (FLEX) equipment maintenance and testing

5. RRC (SAFER) Response Plan for NMP

**Proposed Schedule**

**Onsite Day 1, Monday, November 3, 2014**

0800 Check in at site:
Badging
Dosimetry and whole body count for RCA entrance

0930 Entrance meeting

1000 Licensee presentation of strategies

1200 Lunch

1300 NRC Audit Team Activities:

- Technical area break-out discussions between NRC and licensee staff in the areas of reactor systems, electrical, balance-of-plant/structures, SFPI, and others
- Review documents relating to open or confirmatory items, RAIs, codes, analyses, etc.

1600 NRC Audit Team meeting

1630 Team lead daily debrief/next day planning with licensee

**Onsite Day 2, Tuesday, November 4, 2014**

0830 NRC Audit Team Activities:

- Technical area break-out discussions between NRC and licensee staff in the areas of reactor systems, electrical, balance-of-plant/structures, SFPI, and others
- Review documents relating to open or confirmatory items, RAIs, codes, analyses, etc.

1230 Lunch

1330 Continue NRC Audit Team Activities:

- Technical area break-out discussions between NRC and licensee staff in the areas of reactor systems, electrical, balance-of-plant/structures, SFPI, and others
- Review documents relating to open or confirmatory items, RAIs, codes, analyses, etc.

1600 NRC Audit Team meeting

1630 Team lead daily debrief/next day planning with licensee

**Onsite Day 3, Wednesday, November 5, 2014**

0830 Check in at site; meet with Senior Resident/Resident

0900 NRC Audit Team Activities:

- Review documents relating to open or confirmatory items, RAIs, codes, analyses, etc.
- Mitigating Strategies/SFPI walk-throughs with licensee

1200 Lunch

1300 Continue NRC Audit Team Activities

1600 NRC Audit Team meeting

1630 Team lead daily debrief/next day planning with licensee

**Onsite Day 4, Thursday, November 6, 2014**

0830 Continue NRC Audit Team Activities

1200 Lunch

1300 Continue NRC Audit Team Activities

1600 NRC Audit Team meeting

1630 Team lead daily debrief/next day planning with licensee

**Onsite Day 5, Friday, November 7, 2014**

0830 NRC Audit Team meeting

0900 NRC/Licensee pre-exit meeting

1000 NRC/Licensee exit meeting

1030 Audit closeout/departure

If you have any questions, please contact me at 301-415-5888 or by e-mail at Jason.Paige@nrc.gov.

Sincerely,

***/RA by John Hughey for/***

Jason Paige, Project Manager
Orders Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket Nos.: 50-220 and 50-410

Enclosure:
Audit plan

cc w/encl: Mr. Christopher Costanzo
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|---|---|---|---|---|
| NAME | JPaige | SLent | BVaidya | SBailey |
| DATE | 10/02/14 | 10/02/14 | 10/02/14 | 10/03/14 |
| OFFICE | NRR/JLD/JERB/BC | NRR/JLD/JOMB/BC(A) | NRR/JLD/JOMB/PM | |
| NAME | BPham | MHalter | JPaige (JHughey for) | |
| DATE | 10/02/14 | 10/06/14 | 10/08/14 | |

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