



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

October 9, 2014

Mr. Michael J. Pacilio
President and Chief Nuclear Officer
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: LIMERICK GENERATING 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. MF0847, MF0848,
MF0854, AND MF0855)

Dear Mr. Pacilio:

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. ML13060A127), Exelon Generation Company, LLC (Exelon, the licensee) submitted its OIP for Limerick Generating Station, Units 1 and 2 (LGS) in response to Order EA-12-049. By letters dated August 28, 2013, February 28, 2014 and August 28, 2014 (ADAMS Accession Nos. ML13240A266, ML14059A219 and ML14241A285, 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 LGS interim staff evaluation (ISE) and audit report (ADAMS Accession No. ML13337A600) on January 10, 2014, and continues with in-office and onsite portions of this audit.

By letter dated February 28, 2013 (ADAMS Accession No. ML13059A391), the licensee submitted its OIP for LGS in response to Order EA-12-051. By letter dated June 24, 2013 (ADAMS Accession No. ML13171A315), the NRC staff sent a request for additional information (RAI) to the licensee. By letters dated July 18, 2013, August 28, 2013, February 28, 2014 and August 28, 2014 (ADAMS Accession Nos. ML13199A485, ML13241A037, ML14059A223, and ML14241A291, respectively), the licensee submitted its RAI responses and first three six-month updates to the OIP. The NRC staff's review of these submittals led to the issuance of the LGS ISE and RAI dated October 23, 2013 (ADAMS Accession No. ML13273A538). By letter dated

M. Pacilio

- 2 -

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 LGS in accordance with the enclosed audit plan from October 27 - 30, 2014.

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

Sincerely,



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

Docket Nos.: 50-352 and 50-353

Enclosure:
Audit plan

cc w/encl: Distribution via Listserv

Audit Plan
Limerick Generating 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.

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Enclosure

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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 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, "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 Japan Lessons-Learned Project Directorate (JLD) 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 LGS 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 Spent Fuel Pool Instrumentation 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 equipment provided by the Strategic Alliance for FLEX Emergency Response from the National SAFER Response Centers (NSRCs) (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	John Hughey
Technical Support	Kerby Scales
Technical Support	Steve Wyman
Technical Support	Matthew Hardgrove
Technical Support	Garry Armstrong
Technical Support	Bruce Heida

NRC AUDIT TEAM – SUPPLEMENTAL MEMBERS

Title	Team Member
Acting Associate Director	Jeremy Bowen
Resident Inspector	Richard Montgomery

LOGISTICS

The audit will be conducted onsite at LGS on October 27 - 30, 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 60 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, Strategic Alliance for FLEX Emergency Response (SAFER) Response Plan for LGS; 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

Part 2 – Specific Technical Review Items:

During the visit, the following audit items will be addressed from the licensee's ISEs (open items (OI), confirmatory items (CI), 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.

Audit Item Reference	Item Description
ISE OI 3.1.2.2.A	Further review is required regarding how the licensee will address NEI 12-06 Section 6.2.3.2 deployment considerations 2, 4, 5, and 8 with respect to transient floods. This review shall include an applicable procedure review.
ISE OI 3.2.3.A	With regard to maintaining containment, the implementation of Boiling Water Reactor Owners Group (BWROG) Emergency Procedure Guideline (EPG)/Severe Accident Guideline (SAG), Revision 3, including any associated plant-specific evaluations, must be completed in accordance with the provisions of NRC letter dated January 9, 2014 (ADAMS Accession No. ML13358A206).
ISE OI 3.2.4.2.C	With regard to elevated temperatures in general, the licensee should provide an evaluation of the impact of elevated temperatures, as a result of loss of ventilation and/or cooling, on electrical equipment being credited as part of the extended loss of [alternating current] ac power (ELAP) strategies (e.g., electrical equipment in the reactor core isolation cooling (RCIC) pump rooms).
ISE OI 3.4.A	The licensee should provide details that demonstrate the minimum capabilities for offsite resources will be met, per NEI 12-06 Section 12.2.

Audit Item Reference	Item Description
ISE CI 3.1.1.4.A	With regard to offsite resources, confirm that the licensee develops a plan that will address the logistics for equipment transportation, area set up, and other needs for ensuring the equipment and commodities to sustain the site's coping strategies.
ISE CI 3.2.1.1.A	Benchmarks must be identified and discussed which demonstrate that Modular Accident Analysis Program (MAAP) is an appropriate code for the simulation of an ELAP event at LGS, consistent with the NRC endorsement of the industry position paper on MAAP.
ISE CI 3.2.1.1.B	Confirm that the collapsed reactor pressure vessel level remains above Top of Active Fuel and the RCS cool down rate is within technical specifications limits.
ISE CI 3.2.1.1.C	Confirm that MAAP is used in accordance with Sections 4.1, 4.2, 4.3, 4.4, and 4.5 of the June 2013 position paper.
ISE CI 3.2.1.1.D	Confirm that, in using MAAP, the licensee identifies and justifies the subset of key modeling parameters cited from Tables 4-1 through 4-6 of the "MAAP Application Guidance, Desktop Reference for Using MAAP Software, Revision 2" (Electric Power Research Institute Report 1020236).
ISE CI 3.2.1.3.A	The licensee stated that the "times to complete actions in the events timeline are based on current supporting analyses." Confirm that the final timeline is validated once detailed designs are completed and procedures are developed.
ISE CI 3.2.1.4.A	The licensee stated that the detailed design will determine containment heat-up rate and the subsequent impacts on RCIC operation and the need for any modifications. Confirm that this evaluation is completed satisfactorily.
ISE CI 3.2.1.4.C	Because the integrated plan makes reference to use of the Phase 3 equipment as backup, the integrated plan should address the guidance of NEI 12-06 regarding site procedures for Phase 3 implementation. The licensee addressed this concern during the audit response and stated that LGS would ensure connection capabilities of the Phase 3 offsite equipment to site systems and would develop any procedural guidance required for those connections. Confirm that the connections for the Phase 3 equipment have been properly determined, once the details are finalized.
ISE CI 3.2.1.7.A	The licensee stated that LGS plans to abide by the generic resolution for refueling and cold shutdown conditions. The licensee stated that a review is in progress to develop a plan to address potential plant specific issues associated with implementing the generic approach. Confirm that this evaluation is completed satisfactorily.
ISE CI 3.2.1.8.B	Insufficient technical information is presented or referenced in the integrated plan to confirm the ability of the portable FLEX pumps to deliver the required flow through the system of flex hoses, couplings, valves, elevation changes, etc. for the configurations described. Confirm that these evaluations are completed and documented.
ISE CI 3.2.4.2.A	It was not clear from the information presented in the integrated plan what analysis or technical basis was used to conclude that the battery room temperature rise is inconsequential. Also, no discussion was presented to address possible low temperature effects. Confirm the adequacy of the battery room ventilation to protect the batteries from the effects of elevated or lowered temperatures.

Audit Item Reference	Item Description
ISE CI 3.2.4.2.B	The licensee stated that battery room ventilation will be addressed through procedure changes and that the proposed methods of ventilation, open doors and fans, will be confirmed during the detailed design process. Confirm that this is completed satisfactorily.
ISE CI 3.2.4.4.A	Confirm that the proposed communications upgrades in the licensee's communications assessment are completed as planned.
ISE CI 3.2.4.5.A	The licensee stated that keys for access to the plant are available to security, the shift manager and to the radiation protection group. The licensee further stated that plant areas requiring access as part of the FLEX response, will be evaluated to determine if sufficient keys are available or if additional keys will be required. Confirm that this evaluation is completed.
ISE CI 3.2.4.6.A	According to the licensee, habitability conditions will be evaluated and a strategy will be developed for the main control room. Confirm that the strategy and associated support analyses are completed.
ISE CI 3.2.4.6.B	With regard to the fuel building habitability, the licensee acknowledged that the evaluation of the spent fuel pool area for steam and condensation has not yet been performed. Confirm that this evaluation is completed, and its resulting conclusions satisfactorily addressed.
ISE CI 3.2.4.8.A	The integrated plan did not provide information regarding the technical basis for the selection and size of the FLEX generators to be used in support of the coping strategies. Confirm that this evaluation is satisfactorily completed.
ISE CI 3.2.4.10.B	The licensee stated that the minimum limit for the direct current (dc) bus voltage is 105 volts. More information is needed to understand if this minimum voltage provides for sufficient operating voltages at the device terminals to ensure proper operation in support of the strategies.
AQ - 10	049-RAI-Limerick-10: 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 the relevant calculations that demonstrate adequate core cooling for NRC staff review (e.g., reactor pressure vessel (RPV) water level, pressure and temperature, etc...).

Audit Item Reference	Item Description
AQ -11	<p>049-RAI-Limerick-11: Recirculation Pump Seal Leakage. Conformance with the guidance of NEI 12-06, Section 3.2.1.5, Paragraph (4), includes consideration of reactor recirculation pump seal leakage. When determining time constraints and the ability to maintain core cooling, it is important to consider losses to the RCS inventory as this can have a significant impact on the sequence of events. Special attention is paid to the recirculation pump seals because these can fail in a station black out event and contribute to beyond normal system leakage.</p> <p>In Limerick reference document, LG-MISC-012, "MAAP Analysis to Support FLEX Initial Strategy," Revision 1, the general assumption made for the input data for seal leakage is discussed on page 11 of 114 as follows: "The seal leakage assumed from each reactor recirculation pump due to loss of seal water is 18 gallons per minute (gpm) per pump (total of 36 gpm)."</p> <p>No technical basis is presented for the assumed 36 gpm reactor recirculation pump seal leakage. The NRC has identified this as a generic issue for the industry. Reactor recirculation pump seal leakage has been identified by the NRC as a generic concern for conformance with NEI 12-06. Provide additional information to provide a technical basis for the assumed leakage.</p>
AQ - 22	<p>049-RAI-Limerick-22: Support Systems Ventilation - Battery Room. Provide a discussion of battery room ventilation to prevent hydrogen accumulation while recharging the batteries in phase 2 or 3. In your response, include a description of the exhaust path if it is different from the design basis. Also 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.</p>
AQ - 23	<p>049-RAI-Limerick-23: Support Systems - Heat Tracing. NEI 12-06, Section 3.2.2, Paragraph (12) provides that plant procedures/guidance should consider loss of heat tracing effects for equipment required to cope with an ELAP. Alternate steps, if needed, should be identified to supplement planned action. Heat tracing is used at some plants to ensure cold weather conditions do not result in freezing important piping and instrumentation systems with small diameter piping. Procedures/guidance should be reviewed to identify if any heat traced systems are relied upon to cope with an ELAP. For example, additional condensate makeup may be supplied from a system exposed to cold weather where heat tracing is needed to ensure control systems are available. If any such systems are identified, additional backup sources of water not dependent on heat tracing should be identified.</p> <p>It is not clear from the information provided in the integrated plan whether or not freezing of piping or instrument lines have been addressed. Provide supplemental information to demonstrate compliance with NEI 12-06, Section 3.2.2, Paragraph (12).</p>

Audit Item Reference	Item Description
AQ - 24	<p>049-RAI-Limerick-24: Support Systems - Portable lighting. NEI 12-06, Section 3.2.2, Paragraph (8) provides that plant procedures/guidance should identify the portable lighting (e.g., flashlights or headlamps) and communications systems necessary for ingress and egress to plant areas required for deployment of FLEX strategies. Areas requiring access for instrumentation monitoring or equipment operation may require portable lighting as necessary to perform essential functions.</p> <p>Exelon's plans, for the development of guidance and strategies with regard to the provision of portable lighting devices, provides no information to demonstrate there is reasonable assurance that the guidance and strategies developed will conform to the guidance of NEI 12-06 Section 3.2.2 Paragraph (8) regarding provisions for portable lighting. Provide supplemental information to demonstrate compliance with NEI 12-06, Section 3.2.2, Paragraph (8).</p>
AQ - 25	<p>049-RAI-Limerick-25: Support Systems - Access to the Protected Area and internal locked areas. NEI 12-06, Section 3.2.2, Paragraph (9) provides that plant procedures/guidance should consider the effects of ac power loss on area access, as well as the need to gain entry to the Protected Area and internal locked areas where remote equipment operation is necessary. At some plants, the security system may be adversely affected by the loss of the preferred or Class 1E power supplies in an ELAP. In such cases, manual actions specified in ELAP response procedures/guidance may require additional actions to obtain access.</p> <p>Exelon's integrated plan provided insufficient information related to the development of guidance and strategies with regard to the access to the Protected Area and internal locked areas. Provide supplemental information to address this issue to demonstrate compliance with the guidance of NEI 12-06, Section 3.2.2, Paragraph (9).</p>
AQ - 27	<p>049-RAI-Limerick-27: Electrical Support. Describe how electrical isolation will be maintained such that (a) Class 1E equipment is protected from faults in portable/FLEX equipment and (b) multiple sources do not attempt to power electrical buses.</p>
AQ - 29	<p>049-RAI-Limerick-29: Support Functions – Fuel Oil Supply. Describe plans for supplying fuel oil to FLEX equipment (i.e., fuel oil storage tank volume, supply pathway, etc.). Specifically address how fuel oil will be accessed from the storage tanks, storage volume requirements for fuel oil stored onsite to support FLEX equipment, and the plan for refueling the FLEX equipment. Also, explain how fuel quality will be assured if stored for extended periods of time.</p>

Audit Item Reference	Item Description
AQ - 41	<p>049-RAI-Limerick-41: Main Control Room Habitability. Page 5 of the integrated plan states that NUMARC 87-00 will be used as a basis document for habitability. On pages 47 and 49 of the integrated plan, the statement is made that actions will be taken to prevent the Main Control Room temperature from exceeding 120°F. The assumed maximum temperature for efficient human performance as described in NUMARC 87-00 is 110°F and the technical basis for defining the habitability standard comes from MIL-STD-1472C, which concludes that 110°F is tolerable for light work for a 4 hour period while dressed in conventional clothing with a relative humidity of ~30%. Clarify whether the forthcoming analysis and strategy for main control room habitability will conform to the above-stated limits and basis of NUMARC 87-00. If not, provide a discussion of the chosen habitability criteria and its basis for acceptance.</p>
AQ - 42	<p>049-RAI-Limerick-42: The licensee's strategy includes taking suction from a spray pond using a FLEX Pump and discharging water into residual heat removal (RHR) service water (SW) piping. The licensee's strategy is to create a flow path for this water into RHR system piping and into the RCS.</p> <p>a) The staff requests information on the modifications required to get the water from the SW side to the RCS side.</p> <p>b) Confirm the RHR SW piping from the spray pond pump house to the point where the RHR SW piping will be modified to flow into RHR side is qualified to withstand an ELAP event.</p> <p>c) Describe how long it will take to initiate, and complete, actions to provide RCS makeup from the spray ponds through the RHR system.</p>
AQ - 43	<p>049-RAI-Limerick-43: The alternate method for supplying makeup water to the RCS and suppression pool involves the same method as the primary, injecting to RHR SW then into RHR then into the RCS or spent fuel pool.</p> <p>As specified in NEI 12-06, section 3.2.2, the alternate method must be diverse, not employing the same system. The staff requests the licensee provide an alternate strategy that provides some diversity in case the primary method is not available.</p>

Audit Item Reference	Item Description
AQ - 45	<p>049-RAI-Limerick-RAI-45: On page 14 of 72, in the integrated plan, in the section describing BWR Installed Equipment Phase 1, Reactor Level Control, it is stated: "The RCIC pump can take suction from the condensate storage tank (CST) or from the suppression pool. ...If the CST is unavailable, suction will be transferred to the suppression pool."</p> <p>The staff understands that RCIC suction is normally aligned to the CST, and is switched over to the suppression pool (SP) when CST water level is low. Please provide the following additional information:</p> <p>Is the CST qualified for all potential ELAP events? If not, in the event ELAP conditions significantly damage the CST, provide information with a discussion that supports the instrumentation to switch RCIC suction from the CST to the SP will remain operational, the switchover function will be accomplished in a timely manner, and that RCIC injection to RPV will remain uninterrupted. The discussion should include whether the switchover function during ELAP will be carried out manually or automatically; and if manually, then whether it is carried out from the main control room, or from the remote control panel, or from any other secured and accessible location. The discussion should further address whether the switchover function is fail-safe, and the function logic, software, hardware, all related piping, valves, systems, structures and components, and CST water level instrumentation to support the switchover function, either manually or automatically, are of safety grade and are qualified for all potential ELAP events including seismic, tornado/high winds, flooding and missiles. If not, then justify how switchover of RCIC suction from the CST to the SP will be successful in ELAP conditions if the CST is not available.</p>
AQ - 51	<p>049-RAI-Limerick-51: Provide the dc load profile with the required loads for the mitigating strategies to maintain core cooling, containment, and spent fuel pool cooling.</p>
AQ - 52	<p>049-RAI-Limerick-52: Provide 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. Discuss actions needed to mitigate resultant hazards (for example, allowing hydrogen release from the main generator).</p>
AQ - 56	<p>RCIC room temperature: Are there any safety trips to RCIC from room or area temperature switches.</p>
AQ - 58	<p>The licensee identifies the alternate source for makeup to the suppression pool and the RPV as the spray pond (OIP page 18). Yet the primary strategy is also identified as the spray pond. Please clarify what the primary and alternate strategies are for makeup to the suppression pool and RPV, and whether they are qualified to withstand an ELAP event.</p>

Audit Item Reference	Item Description
AQ - 59	Identify the non-safety related installed systems or equipment that are credited in establishing ELAP mitigation strategies. For all the identified systems or equipment, discuss the intended mitigation functions, and provide information to show that the identified systems or equipment are available and reliable to provide the intended mitigation functions on demand during an ELAP event.
OIP - 1	Sequence of Events (OIP p. 8): The times to complete actions in the Events Timeline are based on operating judgment, conceptual designs, and current supporting analyses. The final timeline will be time validated once detailed designs are completed and procedures developed.
OIP - 2	Sequence of Events (OIP p. 7) and Installed Phase 1 Equipment (OIP p.37): Initial evaluations were used to determine the fuel pool timelines. Formal calculations will be performed to validate this information during development of the SFP cooling strategy detailed design.
OIP - 4	Identify how strategies will be deployed in all modes (OIP p. 11): Transportation routes will be developed from the equipment storage area to the FLEX staging areas. An administrative program will be developed to ensure pathways remain clear or compensatory actions will be implemented to ensure all strategies can be deployed during all modes of operation. Identification of storage areas and creation of the administrative program are open items.
OIP - 5	Identify how the programmatic controls will be met (OIP p. 12). An administrative program for FLEX to establish responsibilities, and testing & maintenance requirements will be implemented.
OIP - 6	Sequence of Events (OIP p. 9) Additional work will be performed during detailed design development to ensure Suppression Pool temperature will support RCIC operation, in accordance with approved BWROG analysis, throughout the event.
OIP - 9	Installed Equip Phase 1 (OIP p.47) Portable Equip Phase 2 (OIP p. 50) Develop a procedure to prop open battery room doors upon energizing the battery chargers to prevent a buildup of hydrogen in the battery rooms.
SFPI RAI 3	RAI #3 Please provide a clearly labeled sketch or marked-up plant drawing of the plan view of the SFP area, depicting the SFP inside dimensions, the planned locations/placement of the primary and backup SFP level sensor, and the proposed routing of the cables that will extend from the sensors toward the location of the read-out/display device.

Audit Item Reference	Item Description
SFPI RAI 4	<p>RAI #4 Please provide additional information describing how the final arrangement of the SFP instrumentation and routing of the cabling between the level instruments, the electronics and the displays, meets the order requirement to arrange the SFP level instrument channels in a manner that provides reasonable protection of the level indication function against missiles that may result from damage to the structure over the SFP.</p>
SFPI RAI 10	<p>RAI #10 Please provide the following:</p> <p>a) A description of how the two channels of the proposed level measurement system meet this requirement so that the potential for a common cause event to adversely affect both channels is minimized to the extent practicable.</p> <p>b) Further information on how each level measurement system, consisting of level sensor electronics, cabling, and readout devices will be designed and installed to address independence through the application and selection of independent power sources, the use of physical and spatial separation, independence of signals sent to the location(s) of the readout devices, and the independence of the displays.</p>
SFPI RAI 14	<p>RAI #14 Please provide the following:</p> <p>a) The specific location for the primary and backup instrument channel display.</p> <p>b) For any display located outside the main control room, please describe the evaluation used to validate that the display location can be accessed without unreasonable delay following a BDBEE. Include the time available for personnel to access the display as credited in the evaluation, as well as the actual time (e.g., based on walk-throughs) that it will take for personnel to access the display. Additionally, please include a description of the radiological and environmental conditions on the paths personnel might take. Describe whether the display location remains habitable for radiological, heat and humidity, and other environmental conditions following a BDBEE. Describe whether personnel are continuously stationed at the display or monitor the display periodically.</p>
SFPI RAI 18 (additional SFPI Item)	[electromagnetic compliance] EMC compliance

Audit Item Reference	Item Description
SE #1	<p>Please address the following items regarding the use of raw water sources for mitigating an ELAP event:</p> <p>a.) Please 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.</p> <p>b.) Please 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.</p> <p>c.) If Applicable, please 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 please 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?</p>
SE #2	Verify that appropriate human factors are applied for the implementation of the FLEX strategies.

Part 3 – Specific Topics for Discussion:

1. Draft of LGS OPD/FIP
2. Training
3. Portable (FLEX) equipment maintenance and testing
4. NSRC Response Plan for LGS

Proposed Schedule

Onsite Day 1, Monday, October 27, 2014

0800 Check in at site; Badging; Dosimetry

0900 Entrance meeting

0915 Licensee presentation of strategies

1230 Lunch

1330 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.
- NRC Mitigating Strategies/SFPI walk-throughs with licensee

1630 Team lead daily debrief/next day planning with licensee

Onsite Day 2, Tuesday, October 28, 2014

0800 Continue NRC Audit Team Activities

1200 Lunch

1300 Continue NRC Audit Team Activities

1630 Team lead daily debrief/next day planning with licensee

Onsite Day 3, Wednesday, October 29, 2014

0800 Continue NRC Audit Team Activities

1200 Lunch

1300 Continue NRC Audit Team Activities

1630 Team lead daily debrief/next day planning with licensee

Onsite Day 4, Thursday, October 30, 2014

0800 Continue NRC Audit Team Activities

1200 Lunch

1300 NRC Audit Team meeting

1430 NRC/Licensee pre-exit meeting

1615 NRC/Licensee exit meeting

1645 Audit closeout/departure

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 LGS in accordance with the enclosed audit plan from October 27 - 30, 2014.

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 Nos.: 50-352 and 50-353

Enclosure:

Audit plan

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OFFICE	NRR/JLD/JOMB/PM	NRR/JLD/LA	NRR/JLD/JCBB/BC	NRR/JLD/JERB/BC
NAME	JHughey	SLent	SBailey (BHeida for)	BPham
DATE	10/07/14	10/06/14	10/09/14	10/07/14
OFFICE	NRR/JLD/JOMB/BC(A)	NRR/DORL/LPL1-2	NRR/JLD/JOMB/PM	
NAME	MHalter	REnnis	JHughey	
DATE	10/07/14	10/08/14	10/09/14	

OFFICIAL AGENCY RECORD