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

May 1, 2018

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SUBJECT: BRYON STATION, UNITS 1 AND 2 – DOCUMENTATION OF THE COMPLETION OF REQUIRED ACTIONS TAKEN IN RESPONSE TO THE LESSONS LEARNED FROM THE FUKUSHIMA DAI-ICHI ACCIDENT

Dear Mr. Hanson:

The purpose of this letter is to acknowledge and document that actions required by the U.S. Nuclear Regulatory Commission (NRC) in orders issued following the accident at the Fukushima Dai-ichi Nuclear Power Station have been completed for Byron Station, Units 1 and 2 (Byron). In addition, this letter acknowledges and documents that Exelon Generation Company, LLC (Exelon, the licensee) has provided the information requested in the NRC's March 12, 2012, request for information under Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.54(f), related to the lessons learned from that accident. Completing these actions and providing the requested information, in conjunction with the regulatory activities associated with the Mitigation of Beyond-Design-Basis Events (MBDBE) rulemaking, implements the safety enhancements mandated by the NRC based on the lessons learned from the accident. Relevant NRC, industry, and licensee documents are listed in the reference tables provided in the enclosure to this letter. The NRC will provide oversight of these safety enhancements through the Reactor Oversight Process (ROP).

BACKGROUND

In response to the events in Japan resulting from the Great Tōhoku Earthquake and subsequent tsunami on March 11, 2011, the NRC took immediate action to confirm the safety of U.S. nuclear power plants:

- On March 18, 2011, the NRC issued Information Notice 2011-05, "Tōhoku-Taiheiyou-Oki Earthquake Effects on Japanese Nuclear Power Plants" (Reference 1.1). The information notice was issued to inform U.S. operating power reactor licensees and applicants of the effects from the earthquake and tsunami. Recipients were expected to review the information for applicability to their facilities and consider actions, as appropriate. Suggestions contained in an information notice are not NRC requirements; therefore, no specific action or written response was required.

- On March 23, 2011, the NRC issued Temporary Instruction (TI) 2515/183, "Followup to the Fukushima Daiichi Fuel Damage Event." The purpose of TI 2515/183 was to provide NRC

inspectors with guidance on confirming the reliability of licensees' strategies intended to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities following events that may exceed the design-basis for a plant. The results of the inspection for each licensee were documented in an inspection report (Reference 1.2).

- On March 23, 2011, the Commission provided staff requirements memorandum (SRM) COMGBJ-11-0002, "NRC Actions Following the Events in Japan." The tasking memorandum directed the Executive Director for Operations to establish a senior level agency task force, referred to as the Near-Term Task Force (NTTF), to conduct a methodical and systematic review of the NRC processes and regulations to determine whether the agency should make additional improvements to the regulatory system and make recommendations to the Commission within 90 days for its policy direction (Reference 1.3).

- On April 29, 2011, the NRC issued TI 2515/184, "Availability and Readiness Inspection of Severe Accident Management Guidelines (SAMGs)." The purpose of TI 2515/184 was to inspect the readiness of nuclear power plant operators to implement SAMGs. The results of the inspection were summarized and provided to the NTTF, as well as documented in a 2011 quarterly integrated inspection report for each licensee (Reference 1.4).

- On May 11, 2011, the NRC issued Bulletin (BL) 2011-01, "Mitigating Strategies." BL 2011-01 required licensees to provide a comprehensive verification of their compliance with the regulatory requirements of 10 CFR 50.54(hh)(2), as well as provide information associated with the licensee's mitigation strategies under that section. In 10 CFR 50.54(hh)(2), it states, in part: "Each licensee shall develop and implement guidance and strategies intended to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities under the circumstances associated with loss of large areas of the plant due to explosions or fire... ." BL 2011-01 required a written response from each licensee (Reference 1.5).

- On July 21, 2011, the NRC staff provided the NTTF report, "Recommendations for Enhancing Reactor Safety in the 21st Century: The Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident" to the Commission in SECY-11-0093, "Near-Term Report and Recommendations for Agency Actions Following the Events in Japan" (Reference 1.6).

- On October 3, 2011, the staff prioritized the NTTF recommendations into three tiers in SECY-11-0137, "Prioritization of Recommended Actions To Be Taken in Response to Fukushima Lessons Learned." The Commission approved the staff's prioritization, with comment, in the SRM to SECY-11-0137 (Reference 1.7).

  A complete discussion of the prioritization of the recommendations from the NTTF report, additional issues that were addressed subsequent to the NTTF report, and the disposition of the issues that were prioritized as Tier 2 or Tier 3 is provided in SECY-17-0016, "Status of Implementation of Lessons Learned from Japan's March 11, 2011, Great Tōhoku Earthquake and Subsequent Tsunami" (Reference 12.10). A listing of the previous Commission status reports, which were provided semiannually, can be found in Table 12 in the enclosure to this letter.

The NRC undertook the following regulatory activities to address the majority of the Tier 1 recommendations:

- On March 12, 2012, the NRC issued Orders EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," EA-12-050, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents," and EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," and a request for information under 10 CFR 50.54(f) (hereafter referred to as the 50.54(f) letter) to licensees (References 1.8, 1.9, 1.10, and 1.11, respectively).

- On June 6, 2013, the NRC issued Order EA-13-109, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions" (Reference 1.12), which superseded Order EA-12-050, replacing its requirements with modified requirements.

- In addition to the three orders and the 50.54(f) letter, the NRC is considering a new regulation (10 CFR 50.155, "Mitigation of Beyond-Design-Basis Events"). The draft final rule and supporting documentation were provided to the Commission for approval in SECY-16-0142, "Draft Final Rule – Mitigation of Beyond-Design-Basis Events (RIN 3150-AJ49)" (Reference 1.13). The MBDBE rulemaking would consolidate several of the recommendations from the NTTF report. The draft final rule, as provided to the Commission, contains provisions that make generically applicable the requirements imposed by Orders EA-12-049 and EA-12-051 and supporting requirements for the integrated response capability that includes staffing, communications, training, drills or exercises, and documentation of changes. The draft final rule also contains requirements for licensees to consider the effects of the reevaluated seismic and flooding hazard information identified in response to Enclosures 1 and 2 of the 50.54(f) letter. Three proposed regulatory guides (References 1.14, 1.15, and 1.16) were included to provide methods and procedures that the NRC staff considers acceptable for licensees to demonstrate compliance with the MBDBE rule, if approved by the Commission.

This letter acknowledges and documents that the actions required by the NRC in response to the orders, as well as the information provided in response to the March 12, 2012, 50.54(f) letter, have been completed for Byron. However, the staff is not determining whether the licensee complies with the draft final MBDBE rule. Oversight of compliance with the draft final MBDBE rule at Byron will be conducted through the ROP, if the Commission approves the rule.

DISCUSSION

Mitigation Strategies Order

Order EA-12-049, which applies to Byron, requires licensees to implement a three-phase approach for mitigation of beyond-design-basis external events (BDBEE). It requires 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 BDBEE that results in a simultaneous loss of all alternating current (ac) power and loss of normal access to the ultimate heat sink (LUHS). Phases 1 and 2 of the order use onsite equipment, while Phase 3 requires obtaining sufficient offsite resources to sustain those functions indefinitely.

In August 2012, the Nuclear Energy Institute (NEI) issued industry guidance document NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," as guidance to comply with the order. The NRC endorsed the guidance in Japan Lessons-Learned Project Directorate (JLD) interim staff guidance (ISG) document 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" (Reference 2.1). Licensees were required to provide an overall integrated plan (OIP) to describe how they would comply with the order, along with status reports every 6 months until compliance was achieved (Reference 2.2). The NRC staff provided an interim staff evaluation (ISE) related to the OIP (Reference 2.3). The NRC concluded in the ISE that the licensee provided sufficient information to determine that there is reasonable assurance that the plan, when properly implemented, including satisfactory resolution of the open and confirmatory items, would meet the requirements of Order EA-12-049 at Byron. The NRC staff also conducted a regulatory audit of the licensee's strategies and issued a report which documented the results of the audit activities (Reference 2.4). Upon reaching compliance with the order requirements, the licensee submitted a compliance letter and a final integrated plan (FIP) to the NRC (Reference 2.5). The FIP describes how the licensee is complying with the order at Byron.

The NRC staff completed a safety evaluation (SE) of the licensee's FIP (Reference 2.6). The SE informed the licensee that its integrated plan, if implemented as described, provided a reasonable path for compliance with Order EA-12-049 at Byron. The staff then evaluated the implementation of the plans through inspection, using TI 2515/191, "Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communications/Staffing/Multi-Unit Dose Assessment Plans." An inspection report was issued to document the results of the TI 2515/191 inspection (Reference 2.7). The NRC will oversee implementation of the mitigation strategies requirements under the proposed MBDBE rule requirements, if approved by the Commission, through the ROP.

Phase 3 of Order EA-12-049 required licensees to obtain sufficient offsite resources to sustain the required functions indefinitely. There are two redundant National Strategic Alliance for FLEX Emergency Response (SAFER) Response Centers (NSRCs), one located in Memphis, Tennessee, and the other in Phoenix, Arizona, which have the procedures and plans in place to maintain and deliver the equipment needed for Phase 3 from either NSRC to any participating U.S. nuclear power plant when requested (Reference 2.8). The NRC staff evaluated and inspected the NSRCs and the SAFER program, plans, and procedures (References 2.9 and 2.10). The NRC concluded that licensees may reference the SAFER program and implement their SAFER response plans to meet the Phase 3 requirements of the order. The licensee's FIP (Reference 2.5) includes the plans for utilizing the NSRC equipment at Byron. In its SE (Reference 2.6), the NRC staff concluded that the licensee has developed guidance that, if implemented appropriately, should allow utilization of offsite resources following a BDBEE consistent with NEI 12-06 guidance and should adequately address the requirements of the order.

Spent Fuel Pool Instrumentation Order

Order EA-12-051, which applies to Byron, required licensees to install reliable SFP level instrumentation with a primary channel and a backup channel, independent of each other, and with the capability to be powered independent of the plant's power distribution systems. The NEI issued NEI 12-02, "Industry Guidance for Compliance with NRC Order EA-12-051, 'To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation,'" as guidance to be used by licensees to comply with the order. The NRC endorsed this guidance in

JLD-ISG-2012-03, "Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation" (Reference 3.1). Licensees were required to provide an OIP to describe how they would comply with the order, along with status reports every 6 months until compliance was achieved (Reference 3.2). The NRC issued an ISE, providing feedback on the OIP (Reference 3.3). The NRC staff conducted a regulatory audit of the licensee's strategies and issued a report that documented the results of the audit activities (Reference 3.4). Upon reaching compliance with the order requirements, the licensee submitted a compliance letter to the NRC (Reference 3.5), describing how the licensee complied with the order at Byron.

The NRC staff completed an SE of the actions taken by the licensee in response to the order (Reference 3.6). The SE informed the licensee that its integrated plan, if implemented as described, provided a reasonable path for compliance with Order EA-12-051 at Byron. The staff then evaluated the implementation of the plan through inspection, using TI 2515/191. An inspection report was issued to document the results of the TI 2515/191 inspection (Reference 3.7). The NRC will oversee implementation of the SFP instrumentation requirements under the proposed MBDBE rule requirements, if approved by the Commission, through the ROP.

Reliable Hardened Containment Vent Order

Order EA-13-109 is only applicable to operating boiling-water reactors (BWRs) with Mark I and Mark II containments. Because the reactors at Byron are pressurized water reactors with large, dry, ambient pressure containments, this order is not applicable to Byron.

Request for Information Under 10 CFR 50.54(f)

The 50.54(f) letter requested operating power reactor licensees to:

- reevaluate the seismic and flooding hazard at their sites using present-day NRC requirements and guidance, and identify actions that are planned to address plant-specific vulnerabilities associated with the reevaluated seismic and flooding hazard;

- perform seismic and flooding walkdowns to verify compliance with the current licensing basis; verify the adequacy of current strategies and maintenance plans; and identify degraded, nonconforming, or unanalyzed conditions related to seismic and flooding protection; and

- provide an assessment of their current emergency communications and staffing capabilities to determine if any enhancements are needed to respond to a large-scale natural emergency event that results in an extended loss of ac power to all reactors at the site, and/or impeded access to the site.

In COMSECY-14-0037, "Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluat[i]on of Flooding Hazards" (Reference 6.13), the NRC staff described issues related to the implementation of Order EA-12-049 and the related MBDBE rulemaking, and the completion of flooding reevaluations and assessments. In the SRM to COMSECY-14-0037 (Reference 6.14), the Commission directed the NRC staff to ensure that licensees of operating nuclear power plants address the reevaluated hazard within their mitigation strategies for BDBEE. The SRM also directed the NRC staff to provide a plan for achieving closure of the flooding hazard assessments to the Commission for review and

approval. The NRC staff provided this plan in COMSECY-15-0019, "Closure Plan for the Reevaluation of Flooding Hazards for Operating Nuclear Power Plants" (Reference 6.16), which the Commission approved in the SRM to COMSECY-15-0019 (Reference 6.17).

Hazard Reevaluations (Enclosures 1 and 2 of the 50.54(f) letter)

Each licensee followed a similar two-phase process to respond to the hazard reevaluations requested by the 50.54(f) letter. In Phase 1, licensees submitted hazard reevaluation reports using NRC-endorsed, industry-developed guidance. The guidance specified that a licensee should determine if interim protection measures were needed while a longer-term evaluation of the impacts of the hazard was completed. The NRC staff reviewed the reevaluated hazard information. Using the reevaluated hazard information and a graded approach, the NRC identified the need for, and prioritization and scope of, plant-specific assessments. For those plants that were required to perform a flooding integrated assessment or a seismic probabilistic risk assessment (SPRA), Phase 2 decisionmaking (as described in a letter dated September 16, 2016 (Reference 5.17)) would determine whether additional plant-specific regulatory actions were necessary. In addition, as discussed in COMSECY-15-0019 and the draft final MBDBE rule, each licensee performed a mitigating strategies assessment (MSA) to confirm that the licensee had adequately addressed the reevaluated hazards within their mitigation strategies developed for BDBEEs.

Seismic Hazard Reevaluation (Enclosure 1 of the 50.54(f) letter)

Enclosure 1 of the 50.54(f) letter requested each operating power reactor licensee to complete a reevaluation of the seismic hazard that could affect their sites using updated seismic hazard information and present-day regulatory guidance and methodologies to develop a ground motion response spectrum (GMRS). The licensee was asked to compare their results to the safe-shutdown earthquake (SSE) ground motion and then report to the NRC in a seismic hazard screening report. To provide a uniform and acceptable industry response, the Electric Power Research Institute (EPRI) developed a technical report, EPRI 1025287, "Screening, Prioritization and Implementation Details (SPID) for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic," and the NRC endorsed the guidance in a letter dated February 15, 2013 (Reference 5.1). From November 2012 to May 2014, the NRC and the industry provided guidance for the performance of the reevaluated hazard reviews (References 5.2-5.7). The licensee provided a seismic hazard screening report for Byron (Reference 5.8).

If the new GMRS was not bound by the current design basis (CDB) SSE, Enclosure 1 of the 50.54(f) letter requested more detailed evaluations of the impact from the hazard. Also, the licensee was asked to evaluate whether interim protection measures were needed while the more detailed evaluation was completed. By letter dated May 7, 2013, the NRC endorsed industry-developed guidance, a proposed path forward, and schedules, which were provided in a letter from NEI dated April 9, 2013. Attachment 1 of the NEI letter contains EPRI report 300200704, "Augmented Approach for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic," to provide the guidance needed to perform an evaluation of any needed interim protective measures (Reference 5.3). This expedited seismic evaluation process (ESEP) is a screening, evaluation, and equipment modification process performed by licensees to provide additional seismic margin and expedite plant safety enhancements for certain core cooling and containment components while the more detailed and comprehensive plant seismic risk evaluations are being performed. Byron initially committed to perform an ESEP in their seismic hazard screening report (see References 5.8, 5.10 and 5.11). Subsequently, the licensee determined that the previous Individual Plant

Examination for External Events (IPEEE) evaluations for Byron demonstrate capacities above the reevaluated GMRS. Therefore, there would be no significant safety benefit from performing an ESEP. The NRC staff reviewed the information provided and concluded that it was sufficient to justify not performing the ESEP (Reference 5.13).

As part of the mitigation strategies assessment (MSA) process (described later in this letter), the licensee elected to submit an ESEP report with the seismic MSA (Reference 7.8) to complete the scope of the MSA. The NRC staff reviewed the ESEP (Reference 7.9) and concluded that all evaluated components demonstrated adequate seismic capacity and no component modifications were required.

By letter dated May 9, 2014 (Reference 5.10), the NRC informed licensees of the initial screening and prioritization results based on a review of the licensees' seismic hazard screening reports. The NRC updated the screening and prioritization in a letter dated October 3, 2014 (Reference 5.11). The NRC provided the final determination of required seismic evaluations in a letter dated October 27, 2015 (Reference 5.18). These evaluations could consist of an SPRA (Reference 5.1, SPID, Section 6.1.1), limited scope evaluations (High Frequency (Reference 5.14) and/or SFP (Reference 5.15)), or a relay chatter evaluation (Reference 5.4). If an SPRA was required, then additional Phase 2 regulatory decisionmaking was required (References 5.16 and 5.17).

The NRC staff completed and documented its review of the licensee's reevaluated seismic hazard in a staff assessment (Reference 5.9). In order to complete its response to the 50.54(f) letter, the licensee submitted a high frequency confirmation report and a SFP evaluation for Byron (Reference 5.19). The NRC reviewed the high frequency confirmation report and confirmed that Byron met the limited high frequency criteria (Reference 5.21). The NRC reviewed the SFP evaluation and confirmed that Byron met the criteria of the SFP evaluation guidance (Reference 5.21).

The NRC staff reviewed the information provided and, as documented in the staff assessments (References 5.9 and 5.21), determined that the licensee provided sufficient information in response to Enclosure 1 of the 50.54(f) letter. The staff acknowledges that all seismic hazard reevaluation activities requested by Enclosure 1 of the 50.54(f) letter have been completed for Byron. No further information related to the reevaluated seismic hazard is required.

Flooding Hazard Reevaluation (Enclosure 2 of the 50.54(f) letter)

Enclosure 2 of the 50.54(f) letter requested each operating power reactor licensee to complete a reevaluation of applicable flood-causing mechanisms at their site using updated flooding hazard information and present-day regulatory guidance and methodologies. Licensees were asked to compare their results to the CDB for protection and mitigation from external flood events. The NRC developed guidance to conduct the reevaluations (References 6.1 through 6.6). The licensee submitted a flood hazard reevaluation report (FHRR) for Byron (Reference 6.7) to the NRC as requested by the 50.54(f) letter. Interim actions to protect against the reevaluated flood hazard were not needed. A regulatory audit to support the review of the FHRR was not required. The NRC staff reviewed the FHRR and provided an interim hazard letter (Reference 6.10) to provide feedback on the staff's review of the flooding hazard reevaluations. The interim hazard letter was used by the licensee to complete the flood hazard MSA and other flood hazard evaluations. Separately, the NRC staff documented the technical bases for its conclusions in the interim hazard letters by issuing a staff assessment (Reference 6.11).

In COMSECY-14-0037 (Reference 6.13), the NRC staff requested Commission direction to more clearly define the relationship between Order EA-12-049, the related MBDBE rulemaking, and the flood hazard reevaluations and assessments. Because the NRC was reevaluating its approach to the flooding evaluations, the NRC provided an extension of the due dates for any integrated assessments in a letter dated November 21, 2014 (Reference 6.12). In the SRM to COMSECY-14-0037 (Reference 6.14), the Commission affirmed that licensees of operating nuclear power plants need to address the reevaluated flooding hazard within their mitigation strategies. The Commission also directed the NRC staff to provide a plan for achieving closure of the flooding portion of NTTF Recommendation 2.1 to the Commission for its review and approval. On May 26, 2015, the NRC deferred, until further notice, the date for submitting the integrated assessment reports (Reference 6.15). On June 30, 2015, the NRC staff provided a plan to the Commission in COMSECY-15-0019 (Reference 6.16). On July 28, 2015, the Commission approved the plan in the SRM to COMSECY-15-0019 (Reference 6.17). On September 29, 2015, the NRC issued a letter to licensees to describe the graded approach to the flood hazard reevaluations approved by the Commission (Reference 6.18).

The COMSECY-15-0019 action plan required the NRC staff to develop a graded approach to identify the need for, and prioritization and scope of, plant-specific integrated assessments and evaluation of plant-specific regulatory actions. The NRC staff's graded approach enabled a site with hazard exceedance above its CDB to demonstrate the site's ability to cope with the reevaluated hazard through appropriate protection or mitigation measures which are timely, effective, and reasonable. Integrated assessments were focused on sites with the greatest potential for additional safety enhancements. New guidance for performing the integrated assessments and focused evaluations was developed for this graded approach. The guidance also provided schedule information for submission of any required integrated assessment. On July 18, 2016, the staff issued JLD-ISG-2016-01, "Guidance for Activities Related to Near-Term Task Force Recommendation 2.1, Flooding Hazard Reevaluation, Focused Evaluation and Integrated Assessment" (Reference 6.19). The ISG provided the guidance for Phase 1 flooding assessments, as described in COMSECY-15-0019, and endorsed industry guidance provided in NEI 16-05, "External Flooding Integrated Assessment Guidelines" (Reference 6.19). If an integrated assessment was necessary, then Phase 2 regulatory decisionmaking was required (References 6.22 and 6.23).

As noted in the interim hazard response letter (Reference 6.10), the reevaluated flooding hazard at Byron was bound by the CDB. The NRC staff documented its review of the FHRR in a staff assessment (Reference 6.11) and concluded that the licensee provided sufficient information in response to the 50.54(f) letter. Because the reevaluated flood mechanisms are bound by the CDB, it was not necessary for this licensee to perform a focused evaluation or an integrated assessment.

The NRC staff reviewed the information provided by the licensee and has concluded that sufficient information was provided to be responsive to Enclosure 2 of the 50.54(f) letter. The staff acknowledges that all flooding hazard reevaluation activities requested by Enclosure 2 of the 50.54(f) letter have been completed for Byron. No further information related to the reevaluated flood hazard is required.

Mitigating Strategies Assessment

In addition to the closure plan for NTTF Recommendation 2.1, the action plan approved by the Commission in the SRM to COMSECY-15-0019 (Reference 7.4) identified the staff efforts to ensure licensees would address the reevaluated hazard information in their mitigation

strategies. Performance of the MSA is necessary to support compliance with the final MBDBE rule, if approved by the Commission.

The objective of the MSA is to determine whether the mitigation strategies developed for Order EA-12-049 can still be implemented given the reevaluated hazard levels. If it was determined that the mitigation strategies could not be implemented for the reevaluated hazard levels, the MSA could provide other options such as performing additional evaluations, modifying existing mitigation strategies, or developing alternate mitigation strategies or targeted mitigation strategies to address the reevaluated hazard levels. In Revision 1 to JLD-ISG-2012-01, the NRC endorsed industry-developed guidance contained in Appendices G and H of NEI 12-06 (Reference 7.5) for completing the MSAs.

The licensee completed both a flood hazard MSA (Reference 7.6) and a seismic hazard MSA (Reference 7.8) for Byron. A regulatory audit was not required (Reference 7.10). The NRC staff reviewed the MSA submittals, and issued staff assessments (References 7.7 and 7.9) documenting its review. The NRC staff concluded that the licensee has demonstrated that the mitigation strategies appropriately address the reevaluated hazard conditions. Oversight of any changes to existing mitigation strategies, or new strategies, resulting from the MSAs will be included in the longer-term oversight of mitigation strategies through the ROP.

Walkdowns (Enclosures 3 and 4 of the 50.54(f) letter)

Enclosures 3 and 4 of the 50.54(f) letter requested that licensees perform plant walkdowns to verify compliance with the current licensing basis as it pertains to seismic and flood protection. By letter dated May 31, 2012 (Reference 8.2), the NRC endorsed industry-developed guidance contained in Technical Report EPRI 1025286, "Seismic Walkdown Guidance" (Reference 8.1), for the performance of the seismic walkdowns. By letter dated May 31, 2012 (Reference 9.2), the NRC endorsed industry-developed guidance contained in NEI 12-07, "Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features" (Reference 9.1), for performance of the flooding walkdowns. The licensee provided a report for both the seismic and flooding walkdowns at Byron (References 8.3 and 9.3). The NRC performed onsite inspections per TI 2515/188, "Inspection of Near-Term Task Force Recommendation 2.3 Seismic Walkdowns" and TI 2515/187, "Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns," and documented the inspection results in a quarterly integrated inspection report (References 8.4 and 9.4). The NRC staff issued staff assessments for both the seismic and flooding walkdowns (References 8.6 and 9.5). Because there were inaccessible items identified during the initial licensee seismic walkdowns, the licensee submitted a subsequent seismic walkdown report after accessing the areas (Reference 8.5). The NRC documented its review of the subsequent walkdown reports in a memo dated September 25, 2015 (Reference 8.7).

The NRC staff reviewed the information provided by the licensee and determined that sufficient information was provided to be responsive to Enclosures 3 and 4 of the 50.54(f) letter. The staff acknowledges that all seismic and flooding walkdown activities requested by the 50.54(f) letter have been completed for Byron.

Communications and Staffing (Enclosure 5 of the 50.54(f) letter)

Enclosure 5 of the 50.54(f) letter requested licensees to assess their means to power equipment needed to communicate onsite and offsite during a prolonged station blackout event and to identify and implement enhancements to ensure that communications can be maintained during

such an event. Also, licensees were requested to assess the staffing required to fill all necessary positions to respond to a multi-unit event with impeded access to the site, or to an extended loss of all ac power for single unit sites. Licensees were requested to submit a written response to the information requests within 90 days, or provide a response within 60 days and describe an alternative course of action and estimated completion dates. The licensee proposed an alternative course of action and schedule for Byron (Reference 10.2), which included a 90-day partial response (Reference 10.3). The NRC acknowledged the schedule changes in a letter dated July 26, 2012 (Reference 10.4).

By letter dated May 15, 2012, the NRC endorsed industry-developed guidance contained in NEI 12-01, "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities" (Reference 10.1), for the performance of the communications and staffing assessments. The licensee provided the communications assessment and implementation schedule for their fleet, including Byron (Reference 10.5), and the NRC completed a staff assessment of the licensee's communications assessment (Reference 10.6).

Licensees responded to the staffing portion of the 50.54(f) letter in two phases to account for the implementation of mitigation strategies. Phase 1 staffing assessments were based on the existing station blackout coping strategies with an assumption of all reactors at the site being affected concurrently. The Phase 1 staffing assessment is required for multiunit sites and was completed for Byron (Reference 10.7). In Phase 2, all licensees assessed the staffing necessary to carry out the mitigation strategies (Reference 10.9). The NRC staff issued staffing assessment response letters (References 10.8 and 10.10) for each submittal. The NRC performed an onsite inspection using TI 2515/191 to verify that the emergency communications and staffing plans at Byron have been implemented as described by the licensee (Reference 10.11).

The draft final MBDBE rule would make generically applicable the staffing and communications requirements to support the mitigation strategies. Regulatory Guide 1.228 (Reference 1.16) is expected to endorse, with clarifications, NEI 12-01, NEI 13-06, "Enhancements to Emergency Response Capabilities for Beyond-Design-Basis Events and Severe Accidents" (Reference 11.17), and NEI 14-01, "Emergency Response Procedures and Guidelines for Beyond-Design-Basis Events and Severe Accidents" (Reference 11.7), to provide acceptable methods for implementing the MBDBE rule requirements, if approved. The NRC will oversee the communications and staffing requirements, and a periodic drill or exercise, under the proposed MBDBE rule requirements, if approved by the Commission, through the ROP.

The NRC staff reviewed the information provided by the licensee and determined that sufficient information was provided to be responsive to Enclosure 5 of the 50.54(f) letter. The staff acknowledges that all emergency preparedness communications and staffing activities requested by Enclosure 5 of the 50.54(f) letter have been completed for Byron. No further information related to the communications and staffing assessments is required.

Additional Industry Commitments

Update and Maintain Severe Accident Management Guidelines

The NRC staff provided the proposed MBDBE rule to the Commission on April 30, 2015, in SECY-15-0065, "Proposed Rulemaking: Mitigation of Beyond-Design-Basis Events (RIN 3150-AJ49)" (Reference 11.1) and the Commission issued the SRM to SECY-15-0065 on August 27, 2015 (Reference 11.2). The Commission approved publication of the proposed rule

subject to removal of the proposed requirements pertaining to the SAMGs. The Commission also directed the staff to update the ROP to explicitly provide periodic oversight of industry's implementation of the SAMGs. By letter dated October 26, 2015 (Reference 11.3), NEI described the industry initiative, approved by the Nuclear Strategic Issues Advisory Committee as mandatory for all NEI members, to update and maintain the SAMGs. Specifically, each licensee will perform timely updates of their site-specific SAMGs based on revisions to generic severe accident technical guidelines. Licensees will also ensure that SAMGs are considered within plant configuration management processes. As noted in the NEI letter, the licensee provided a letter (Reference 11.4) to establish a site-specific regulatory commitment for Byron.

In a letter to NEI dated February 23, 2016 (Reference 11.5), the staff outlined its approach for making changes to the ROP in accordance with the Commission direction. The staff engaged NEI and other stakeholders to identify the near-term and long-term changes to the ROP, consistent with the Commission direction and the licensees' near-term and long-term SAMG commitments. The staff then revised Inspection Procedure 71111.18, "Plant Modifications" (Reference 11.6), to provide oversight of the initial inclusion of SAMGs within the plant configuration management processes to ensure that the SAMGs reflect changes to the facility over time.

Multiunit/Multisource Dose Assessments

In COMSECY-13-0010, "Schedule and Plans for Tier 2 Order on Emergency Preparedness for Japan Lessons Learned," dated March 27, 2013 (Reference 11.13), the NRC staff requested Commission approval to implement the NTTF recommendation concerning multiunit/multisource dose assessments by having licensees document their commitment to obtain multiunit/multisource dose assessment capability by the end of 2014, rather than by issuing an order. Multiunit dose assessment capabilities would be made generically applicable through subsequent rulemaking. The Commission approved the staff's requests in the SRM to COMSECY-13-0010, dated April 30, 2013 (Reference 11.14). The licensee commitments are documented in References 11.8 through 11.11.

The NRC staff included the multiunit/multisource dose assessment requirement in the proposed MBDBE rulemaking (Reference 11.1). However, in response to a public comment concerning the 10 CFR 50.109 backfitting justification for the proposed multiple source term dose assessment requirements, the staff determined that this requirement did not meet the criteria for imposition under 10 CFR 50.109(a)(4)(ii). The NRC staff also concluded that this could not be justified as a compliance backfit or as a substantial safety improvement whose costs, both direct and indirect, would be justified in light of the potential safety gain. Therefore, these requirements were removed from the draft final rule (Reference 11.16).

The licensee provided the requested information and stated that Byron will have multiunit/multisource dose assessment capabilities (Reference 11.11) by December 31, 2014. The NRC acknowledged the licensee's submittal (Reference 11.12), verified the implementation of these dose assessment capabilities through inspection per TI 2515/191, and issued an inspection report (Reference 11.15).

CONCLUSION

The NRC staff concludes that Exelon, the licensee, has implemented the NRC-mandated safety enhancements resulting from the lessons learned from the Fukushima Dai-ichi accident through its implementation of Orders EA-12-049, EA-12-051, and its response to the 50.54(f) letter at

Byron. No further regulatory decisionmaking is required for Byron related to the Fukushima lessons-learned.

A listing of the applicable correspondence related to the Fukushima lessons-learned activities for Byron is included as an enclosure to this letter.

If you have any questions, please contact Robert Bernardo of my staff at 301-415-2621 or by e-mail at Robert.Bernardo@nrc.gov.

Sincerely,

Louise Lund

Louise Lund, Director
Division of Licensing Projects
Office of Nuclear Reactor Regulation

Docket Nos. 50-454 and 50-455

Enclosure:
Documents Related to Required Response

cc w/encl: Distribution via Listserv

Reference Documents Related to Required Response to the Lessons Learned from the Fukushima Dai-ichi Accident

TABLE 1 Initial Actions in Response to the Events in Japan Caused by the Great Tōhoku Earthquake and Subsequent Tsunami			
Ref	Document	Date	ADAMS[1] Accession No.
1.1	NRC Information Notice 2011-05	March 18, 2011	ML110760432
1.2	NRC Follow-up to the Fukushima Dai-ichi Fuel Damage Event		
	Temporary Instruction (TI) 2515/183	March 23, 2011	ML11077A007
	NRC TI 2515/183 Inspection Report 2011-014	May 13, 2011	ML111320288
	Summary of Observations – TI-183	November 28, 2011	ML11325A020
1.3	NRC Tasking Memorandum, Staff Requirements Memorandum (SRM) to COMGBJ-11-0002	March 23, 2011	ML110820875
1.4	NRC Availability and Readiness Inspection of SAMG		
	NRC Availability and Readiness Inspection of SAMG - TI 2515/184	April 29, 2011	ML11115A053
	NRC Integrated Inspection Report 2011-003 (TI 2515/184 inspection results)	July 28, 2011	ML11209C336
	NRC TI 2515/184 Inspection Results, Region 3 Summary	June 1, 2011	ML111520396
	NRC Summary of TI 2515/184 Results	June 6, 2011	ML11154A109
1.5	NRC Bulletin 2011-01, "Mitigating Strategies"		
	NRC Bulletin 2011-01	May 11, 2011	ML111250360
	Licensee 30 day response to BL 2011-01	June 8, 2011	ML111600096
	Licensee 60 day response to BL 2011-01	July 8, 2011	ML111920162
	NRC Request for Additional Information (RAI) regarding Licensee 60 day response to BL 2011-01	November 22, 2011	ML113120057
	Licensee response to RAI	December 20, 2011	ML113550139
	NRC Closeout of BL 2011-01 for Exelon	August 2, 2012	ML12178A215
1.6	NRC NTTF Report (SECY-11-0093)	July 21, 2011	ML11186A950
1.7	NRC SECY-11-0137, Prioritization of Recommended Actions To Be Taken in Response to Fukushima Lessons Learned		
	NRC SECY-11-0137	October 3, 2011	ML11272A111
	SRM-SECY-11-0137	December 15, 2011	ML113490055
1.8	NRC Order EA-12-049	March 12, 2012	ML12054A735
1.9	NRC Order EA-12-050	March 12, 2012	ML12054A694

[1] Agencywide Documents Access and Management System (ADAMS)

TABLE 1
Initial Actions in Response to the Events in Japan Caused by the Great Tōhoku Earthquake and Subsequent Tsunami

Ref	Document	Date	ADAMS[1] Accession No.
1.10	NRC Order EA-12-051	March 12, 2012	ML12054A679
1.11	NRC Request for Information Under 10 CFR 50.54(f) (the 50.54(f) letter)	March 12, 2012	ML12053A340
1.12	NRC Order EA-13-109	June 6, 2013	ML13143A321
1.13	NRC SECY-16-0142, "Draft Final Rule: Mitigation of Beyond-Design-Basis Events"	December 15, 2016	ML16301A005
1.14	Regulatory Guide 1.226, Flexible Mitigation Strategies for Beyond-Design-Basis Events (Draft Final Version)	November 2016	ML16301A128
1.15	Regulatory Guide 1.227, Wide Range Spent Fuel Pool Level Instrumentation (Draft Final Version)	November 2016	ML16211A167
1.16	Regulatory Guide 1.228 - Integrated Response Capabilities for Beyond-Design-Basis Events (Draft Final Version)	November 2016	ML16218A236

TABLE 2 Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events – EA-12-049			
Ref	**Document**	**Date**	**ADAMS Accession No.**
2.1	Guidance for Compliance with EA-12-049 - Diverse and Flexible Coping Strategies (FLEX)		
	Industry Guidance on Diverse and Flexible Coping Strategies (FLEX) NEI 12-06, Revision 0	August 21, 2012	ML12242A378
	NRC endorsement of NEI 12-06, Revision 0 - JLD-ISG-2012-01, Revision 0	August 29, 2012	ML12229A174
2.2	Licensee Overall Integrated Plan (OIP)		
	Licensee OIP submittal	February 28, 2013	ML13060A364
	OIP 1st six month status report	August 28, 2013	ML13241A279
	OIP 2nd six month status report	February 28, 2014	ML14059A425
	OIP 3rd six month status report	August 28, 2014	ML14248A229
	OIP 4th six month status report	February 27, 2015	ML15058A476
	OIP 5th six month status report	August 28, 2015	ML15240A304
	OIP 6th six month status report	February 26, 2016	ML16057A209
2.3	NRC Interim Staff Evaluation of OIP	December 17, 2013	ML13225A595
2.4	NRC audit of EA-12-049 OIP		
	NRC Notification of Audit of EA-12-049	August 28, 2013	ML13234A503
	NRC Site Specific Audit Plan	July 24, 2014	ML14198A559
	NRC Audit Report	December 17, 2014	ML14336A569
2.5	Licensee Compliance Letter for EA-12-049 and Final Integrated Plan (FIP)		
	Byron Unit 1, Report of Full Compliance Letter with EA-12-049	November 30, 2015	ML15335A390
	Byron Unit 2, Report of Full Compliance Letter with EA-12-049 and FIP	July 15, 2016	ML16197A390
2.6	NRC Safety Evaluation of Implementation of EA-12-049	December 19, 2016	ML16334A504
2.7	NRC Inspection of Licensee Responses to EA-12-049, EA-12-051, and Emergency Preparedness Information		
	NRC Temporary Instruction 2515/191	December 23, 2015	ML15257A188
	NRC TI 2515/191 Inspection Report 2017-008	September 20, 2017	ML17263B152
2.8	Industry White Paper – National SAFER Response Centers (NSRC)	September 11, 2014	ML14259A221
2.9	NRC Staff Assessment of NSRCs	September 26, 2014	ML14265A107

TABLE 2 Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events – EA-12-049			
Ref	**Document**	**Date**	**ADAMS Accession No.**
2.10	NRC Inspection of Implementation of EA-12-049 Regarding the use of NSRC		
	NRC Inspection Procedure (IP) 43006	September 30, 2016	ML16273A318
	NRC Vendor Inspection of the Phoenix NSRC Report No. 99901013/2016-201	January 12, 2017	ML17012A186
	NRC Vendor Inspection of the Memphis NSRC Report No. 99901013/2017-201	May 5, 2017	ML17117A576

TABLE 3 Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation – EA-12-051			
Ref	**Document**	**Date**	**ADAMS Accession No.**
3.1	Guidance for Compliance with EA-12-051 – Spent Fuel Pool Instrumentation		
	Industry Guidance for Compliance with EA-12-051 – NEI 12-02, Revision 1	August 2012	ML12240A307
	NRC endorsement of NEI 12-02, Revision 1 - JLD-ISG-2012-03, Revision 0	August 29, 2012	ML12221A339
3.2	Licensee Overall Integrated Plan (OIP)		
	Licensee OIP	February 28, 2013	ML13063A265
	OIP 1st six month status report	August 28, 2013	ML13241A239
	OIP 2nd six month status report	February 28, 2014	ML14062A057
	OIP 3rd six month status report	August 28, 2014	ML14248A323
	OIP 4th six month status report		
3.3	NRC Interim Staff Evaluation of OIP	November 4, 2013	ML13275A305
3.4	NRC Audit of EA-12-051		
	NRC Notification of Audit of EA-12-051	March 26, 2014	ML14083A620
	NRC Audit Report of Westinghouse SFPI design specifications	August 18, 2014	ML14211A346
	NRC Site Specific Audit Plan	July 24, 2014	ML14198A559
	NRC Audit Report	December 17, 2014	ML14336A569
3.5	Licensee Compliance Letter for EA-12-051	December 8, 2014	ML14342A965
3.6	NRC Safety Evaluation of Implementation of EA-12-051	December 19, 2016	ML16334A504
3.7	NRC Inspection of Licensee Responses to EA-12-049, EA-12-051, and Emergency Preparedness Information		
	NRC Temporary Instruction 2515/191	December 23, 2015	ML15257A188
	NRC TI 2515/191 Inspection Report 2017-008	September 20, 2017	ML17263B152

Note: Table 4 relates to the Hardened Containment Vent System and is not applicable to Byron.

	TABLE 5 **Request for Information under Title 10 of the *Code of Federal Regulations*, Section 50.54(f), Enclosure 1: Recommendation 2.1 Seismic Hazard Reevaluation**		
Ref	**Document**	**Date**	**ADAMS Accession No.**
Guidance Documents			
5.1	Screening, Prioritization and Implementation Details (SPID)		
	Industry Guidance (SPID) – EPRI 1025287	November 2012	ML12333A170
	NRC letter endorsing SPID	February 15, 2013	ML12319A074
5.2	NRC guidance for performing a Seismic Margin Assessment (SMA) – JLD-ISG-2012-04	November 16, 2012	ML12286A029
5.3	Expedited Seismic Evaluation Process (ESEP)		
	Industry Letter – Proposed path forward for NTTF Recommendation 2.1: Seismic	April 9, 2013	ML13101A345
	Industry Guidance – Expedited Seismic Evaluation Process (ESEP) - EPRI 3002000704	April 2013	ML13102A142
	NRC letter endorsing the ESEP approach. Extension of ESEP due date to 3/31/14 for Central and Eastern U.S. (CEUS) sites	May 7, 2013	ML13106A331
5.4	Industry letter on relay chatter review	October 3, 2013	ML13281A308
5.5	NRC letter with guidance on the content of seismic reevaluation submittals (includes operability and reportability discussions)	February 20, 2014	ML14030A046
5.6	Industry letter on seismic risk evaluations for CEUS plants	March 12, 2014	ML14083A596
5.7	NRC background paper - Probabilistic seismic hazard analysis	May 20, 2014	ML14140A648
Seismic Hazard Screening Report			
5.8	Licensee Seismic Hazard Screening Report	March 31, 2014	ML14091A010
5.9	NRC Staff Assessment of Reevaluated Seismic Hazard Information		
	NRC Staff Assessment	February 17, 2016	ML16027A045
	NRC supplement to staff assessment	March 15, 2016	ML16070A116
Screening and Prioritization Results			
5.10	NRC Letter - Seismic screening and prioritization results for CEUS plants	May 9, 2014	ML14111A147
5.11	NRC Letter – Updated seismic screening and prioritization results	October 3, 2014	ML14258A043
5.12	NRC letter regarding development of Seismic Risk Evaluations – suitability of updated seismic hazard information for further assessments	December 10, 2014	ML14307B707

	TABLE 5 **Request for Information under Title 10 of the *Code of Federal Regulations*, Section 50.54(f), Enclosure 1: Recommendation 2.1 Seismic Hazard Reevaluation**		
Ref	**Document**	**Date**	**ADAMS Accession No.**
5.13	ESEP Submittal and Evaluation		
	Licensee ESEP Commitment Change Letter (will not submit ESEP)	August 29, 2014	ML14241A563
	NRC Response Letter to the ESEP Commitment Change	December 15, 2014	ML14310A033
Additional Guidance Documents			
5.14	High Frequency Program Application Guidance		
	Industry HF Application Guidance - EPRI 3002004396	July 30, 2015	ML15223A095
	NRC letter endorsing HF Application Guidance	September 17, 2015	ML15218A569
5.15	Spent Fuel Pool Evaluation Guidance		
	Industry SFP evaluation guidance – EPRI 3002007148	February 23, 2016	ML16055A017
	NRC letter endorsing SFP evaluation guidance	March 17, 2016	ML15350A158
5.16	NRC Letter - Treatment of Seismic and Flooding Hazard Reevaluations in the Design and Licensing Basis	September 29, 2015	ML15127A401
5.17	NRC Guidance for Regulatory Decisionmaking of reevaluated flooding and seismic hazards	September 21, 2016	ML16237A103
Final Determinations of Required Seismic Evaluations			
5.18	NRC Final Determination of Required Seismic Evaluations	October 27, 2015	ML15194A015
5.19	Licensee Required Seismic Evaluation Submittals		
	High Frequency Confirmation	November 2, 2016	ML16307A447
	Spent Fuel Pool Evaluation	August 31, 2016	ML16244A800
5.20	Audit plan of seismic evaluations submittals	Not Applicable	Not Applicable
5.21	NRC Staff Assessment of Seismic Evaluations		
	High Frequency Confirmation	January 30, 2017	ML17023A137
	Spent Fuel Pool Evaluation	October 12, 2016	ML16274A445

	TABLE 6 Request for Information under Title 10 of the *Code of Federal Regulations*, Section 50.54(f), Enclosure 2: Recommendation 2.1 Flooding Hazard Reevaluation		
Ref	**Document**	**Date**	**ADAMS Accession No.**
Initial Guidance Documents			
6.1	NRC prioritization of plants for completing flood hazard reevaluations	May 11, 2012	ML12097A509
6.2	NRC-issued guidance for performing an integrated assessment for external flooding (JLD-ISG-2012-05)	November 30, 2012	ML12311A214
6.3	NRC letter to industry describing when an integrated assessment is expected	December 3, 2012	ML12326A912
6.4	NRC-issued guidance for performing a tsunami, surge, or seiche hazard assessment (JLD-ISG-2012-06)	January 4, 2013	ML12314A412
6.5	NRC letter to industry with guidance on the content of flooding reevaluation submittals	March 1, 2013	ML13044A561
6.6	NRC-issued guidance for assessing flooding hazards due to dam failure (JLD-ISG-2013-01)	July 29, 2013	ML13151A153
Flood Hazard Reevaluation Report			
6.7	Licensee FHRR Submittal Package	March 12, 2014	ML14079A416
6.8	FHRR Regulatory Audit	Not Required	Not Required
6.9	NRC Inspection of licensee interim actions	Not Applicable	Not Applicable
6.10	NRC Interim Staff Response to Reevaluated Flood Hazards	September 3, 2015	ML15243A462
6.11	NRC Staff Assessment of FHRR	August 16, 2016	ML16214A297
Modified Approach to Flood Hazard Reevaluations			
6.12	NRC extension of due dates for Integrated Assessment reports	November 21, 2014	ML14303A465
6.13	NRC COMSECY-14-0037, "Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluation of Flooding Hazards"	November 21, 2014	ML14309A256
6.14	NRC SRM for COMSECY-14-0037	March 30, 2015	ML15089A236
6.15	NRC letter on second extension of due date for flooding integrated assessment reports	May 26, 2015	ML15112A051
6.16	NRC COMSECY-15-0019 "Closure Plan for the Reevaluation of Flooding Hazards"	June 30, 2015	ML15153A104
6.17	NRC SRM-COMSECY-15-0019	July 28, 2015	ML15209A682
6.18	NRC letter describing the graded approach to flood hazard reevaluation directed by SRM-COMSECY-14-0037	September 1, 2015	ML15174A257

	TABLE 6 Request for Information under Title 10 of the *Code of Federal Regulations*, Section 50.54(f), Enclosure 2: Recommendation 2.1 Flooding Hazard Reevaluation		
Ref	**Document**	**Date**	**ADAMS Accession No.**
6.19	Flooding Assessment Guidance		
	NEI 16-05, "External Flooding Assessment Guidelines"	April 2016	ML16165A178
	NRC endorsement of NEI 16-05 - JLD-ISG-2016-01	July 11, 2016	ML16162A301
6.20	Licensee Required Evaluations		
	No further evaluations were required – reevaluated flood hazard was bound by the CDB	See FHRR Staff Assessment (SA)	See FHRR SA
6.21	NRC Generic FE and IA Regulatory Audit Plan	July 18, 2017	ML17192A452
6.22	NRC Letter - Treatment of Seismic and Flooding Hazard Reevaluations in the Design and Licensing Basis	September 29, 2015	ML15127A401
6.23	NRC Guidance for Regulatory Decisionmaking of reevaluated flooding and seismic hazards	September 21, 2016	ML16237A103

	TABLE 7 Mitigating Strategies Assessments (MSA)		
Ref	**Document**	**Date**	**ADAMS Accession No.**
7.1	NRC COMSECY-14-0037, Integration of Mitigating Strategies with Hazard Reevaluations	November 21, 2014	ML14309A256
7.2	NRC SRM-COMSECY-14-0037	March 30, 2015	ML15089A236
7.3	NRC COMSECY-15-0019, Closure Plan for Flooding Hazard Reevaluations	June 30, 2015	ML15153A104
7.4	NRC SRM-COMSECY-15-0019	July 28, 2015	ML15209A682
7.5	Process for Mitigating Strategies Assessments (MSA)		
	Industry Guidance for performing MSAs - NEI 12-06, Revision 2, including Appendices E, G, & H	December 2015	ML16005A625
	NRC endorsement of NEI 12-06, Revision 2 - JLD-ISG-2012-01, Revision 1	January 22, 2016	ML15357A163
7.6	Licensee's MSA submittal - Flooding	September 30, 2016	ML16274A132
7.7	NRC Staff Assessment of MSA - Flooding	October 21, 2016	ML16291A202
7.8	Licensee's MSA submittal – Seismic	August 22, 2017	ML17234A478
7.9	NRC Staff Assessment of MSA - Seismic	January 22, 2018	ML17313A881
7.10	NRC MSA Audit Plan	December 5, 2016	ML16259A189

	TABLE 8 **Request for Information under Title 10 of the *Code of Federal Regulations*, Section 50.54(f), Enclosure 3: Recommendation 2.3 Seismic Walkdown**		
Ref	**Document**	**Date**	**ADAMS Accession No.**
8.1	Industry Seismic Walkdown Guidance with NRC endorsement letter - EPRI 1025286	May 31, 2012	ML12188A031
8.2	NRC letter endorsing EPRI 1025286	May 31, 2012	ML12145A529
8.3	Licensee Seismic Hazard Walkdown Report		
	Seismic Hazard Walkdown Report Package	November 27, 2012	ML123410194
	Response to RAI	November 27, 2013	ML13331B501
8.4	NRC Inspection of Seismic Walkdowns		
	NRC TI 2515/188	July 6, 2012	ML12156A052
	NRC Integrated Inspection Report 2012-005 (TI 2515/188 inspection results)	February 5, 2013	ML13036A035
8.5	Licensee subsequent seismic walkdown report (Annex A) package	December 13, 2013	ML14030A239
8.6	NRC Staff Assessment of Seismic Walkdown Report		
	Unit 1 Staff Assessment	May 29, 2014	ML14085A533
	Unit 2 Staff Assessment	May 29, 2014	ML14086A682
8.7	NRC review of seismic subsequent walkdown reports	September 25, 2015	ML15268A477

	TABLE 9 **Request for Information under Title 10 of the *Code of Federal Regulations*, Section 50.54(f), Enclosure 4: Recommendation 2.3 Flooding Walkdown**		
Ref	**Document**	**Date**	**ADAMS Accession No.**
9.1	Industry Flooding Walkdown Guidance - NEI 12-07	May 31, 2012	ML12173A215
9.2	NRC letter endorsing NEI 12-07	May 31, 2012	ML12144A142
9.3	Licensee Flooding Hazard Walkdown Report		
	Flooding Hazard Walkdown Report	November 27, 2012	ML12332A380
	Supplement to Flooding Hazard Walkdown Report	May 21, 2013	ML13141A594
	Update to Flooding Hazard Walkdown Report – APM Assessment	January 31, 2014	ML14031A443
9.4	NRC Inspection of Flooding Walkdowns		
	NRC TI 2515/187	June 27, 2012	ML12129A108
	NRC Integrated Inspection Report 2013-002 (TI 2515/187 inspection results)	April 29, 2013	ML13120A181
9.5	NRC Staff Assessment of Flooding Walkdown Report	June 30, 2014	ML14128A556

	TABLE 10 **Request for Information under Title 10 of the *Code of Federal Regulations*, Section 50.54(f), Enclosure 5: Recommendation 9.3 Emergency Preparedness Communications and Staffing**		
Ref	**Document**	**Date**	**ADAMS Accession No.**
10.1	Guidance Documents		
	Industry Guidance for Emergency Preparedness staffing and communications - NEI 12-01	May 2012	ML12125A412
	NRC letter endorsing NEI 12-01	May 15, 2012	ML12131A043
10.2	Exelon 60 day response and proposed alternative course of action		
	Exelon 60 day response	May 10, 2012	ML12135A391
	Exelon correction to 60 day response	May 14, 2012	ML12136A064
10.3	Exelon 90 day response to communications and staffing information requests	June 11, 2012	ML12164A572
10.4	NRC letter – status of 90-day response	July 26, 2012	ML12200A106
10.5	Licensee communications assessment and implementation schedule		
	Licensee communications assessment and implementation schedule	October 31, 2012	ML12306A199
	Licensee supplemental information	February 22, 2013	ML13056A135
10.6	NRC staff assessment of licensee's communications assessment	July 12, 2013	ML13114A067
10.7	Licensee Phase 1 staffing assessment	April 30, 2013	ML13120A274
10.8	NRC Phase 1 staffing assessment response	October 23, 2013	ML13233A183
10.9	Licensee Phase 2 staffing assessment response		
	Licensee Phase 2 staffing assessment for functions related to mitigation strategies	May 29, 2014	ML14149A303
	Licensee response to RAI	September 19, 2014	ML14262A248
10.10	NRC Phase 2 staff assessment response	December 15, 2014	ML14303A163
10.11	NRC Inspection of Licensee Responses to EA-12-049, EA-12-051, and Emergency Preparedness Information		
	NRC TI 2515/191	December 23, 2015	ML15257A188
	NRC TI 2515/191 Inspection Report 2017-008	September 20, 2017	ML17263B152

	TABLE 11 Additional Licensee Commitments – SAMGs and Multisource Dose Assessments		
Ref	Document	Date	ADAMS Accession No.
Update and Maintain SAMGs			
11.1	SECY-15-0065: Proposed Rulemaking: Mitigation of Beyond-Design-Basis Events (RIN 3150-AJ49)	April 30, 2015	ML15049A201
11.2	SRM-SECY-15-0065	August 27, 2015	ML15239A767
11.3	NEI Letter describing industry initiative to update and maintain SAMGs	October 26, 2015	ML15335A442
11.4	Site Commitment to Maintain SAMGs	December 4, 2015	ML15338A125
11.5	NRC letter to NEI describing approach to SAMG oversight	February 23, 2016	ML16032A029
11.6	NRC Inspection Procedure 71111.18, "Plant Modifications"	November 17, 2016	ML16306A185
11.7	NEI 14-01, "Emergency Response Procedures and Guidelines for Extreme Events and Severe Accidents, Rev. 1	February 2016	ML16224A619
Multisource Dose Assessments			
11.8	NEI Letter: Industry survey and plan for multiunit dose assessments	January 28, 2013	ML13028A200
11.9	NRC Letter to request additional information from NEI on multiunit dose assessment capability	February 27, 2013	ML13029A632
11.10	NEI Letter: Commitment for Implementation of Multiunit Dose Assessment Capability	March 14, 2013	ML13073A522
11.11	Licensee Response Regarding the Capability to Perform Multisource Offsite Dose Assessments	June 27, 2013	ML13179A098
11.12	NRC Acknowledgement of Licensee Dose Assessment Submittals	January 29, 2014	ML13233A205
11.13	COMSECY-13-0010	March 27, 2013	ML12339A262
11.14	SRM-COMSECY-13-0010	April 30, 2013	ML13120A339
11.15	NRC Inspection of Licensee Responses to EA-12-049, EA-12-051, and Emergency Preparedness Information		
	NRC TI 2515/191	December 23, 2015	ML15257A188
	NRC TI 2515/191 Inspection Report 2017-008	September 20, 2017	ML17263B152
11.16	Draft Final Rule: Mitigation of Beyond-Design-Basis Events NRC SECY-16-0142, Package	December 15, 2016	ML16301A005
11.17	NEI 13-06, "Enhancements to Emergency Reponses Capabilities for Beyond Design Basis Accidents", Rev 1	February 2016	ML16224A618

	TABLE 12 NRC Semi-Annual Status Reports to the Commission		
Ref	Document	Date	ADAMS Accession No.
12.1	SECY-12-0025, Enclosure 8, "Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tōhoku Earthquake and Tsunami"	February 17, 2012	ML12039A103
12.2	SECY-12-0095 - Enclosure 1: Six-Month Status Update On Charter Activities - February 2012 - July 2012	July 13, 2012	ML12165A092
12.3	SECY-13-0020 - Third 6-Month Status Update On Response To Lessons Learned From Japan's March 11, 2011, Great Tohoku Earthquake And Subsequent Tsunami	February 14, 2013	ML13031A512
12.4	SECY-13-0095 - Fourth 6-Month Status Update on Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Subsequent Tsunami	September 6, 2013	ML13213A304
12.5	SECY-14-0046 - Fifth 6-Month Status Update on Response to Lessons Learned From Japan's March 11, 2011, Great Tohoku Earthquake and Subsequent Tsunami	April 17, 2014	ML14064A520
12.6	SECY-14-0114 - Sixth 6-Month Status Update on Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Subsequent Tsunami	October 21, 2014	ML14234A498
12.7	SECY-15-0059 - Seventh 6-Month Status Update on Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Subsequent Tsunami	April 9, 2015	ML15069A444
12.8	SECY-15-0128: Eighth 6-Month Status Update on Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Subsequent Tsunami	October 14, 2015	ML15245A473
12.9	SECY-16-0043: Ninth 6 Month Status Update on Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Subsequent Tsunami	April 5, 2016	ML16054A255
12.10	SECY-17-0016: Status of Implementation of Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Subsequent Tsunami	January 30, 2017	ML16356A084

SUBJECT: BYRON STATION, UNITS 1 AND 2 – DOCUMENTATION OF THE COMPLETION OF REQUIRED ACTIONS TAKEN IN RESPONSE TO THE LESSONS LEARNED FROM THE FUKUSHIMA DAI-ICHI ACCIDENT DATED May 1, 2018

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