UNITED STATES
NUCLEAR REGULATORY COMMISSION
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Mr. James Barstow
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SUBJECT: WATTS BAR NUCLEAR PLANT, 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. Barstow:

The purpose of this letter is to acknowledge and document that the 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 Watts Bar Nuclear Plant, Units 1 and 2 (Watts Bar). In addition, this letter acknowledges and documents that Tennessee Valley Authority (TVA, 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 Dai-ichi 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 Watts Bar, Unit 1, was documented in an inspection report (Reference 1.2). Watts Bar, Unit 2, was in a construction status at this time and the TI was not applicable to Unit 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 for Watts Bar, Unit 1, was summarized and provided to the NTTF, as well as documented in a 2011 quarterly integrated inspection report (Reference 1.4). Watts Bar, Unit 2, was in a construction status at this time and the TI was not applicable to Unit 2.

- 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). The response for Watts Bar, Unit 1 was completed in April 2012. Watts Bar, Unit 2, was in a construction status at this time. The response for Unit 2 was completed in October 2015. Note that the final MBDBE rule (Reference 1.15) relocated the requirements formerly in 10 CFR 50.54(hh)(2) to 10 CFR 50.155(b)(2).

- 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 completed rulemaking, 10 CFR 50.155, "Mitigation of Beyond-Design-Basis Events," that made generically applicable the requirements of Orders EA-12-049 and EA-12-051. 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 effort consolidated several of the recommendations from the NTTF report.

  On January 24, 2019, the Commission, via SRM-M190124A (Reference 1.14), approved the final MBDBE rule, with edits. The final rule approved by the Commission contains provisions that make generically applicable the requirements imposed by Orders EA-12-049 and EA-12-051 and supporting requirements. The Commission's direction in the SRM makes it clear that the NRC will continue to follow a site-specific approach to resolve the interaction between the hazard reevaluation and mitigation strategies using information gathered in the 50.54(f) letter process. The NRC staff made conforming changes to the final rule package (Reference 1.15) as directed by the Commission, which included changes to two regulatory guides (References 1.16 and 1.17). The final rule was published in the *Federal Register* on August 9, 2019 (84 FR 39684), with an effective implementation date of September 9, 2019.

  Subsequent to Commission approval of the final MBDBE rule, the staff engaged with stakeholders to pursue the expeditious closure of the remaining post-Fukushima 50.54(f) letter responses on a timeframe commensurate with each item's safety significance.

  In a draft discussion paper (Reference 1.18) used to support a Category 3 public meeting held on February 28, 2019 (Reference 1.19), the NRC staff outlined the process to be used to review the reevaluated hazard and mitigation strategies assessment (MSA) information provided by licensees considering the differences between the draft final MBDBE rule and the approved final MBDBE rule. Subsequently, the NRC staff provided a screening letter (also called a "binning" letter) for both seismic and flooding hazard reevaluations (References 5.22 and 6.25), which categorized sites based on available information and the status of any commitments made in prior reports and assessments.

The process is discussed in greater detail in the “Hazard Reevaluation” and “Mitigation Strategies Assessment” sections of the discussion which follows.

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 Watts Bar. However, the staff is not determining whether the licensee complies with the final MBDBE rule. Oversight of compliance with the final MBDBE rule at Watts Bar will be conducted through the ROP.

DISCUSSION

Mitigation Strategies Order

Order EA-12-049, which applies to Watts Bar, requires licensees to implement a three-phase approach for mitigation of beyond-design-basis external events (BDBEEs). 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 Revision 0 of 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 Revision 0 of 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.” Subsequently, in December 2015, NEI issued Revision 2 of NEI 12-06 and the NRC endorsed that guidance in Revision 1 of JLD-ISG-2012-01 (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 Watts Bar. 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). On October 29, 2014, TVA submitted a compliance status letter and final integrated plan (FIP) in response to Order EA-12-049. The compliance status letter provided a status of open items that needed to be addressed before full compliance could be achieved. On March 12, 2015, TVA submitted its full compliance letter and revised FIP for Watts Bar (Reference 2.5). The FIP describes how the licensee is complying with the order at Watts Bar.

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 Watts Bar. 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 final MBDBE rule requirements 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). Subsequently, SAFER provided two addenda to document the treatment of equipment withdrawn from the NSRCs (Reference 2.11). The NRC reviewed the addenda and documented its conclusion in an updated staff assessment (Reference 2.12). 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 Watts Bar. 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 Watts Bar, 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 submittal (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 Watts Bar.

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 Watts Bar. 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 at the site (Reference 3.7). The NRC will oversee implementation of the SFP instrumentation requirements under the final MBDBE rule requirements through the ROP.

Reliable Hardened Containment Vent Order

Order EA-13-109 (Reference 1.12) is only applicable to operating boiling-water reactors with Mark I and Mark II containments. Because the reactors at Watts Bar are pressurized water reactors with ice condenser containments, this order is not applicable to Watts Bar.

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 hazards 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 hazards

- 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 (Note: Because Watts Bar, Unit 2, was in a construction status when the 50.54(f) letter was issued, this section of the 50.54(f) letter is only applicable to Watts Bar, Unit 1.)

- 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 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).

<u>Hazard Reevaluations (Enclosures 1 and 2 of the 50.54(f) letter)</u>

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 (IA) or a seismic probabilistic risk assessment (SPRA), Phase 2 decisionmaking, as described by letters dated September 21, 2016, and March 2, 2020 (References 5.17 and 6.24), would determine whether additional plant-specific regulatory actions were necessary. In addition, as discussed in COMSECY-15-0019, most licensees performed an MSA to demonstrate that the licensee had

adequately addressed the reevaluated hazards within their mitigation strategies developed for BDBEEs.

In a draft discussion paper (Reference 1.18) used to support a Category 3 public meeting held on February 28, 2019 (Reference 1.19), the NRC staff outlined the process to be used to review the reevaluated hazard and MSA information provided by licensees considering the differences between the draft final MBDBE rule and the approved final MBDBE rule. The purpose of these reviews is to ensure that the conclusions in the various staff assessments continue to support a determination that no further regulatory actions are needed.

As stated in the discussion paper, the NRC subsequently issued a seismic screening letter (Reference 5.22) and a flooding screening letter (Reference 6.25), also called "binning" letters, to all operating power reactor licensees. The purpose of the binning letters is to categorize sites based on available information and the status of any commitments made in prior reports and assessments. Watts Bar was binned as a Category 1 site for seismic and as a Category 3 site for flooding. Category 1 includes sites where no additional information or regulatory action is required. This category includes sites, such as Watts Bar, where the licensee has previously demonstrated that existing seismic capacity will address the unbounded seismic reevaluated hazards. As a flooding Category 3 site, the staff's review of the licensee's flood hazard focused evaluation (FE) submittal was conducted in accordance with the Commission direction and is documented in the FE staff assessment.

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 (SHSR). 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 SHSR for Watts Bar (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. Watts Bar screened in to complete an ESEP report (see References 5.10 and 5.11).

The NRC staff completed a technical review of the ESEP report and documented its review in a response letter (Reference 5.13).

By letters dated May 9, 2014, and May 13, 2015 (Reference 5.10), the NRC informed licensees located in the Central and Eastern U.S. (CEUS) and Western U.S. (WUS), respectively, of the initial screening and prioritization results based on a review of the licensees' SHSR. 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 evaluations (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 an SFP evaluation and an SPRA report for Watts Bar (Reference 5.19). An audit was performed to support the SPRA review (Reference 5.20). The audit results are documented in the SPRA staff assessment (Reference 5.21). The NRC reviewed the SFP evaluation and confirmed that Watts Bar met the criteria of the SFP Evaluation Guidance Report (Reference 5.21). The NRC reviewed the SPRA report using the regulatory review guidance provided in Reference 5.17. The staff's review concluded that the SPRA was of sufficient technical adequacy to support Phase 2 regulatory decisionmaking and that Sequoyah responded appropriately to Enclosure 1, item (8) of the 50.54(f) letter (Reference 5.21). Based on the results and risk insights of the SPRA report, the NRC staff concluded that no further response or regulatory actions were required related to the seismic hazard reevaluation activities requested by Enclosure 1 of the 50.54(f) letter.

Because the staff's reviews were completed prior to when the final MBDBE rule was approved, the NRC staff, using the process discussed in the seismic binning letter (Reference 5.22), re-visited these conclusions considering the final approved MBDBE rule. The staff confirmed that the conclusions in the various staff assessments continue to support a determination that no further regulatory actions are required for Watts Bar.

The NRC staff reviewed the information provided and, as documented in the staff assessments (References 5.9 and 5.21), concluded 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 Watts Bar. 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 Watts Bar (Reference 6.7) to the NRC as requested by the 50.54(f) letter. As necessary, interim actions needed to protect against the reevaluated flood hazard were included and described in the FHRR. The NRC inspected the interim actions using TI 2515/190, "Inspection of Licensee's Proposed Interim

Actions as a Result of the Near-Term Task Force Recommendation 2.1 Flooding Evaluation" and documented the results in a quarterly integrated inspection report (Reference 6.9). A regulatory audit to support the review of the FHRR was performed and the results documented in an audit report (Reference 6.8). 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 summarized in the interim hazard letters by issuing a detailed 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 IAs in a letter dated November 21, 2014 (Reference 6.12). In the SRM to COMSECY-14-0037 (Reference 6.14), the Commission 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 (Reference 6.15), the NRC deferred, until further notice, the date for submitting the IA reports. On June 30, 2015 (Reference 6.16), the NRC staff provided a plan to the Commission in COMSECY-15-0019. On July 28, 2015 (Reference 6.17), the Commission approved the plan in the SRM to COMSECY-15-0019. On September 1, 2015, the NRC issued a letter to licensees describing the graded approach to complete the flood hazard reevaluations as 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 IAs 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. The IAs were focused on sites with the greatest potential for additional safety enhancements. New guidance for performing the IAs and FEs was developed for this graded approach. The guidance also provided schedule information for submission of any required IA. On July 18, 2016 (Reference 6.19), 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". 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 IA was necessary, then Phase 2 regulatory decisionmaking was required (References 6.23 and 6.24).

As noted in the interim hazard response letter (Reference 6.10), the local intense precipitation (LIP) and streams and rivers flood-causing mechanisms at Watts Bar were not bounded by the CDB. Therefore, additional assessments of these flood-causing mechanisms were required. The NRC staff used a graded approach to determine if this site would need to perform an IA for the reevaluated flooding hazard, or if an FE would suffice. In the FHRR submittal, TVA committed to completing an IA. Based on the graded approach and guidance provided in NEI 16-05 (as discussed above), TVA withdrew the commitment to perform an IA and committed to performing an FE (Reference 6.26). Therefore, Watts Bar completed an FE (Reference 6.20) to ensure appropriate actions were identified and taken to protect the plant from the reevaluated flood hazard. The NRC staff conducted a regulatory audit (Reference 6.22), completed its review of the FE, and concluded in the staff assessment

(Reference 6.21) that the licensee provided sufficient information in response to the 50.54(f) letter. Audit results were summarized in the staff assessment. No further regulatory actions are required related to the flood hazard reevaluations.

Because the staff's FE review was completed after the final MBDBE rule was approved, the NRC staff appropriately considered the revised MBDBE rule in its staff assessment and confirmed that the conclusions in the various other staff assessments support a determination that no further regulatory requirements are required for Watts Bar.

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 Watts Bar. 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 NRC staff's efforts to ensure licensees would address the reevaluated hazard information in their mitigation strategies. Proposed requirements related to the MSA were included in the draft final MBDBE rule, but were removed as a requirement from the final approved rule language. The Commission's direction in SRM-M190124A (Reference 1.14) makes it clear that the NRC will continue to follow a site-specific approach to resolve the interactions between the hazard reevaluation and mitigation strategies using information gathered in the 50.54(f) letter process.

In a draft discussion paper (Reference 1.18) used to support a Category 3 public meeting held on February 28, 2019 (Reference 1.19), the NRC staff outlined the process to be used to review the reevaluated hazard and MSA information provided by licensees considering the differences between the draft final MBDBE rule and the approved final MBDBE rule. Subsequently, the NRC staff provided a screening letter (also called a "binning" letter) for both seismic and flooding information (References 5.22 and 6.25), which categorized sites based on available information and the status of any commitments made in prior reports and assessments. The majority of MSAs had been submitted and evaluated by the staff prior to the issuance of the binning letters. For the MSA reviews that had not yet been completed, or MSAs that had not yet been submitted, the staff would evaluate the hazard impacts on the mitigation strategies, as appropriate, as part of its review of SPRA reports, flooding FEs, and/or flooding IAs.

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 mitigating strategies, or developing alternate mitigating strategies or targeted hazard mitigating 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 Revision 2 to NEI 12-06 (Reference 7.5) for completing the MSAs. In Revision 2 to JLD-ISG-2012-01, the NRC endorsed the industry-developed guidance of NEI 12-06, Revision 4 (Reference 7.5). Revision 4 of NEI 12-06, among other changes, provides additional guidance in Section H.4.5 for the performance of seismic MSAs for plants with reevaluated seismic hazard information that includes a GMRS that has spectral ordinates greater than twice

the plant's SSE anywhere in the frequency range of 1 to 10 Hertz. Watts Bar used the guidance in Section H.4.5 to complete the seismic MSA.

The licensee completed both a flood hazard MSA (Reference 7.6) and a seismic hazard MSA (Reference 7.8) for Watts Bar. A generic regulatory audit plan (Reference 7.10) was issued for the reviews of the seismic and flooding MSAs. As necessary, the site-specific audit results are documented in the applicable staff assessment. 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. As discussed in the seismic and flooding binning letters (References 5.22 and 6.25), the staff re-visited this conclusion considering the final approved MBDBE rule. The staff confirmed that the conclusions in the MSA staff assessments continue to support a determination that no further regulatory actions are required.

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. As noted in the 50.54(f) letter, information requests in Enclosures 3 and 4 are not applicable to holders of construction permits under 10 CFR Part 50, and thus did not apply to Watts Bar, Unit 2.

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 Watts Bar, Unit 1 (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 for Unit 1 (References 8.4 and 9.4). The NRC staff issued staff assessments for both the seismic and flooding walkdowns of Unit 1 (References 8.6 and 9.5).

The NRC staff reviewed the information provided by the licensee for Unit 1 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 Watts Bar, Unit 1.

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 multiunit 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 Watts Bar (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).

The NRC endorsed industry-developed guidance contained in NEI 12-01, "Guideline for Assessing Beyond-Design-Basis Accident Response Staffing and Communications Capabilities" in a letter dated May 15, 2012 (Reference 10.1), for the performance of the communications and staffing assessments. The licensee provided the communications assessment and implementation schedule for Watts Bar (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 licensee did not provide a Phase 1 staffing assessment for Watts Bar, Unit 1. At the time, Watts Bar, Unit 1, was considered a single-unit site (since Watts Bar, Unit 2, was in a construction status) and only multiunit sites were requested to provide a Phase 1 staffing assessment. In Phase 2, all licensees and construction permit holders assessed the staffing necessary to carry out the mitigation strategies. Therefore, TVA submitted a Phase 2 staffing assessment which applied to both Unit 1 and Unit 2 (Reference 10.9). The NRC staff issued a staffing assessment response letter (Reference 10.10). The NRC performed an onsite inspection using TI 2515/191 to verify that the emergency communications and staffing plans at Watts Bar have been implemented as described by the licensee (Reference 10.11).

Proposed Regulatory Guide 1.228 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16218A236) was 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 11.16), and NEI 14-01, "Emergency Response Procedures and Guidelines for Beyond-Design-Basis Events and Severe Accidents" (Reference 11.7). However, the final MBDBE rule's language was revised to remove these requirements from the rule. The NRC staff canceled proposed Regulatory Guide 1.228 to reflect the approved changes in the final rule. The NRC will oversee the licensee's implementation of communications and staffing plans which support the mitigation strategies requirements 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 Watts Bar. 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 (Reference 11.1), in SECY-15-0065, "Proposed Rulemaking: Mitigation of Beyond-Design-Basis Events (RIN 3150-AJ49)" 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 Watts Bar.

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. In November 2016, the staff revised Inspection Procedure (IP) 71111.18, "Plant Modifications" (Reference 11.6, effective January 1, 2017), 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. In November 2018, the staff published a revision to IP 71111.18 (Reference 11.6, effective January 1, 2019), to provide oversight of the site-specific incorporation of generic owner's groups SAMG guidance revisions.

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 NRC 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 considering the potential safety gain. Therefore, these requirements were removed from the draft final rule (Reference 1.13).

The licensee provided the requested information and stated that Watts Bar 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 TVA, 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 and EA-12-051 at Watts Bar. The staff further concludes that the licensee has completed its response to the 50.54(f) letter for Watts Bar. No further regulatory decisionmaking is required for Watts Bar related to the Fukushima lessons-learned.

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

Sincerely,

/RA/

Robert J. Bernardo, Project Manager
Integrated Program Management
and Beyond-Design-Basis Branch
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-390 and 50-391

Enclosure:
Documents Related to Required
Response

cc w/encl: 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 Followup to the Fukushima Dai-ichi Fuel Damage Event (Unit 1 only)		
	Temporary Instruction (TI) 2515/183	March 23, 2011	ML11077A007
	NRC TI 2515/183 Inspection Report 2011-009	May 13, 2011	ML111330435
	NRC Integrated Inspection Report 2011-003 (TI 2515/183 closeout)	August 5, 2011	ML112170278
	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 (Unit 1 only)		
	NRC Availability and Readiness Inspection of SAMG - TI 2515/184	April 29, 2011	ML11115A053
	NRC Integrated Inspection Report 2011-003 (TI 2515/184 inspection)	August 5, 2011	ML112170278
	NRC TI 2515/184 Inspection Results, Region 2 Summary	June 2, 2011	ML111530328
	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 for Unit 1	June 10, 2011	ML11167A098
	Licensee 60 day response to BL 2011-01 for Unit 1	July 11, 2011	ML11195A148
	Licensee 30 day response to BL 2011-01 for Unit 2	September 24, 2015	ML15268A564
	Licensee 60-day response to BL 2011-01 for Unit 2	July 18, 2011	ML11201A303
	Licensee response to BL 2011-01 for Unit 2	June 29, 2015	ML15181A362
	Dual Unit mitigating strategies per 10 CFR 50.54(hh)	September 30, 2014	ML14275A218
	NRC Closeout of BL 2011-01 for Unit 1	April 23, 2012	ML12102A218
	NRC Closeout of BL 2011-01 for Unit 2	October 14, 2015	ML15280A085
1.6	NRC NTTF Report (SECY-11-0093)	July 12, 2011	ML11186A950

[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.
1.7	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
1.10	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	SRM-M190124A: Affirmation Session-SECY-16-0142: Final Rule: Mitigation of Beyond-Design-Basis Events (RIN 3150-AJ49) - Package	January 24, 2019	ML19023A038
1.15	Final Rule: Mitigation of Beyond-Design-Basis Events (Package)	August 9, 2019	ML19058A006
1.16	Regulatory Guide 1.226, Revision 0, Flexible Mitigation Strategies for Beyond-Design-Basis Events	June 30, 2019	ML19058A012
1.17	Regulatory Guide 1.227, Revision 0, Wide Range Spent Fuel Pool Level Instrumentation	June 30, 2019	ML19058A013
1.18	NRC Staff Preliminary Process for Treatment of Reevaluated Seismic and Flooding Hazard Information in Backfit Determinations	February 14, 2019	ML19037A443
1.19	Category 3 Public Meeting to Discuss Staff's Preliminary Process for Treatment of Reevaluated Seismic and Flooding Hazard Information in Backfit Determinations	February 14, 2019	ML19052A511

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	ML13067A030
	OIP 1st six month status report	August 28, 2013	ML13247A288
	OIP 2nd six month status report	February 7, 2014	ML14062A050
	OIP 3rd six month status report	August 28, 2014	ML14248A517
2.3	NRC Interim Staff Evaluation (ISE) of OIP	December 20, 2013	ML13343A036
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	March 6, 2014	ML14058A105
	NRC Audit Report	May 15, 2014	ML14128A129
2.5	Licensee Compliance Letter for EA-12-049 and Final Integrated Plan (FIP)		
	Licensee Compliance status letter for EA-12-049 and FIP	October 29, 2014	ML14303A546
	Licensee final compliance letter and revised FIP for EA-12-049	March 12, 2015	ML15072A116
2.6	NRC Safety Evaluation (SE) of Implementation of EA-12-049	March 27, 2015	ML15078A193
2.7	NRC Inspection of Licensee Responses to EA-12-049, EA-12-051, and Emergency Preparedness Information		
	NRC TI 2515/191, Revision 0	October 6, 2014	ML14273A444
	NRC TI 2515/191 Inspection Report 05000390/2015009 and 05000391/2015616	June 22, 2015	ML15173A317
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
2.11	Addenda I and II to industry NSRC white paper	May 24, 2018	ML18150A658
2.12	NRC Updated Staff Assessment of NSRCs	September 20, 2018	ML18157A014

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 (SFPI)		
	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 OIP		
	Licensee OIP	February 28, 2013	ML13063A440
	OIP 1st six month status report	August 28, 2013	ML13254A297
	OIP 2nd six month status report	February 28, 2014	ML14064A238
	OIP 3rd six month status report	August 28, 2014	ML14248A484
3.3	NRC ISE of OIP	October 24, 2013	ML13275A373
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	March 6, 2014	ML14058A105
	NRC Audit Report	May 15, 2014	ML14128A129
3.5	Licensee Compliance Letter for EA-12-051		
	Compliance letter with open item	October 29, 2014	ML14303A561
	Letter to resolve open item	December 19, 2014	ML15002A202
3.6	NRC SE of Implementation of EA-12-051	March 27, 2015	ML15078A193
3.7	NRC Inspection of Licensee Responses to EA-12-049, EA-12-051, and Emergency Preparedness Information		
	NRC TI 2515/191, Revision 0	October 6, 2014	ML14273A444
	NRC TI 2515/191 Inspection Report 05000390/2015009 and 05000391/2015616	June 22, 2015	ML15173A317

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

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 (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 (SHSR)			
5.8	Licensee SHSR	March 31, 2014	ML14098A478
5.9	NRC Staff Assessment of Reevaluated Seismic Hazard Information		
	Staff Assessment for Unit 1	October 5, 2015	ML15055A543
	Staff Assessment for Unit 2	October 5, 2015	ML15111A377
Screening and Prioritization Results			
5.10	NRC Letter - Seismic screening and prioritization results		
	Central and Eastern US (CEUS) plants	May 9, 2014	ML14111A147
	Western US (WUS) plants	May 13, 2015	ML15113B344
	Screening based on IPEEE results	November 21, 2014	ML14246A428
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 Submittal	December 30, 2014	ML14365A072
	Licensee response to clarifying questions	May 26, 2015	ML15239A083
	NRC Response Letter for the ESEP	November 2, 2015	ML15275A383
Additional Guidance Documents			
5.14	High Frequency Program Application Guidance		
	Industry High Frequency Application Guidance - EPRI 3002004396	July 30, 2015	ML15223A095
	NRC letter endorsing High Frequency Application Guidance	September 17, 2015	ML15218A569
5.15	Spent Fuel Pool (SFP) 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	Phase 2 Decisionmaking Guidance		
	NRC Guidance for Regulatory Decisionmaking of reevaluated flooding and seismic hazards	September 21, 2016	ML16237A103
	Revision 1 of the Phase 2 guidance	March 2, 2020	ML20043D958
Final Determinations of Required Seismic Evaluations			
5.18	NRC Final Determination of Required Seismic Evaluations	October 27, 2015	ML15194A015
5.19	Licensee Required Seismic Evaluations		
	High Frequency Confirmation	In SPRA	In SPRA
	SFP Evaluation	December 22, 2016	ML16357A578
	Seismic Probabilistic Risk Assessment	June 30, 2017	ML17181A485
	SPRA supplement	April 10, 2018	ML18100A966
5.20	Audit plan of seismic evaluations submittals	July 6, 2017	ML17177A446
5.21	NRC Staff Assessment of Seismic Evaluations		
	High Frequency Confirmation	In SPRA	In SPRA
	SFP Evaluation	March 7, 2017	ML17062A681
	SPRA Response Letter	July 10, 2018	ML18115A138
	Correction to SPRA response letter	September 25, 2019	ML19248C797
5.22	NRC Treatment of Reevaluated Seismic Hazard Information (seismic binning letter)	July 3, 2019	ML19140A307

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 guidance for performing an integrated assessment (IA) for external flooding (JLD-ISG-2012-05)	November 30, 2012	ML12311A214
6.3	NRC letter to industry describing when an IA is expected	December 3, 2012	ML12326A912
6.4	NRC 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 guidance for assessing flooding hazards due to dam failure (JLD-ISG-2013-01)	July 29, 2013	ML13151A153
Flood Hazard Reevaluation Report (FHRR)			
6.7	Licensee FHRR Submittal		
	Initial Package	March 12, 2015	ML15084A323
	Revision 1 – Non-public, SRI	June 16, 2015	ML15169A906
6.8	FHRR Regulatory Audit		
	NRC FHRR Site-Specific Audit Plan	April 17, 2015	ML15106A632
	NRC FHRR Audit Report	October 30, 2015	ML15294A203
6.9	NRC Inspection of licensee interim actions		
	NRC TI 2515/190, Revision 1, Inspection of proposed interim actions as a result of FHRR	September 4, 2015	ML15176A790
	NRC TI 2515/190 inspection report 2015-003	November 6, 2015	ML15310A360
6.10	NRC Interim Staff Response to Reevaluated Flood Hazards	September 3, 2015	ML15239B287
6.11	NRC Staff Assessment of FHRR	December 1, 2015	ML15310A085
Modified Approach to Flood Hazard Reevaluations			
6.12	NRC extension of due dates for IA reports	November 21, 2014	ML14303A465
6.13	NRC COMSECY-14-0037, “Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluat[i]on 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 IA 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

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.
6.18	NRC letter describing the graded approach to flood hazard reevaluation directed by SRM-COMSECY-14-0037	September 1, 2015	ML15174A257
6.19	Flooding Assessment Guidance		
	NEI 16-05, "External Flooding Assessment Guidelines"	June 2016	ML16165A178
	NRC endorsement of NEI 16-05 - JLD-ISG-2016-01	July 11, 2016	ML16162A301
6.20	Licensee Focused Evaluation (FE) submittal – Non-public	October 11, 2019	ML19284F763
6.21	NRC Staff Assessment of FE	April 24, 2020	ML20087M008
6.22	NRC Generic FE and IA Regulatory Audit Plan	July 18, 2017	ML17192A452
6.23	NRC Letter - Treatment of Seismic and Flooding Hazard Reevaluations in the Design and Licensing Basis	September 29, 2015	ML15127A401
6.24	Phase 2 Decisionmaking Guidance		
	NRC Guidance for Regulatory Decisionmaking of reevaluated flooding and seismic hazards	September 21, 2016	ML16237A103
	Revision 1 of the Phase 2 guidance	March 2, 2020	ML20043D958
6.25	NRC Treatment of Reevaluated Flooding Hazard Information (flooding binning letter)	August 20, 2019	ML19067A247
6.26	External Flood Modeling Project (FE due date commitments)		
	Hydrologic Center River Analysis System (HEC-RAS) Project Milestones	June 22, 2016	ML16175A518
	1st HEC-RAS Project update	December 27, 2016	ML16363A387
	Formal withdrawal of commitment to provide IA	March 10, 2017	ML17069A380
	2nd HEC-RAS Project update	June 27, 2017	ML17179A040
	3rd HEC-RAS Project update	December 21, 2017	ML17355A331
	4th HEC-RAS Project update	June 22, 2018	ML18178A432
	5th HEC-RAS Project update	December 27, 2018	ML18361A803
	6th HEC-RAS Project update	April 29, 2019	ML19119A349
	7th HEC-RAS Project update	October 28, 2019	ML19302D601
NA	NRC approval of relaxation of FHRR due date from March 12, 2013, until March 12, 2015,	July 1, 2013	ML13163A296

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
	Industry Guidance for performing MSAs - NEI 12-06, Revision 4	December 12, 2016	ML16354B416
	NRC endorsement of NEI 12-06, Revision 4 - JLD-ISG-2012-01, Revision 2	February 8, 2017	ML17005A182
7.6	Licensee's MSA submittal (non-public, SRI) - Flooding	December 27, 2016	ML16363A381
7.7	NRC Staff Assessment of MSA - Flooding	August 22, 2017	ML17200C933
7.8	Licensee's MSA submittal – Seismic	December 21, 2017	ML17355A362
7.9	NRC Staff Assessment of MSA - Seismic	July 12, 2018	ML18156A151
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
Unit 1 only

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		
	Licensee Seismic Hazard Walkdown Report Package	November 27, 2012	ML123530275
	Response to RAIs	December 2, 2013	ML13339A334
8.4	NRC Inspection of Seismic Walkdowns		
	NRC TI 2515/188	July 6, 2012	ML12156A052
	NRC Integrated Inspection Report 2012-004 (TI 2515/188 inspection)	October 31, 2012	ML12305A496
	NRC Integrated Inspection Report 2012-005 (TI 2515/188 closeout)	February 13, 2013	ML13050A237
8.5	Licensee subsequent seismic walkdown report	Not Required	Not Required
8.6	NRC Staff Assessment of Seismic Walkdown Report	May 23, 2014	ML14133A542

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
Unit 1 only

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	ML12335A340
	Update to Flooding Hazard Walkdown Report – APM Assessment	February 7, 2014	ML14042A393
9.4	NRC Inspection of Flooding Walkdowns		
	NRC TI 2515/187	June 27, 2012	ML12129A108
	NRC Integrated Inspection Report 2012-004 (TI 2515/187 inspection)	October 31, 2012	ML12305A496
	NRC Integrated Inspection Report 2012-005 (TI 2515/187 inspection)	February 13, 2013	ML13050A237
	NRC Integrated Inspection Report 2013-002 (TI 2515/187 closeout)	May 10, 2013	ML13130A218
9.5	NRC Staff Assessment of Flooding Walkdown Report	June 16, 2014	ML14149A150

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	TVA 60 day response and proposed alternative course of action	May 11, 2012	ML12136A131
10.3	TVA 90 day response to communications and staffing information requests	June 11, 2012	ML12164A678
10.4	NRC letter – status of 90-day response	July 26, 2012	ML12200A106
10.5	Licensee communications assessment		
	Licensee communications assessment	October 31, 2012	ML12311A297
	NRC letter on generic technical issues	January 23, 2013	ML13010A162
	Licensee communications assessment supplement	February 22, 2013	ML13058A067
10.6	NRC staff assessment of licensee's communications assessment	July 3, 2013	ML13142A348
10.7	Licensee Phase 1 staffing assessment (Not required – Unit 2 under construction)	Not Required	Not Required
10.8	NRC response to licensee's Phase 1 staffing assessment	Not Required	Not Required
10.9	Licensee Phase 2 staffing assessment for functions related to mitigation strategies	October 6, 2014	ML14280A258
10.10	NRC Phase 2 staff assessment response	December 17, 2014	ML14329A036
10.11	NRC Inspection of Licensee Responses to EA-12-049, EA-12-051, and Emergency Preparedness Information		
	NRC TI 2515/191, Revision 0	October 6, 2014	ML14273A444
	NRC TI 2515/191 Inspection Report 05000390/2015009 and 05000391/2015616	June 22, 2015	ML15173A317

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 30, 2015	ML15365A398
11.5	NRC letter to NEI describing approach to SAMG oversight	February 23, 2016	ML16032A029
11.6	NRC Inspection Procedure 71111.18, "Plant Modifications"		
	Revision effective January 1, 2017	November 17, 2016	ML16306A185
	Revision effective January 1, 2019	November 19, 2018	ML18176A157
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: Implementation of Multiunit Dose Assessment Capability	March 14, 2013	ML13073A522
11.11	Licensee Response Regarding the Capability to Perform Multisource Offsite Dose Assessment – Non-public	June 28, 2013	ML13183A070
11.12	NRC Acknowledgment 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, Revision 0	October 6, 2014	ML14273A444
	NRC TI 2515/191 Inspection Report 05000390/2015009 and 05000391/2015616	June 22, 2015	ML15173A317
11.16	NEI 13-06, "Enhancements to Emergency Reponses Capabilities for Beyond-Design-Basis Accidents and Events," 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 - Second 6-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 Tōhoku 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 Tōhoku 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 Tōhoku 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 Tōhoku 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 Tōhoku 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 Tōhoku 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 Tōhoku 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 Tōhoku Earthquake and Subsequent Tsunami	January 30, 2017	ML16356A084

SUBJECT: WATTS BAR NUCLEAR PLANT, 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 NOVEMBER 25, 2020

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NAME	RBernardo	SLent	KMorgan-Butler	RBernardo
DATE	11/10/2020	11/17/2020	11/24/2020	11/25/2020

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