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SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1 – DOCUMENTATION OF
THE COMPLETION OF REQUIRED ACTIONS TAKEN IN RESPONSE TO THE
LESSONS LEARNED FROM THE FUKUSHIMA DAI-ICHI ACCIDENT

Dear Mr. Stoddard:

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 Virgil C. Summer Nuclear Station, Unit 1 (V.C. Summer). In addition, this letter acknowledges and documents that Dominion Energy South Carolina (DESC, 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). Note that the final MBDBE rule (Reference 1.15) moved 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 NTF 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 6.26), 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 V.C. Summer. However, the staff is not determining whether the licensee complies with the final MBDBE rule. Oversight of compliance with the final MBDBE rule at V.C. Summer will be conducted through the ROP.

DISCUSSION

Mitigation Strategies Order

Order EA-12-049, which applies to V.C. Summer, 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 V.C. Summer. 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 V.C. Summer.

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 V.C. Summer. 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 V.C. Summer. 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 V.C. Summer, 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 V.C. Summer.

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 V.C. Summer. 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 (BWRs) with Mark I and Mark II containments. Because the reactor at V.C. Summer is a pressurized water reactor with a large, dry, ambient-pressure containment, this order is not applicable to V.C. Summer.

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; 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 Reevaluation 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).

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 (IA) or a seismic probabilistic risk assessment (SPRA), Phase 2 decisionmaking, as described by letters dated September 21, 2016, and March 2, 2020 (Reference 5.17), 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. V.C. Summer was binned as a Category 1 site for flooding and a Category 3 site for seismic. Category 1 includes sites where no additional information or regulatory action is required. This category includes sites, such as V.C. Summer, where the licensee has previously demonstrated that effective flood protection will address the unbounded reevaluated hazards. Category 3 includes sites where reviews were ongoing when the binning letter was issued. As a seismic Category 3 site, the staff’s review of the licensee’s SPRA submittal was conducted in accordance with the Commission direction and is documented in the appropriate 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 V.C. Summer (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. Because an ESEP was required for V.C. Summer (see References 5.10 and 5.11), the licensee submitted an ESEP report. 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 V.C. Summer (Reference 5.19). An audit was performed for the SPRA report (Reference 5.20). The audit results are documented in the SPRA staff assessment (Reference 5.21). The NRC reviewed the SFP evaluation submittal and confirmed that V.C. Summer met the criteria of the SFP Evaluation Guidance Report (Reference 5.21). The NRC reviewed the SPRA report, as documented in Reference 5.21, 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 V.C. Summer 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 SPRA review was completed after the final MBDBE rule was approved (i.e., a Category 3 site in the seismic binning letter (Reference 5.22)), 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 V.C. Summer.

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 V.C. Summer. 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 V.C. Summer (Reference 6.7) to the NRC as requested by the 50.54(f) letter. 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 not required to complete the review of the FHRR. The NRC staff reviewed the FHRR and provided an interim staff response to the reevaluated flood hazards in a supplement to the FHRR staff assessment (Reference 6.10) to provide

feedback on the staff's review of the flooding hazard reevaluations. The information in the FHRR staff assessment supplement 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 FHRR supplement 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 integrated assessments 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 integrated assessment 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 29, 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 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 IAs and focused evaluations (FEs) was developed for this graded approach. The guidance also provided schedule information for submission of any required IA. 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 IA was necessary, then Phase 2 regulatory decisionmaking was required (References 6.23 and 6.24).

As noted in the FHRR staff assessment supplement (Reference 6.10), the local intense precipitation (LIP) flood hazard mechanism at V.C. Summer was not bounded by the CDB. Therefore, additional assessment of this flood-causing mechanism was 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. Based on the graded approach, V.C. Summer 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 reviews were completed prior to when the final MBDBE rule was approved, the NRC staff, using the process discussed in the flooding binning letter (Reference 6.25),

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 requirements are required for V.C. Summer.

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 V.C. Summer. 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 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 integrated assessments.

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. V.C. Summer 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 V.C. Summer. 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 flood hazard MSA submittal and issued a staff assessment (Reference 7.7) documenting its review. The NRC staff concluded that the licensee has demonstrated that the mitigation strategies appropriately address the reevaluated flood hazard conditions. As discussed in the flooding binning letter (Reference 6.25), the staff re-visited this conclusion for the flood hazard MSA considering the final approved MBDBE rule. The staff confirmed that the conclusions in the flooding MSA staff assessment continue to support a determination that no further regulatory actions are required.

As noted in the seismic hazard binning letter (Reference 5.22), the staff suspended its review of the seismic MSA for V.C. Summer and did not issue a staff assessment. The staff considered the licensee's seismic hazard MSA as part of its assessment of the SPRA report. The NRC staff appropriately considered the revised MBDBE rule in its staff assessment of the SPRA and confirmed that the conclusions in the various other staff assessments continue to support a determination that no further regulatory requirements are required for V.C. Summer.

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 V.C. Summer (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). There were no inaccessible items identified during the flooding or seismic walkdowns.

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 V.C. Summer.

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 V.C. Summer (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 V.C. Summer (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, therefore, was not required for V.C. Summer. In Phase 2, all licensees assessed the staffing necessary to carry out the mitigation strategies (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 V.C. Summer 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 V.C. Summer. 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 V.C. Summer.

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 NTF 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 V.C. Summer 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 DESC, 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 V.C. Summer. The staff further concludes that the licensee has completed its response to the 50.54(f) letter for V.C. Summer.

No further regulatory decisionmaking is required for V.C. Summer related to the Fukushima lessons-learned.

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

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 BDB Branch
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-395

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 2011-009 | May 13, 2011 | ML111330144 |
| | NRC Integrated Inspection Report 2011-003 (TI 2515/183 follow up inspection) | August 4, 2011 | ML112160535 |
| | 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) | August 4, 2011 | ML112160535 |
| | 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 | June 9, 2011 | ML11161A167 |
| | Licensee 60 day response to BL 2011-01 | July 11, 2011 | ML11194A025 |
| | NRC Request for Additional Information (RAI) regarding Licensee 60 day response to BL 2011-01 | November 15, 2011 | ML11313A219 |
| | Licensee response to RAI | December 15, 2011 | ML11354A247 |
| | NRC Closeout of BL 2011-01 for Dominion | June 26, 2012 | ML12171A333 |
| 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 2 | December 2015 | ML16005A625 |
| | NRC endorsement of NEI 12-06, Revision 2 - JLD-ISG-2012-01, Revision 1 | January 22, 2016 | ML15357A163 |
| 2.2 | Licensee Overall Integrated Plan (OIP) | | |
| | Licensee OIP submittal | February 28, 2013 | ML13063A150 |
| | OIP 1st six month status report | August 28, 2013 | ML13242A273 |
| | OIP 2nd six month status report | February 27, 2014 | ML14063A203 |
| | OIP 3rd six month status report | August 28, 2014 | ML14245A405 |
| | OIP 4th six month status report | February 27, 2015 | ML15062A007 |
| | OIP 5th six month status report | August 24, 2015 | ML15239A750 |
| | OIP 6th six month status report | February 26, 2016 | ML16061A005 |
| | OIP 7th six month status report | August 29, 2016 | ML16243A464 |
| 2.3 | NRC Interim Staff Evaluation of OIP | February 21, 2014 | ML14034A339 |
| 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 | June 2, 2015 | ML15147A056 |
| | NRC Audit Report | September 16, 2015 | ML15253A721 |
| 2.5 | Licensee Compliance Letter for EA-12-049 and Final Integrated Plan (FIP) | October 31, 2016 | ML16307A390 |
| 2.6 | NRC Safety Evaluation of Implementation of EA-12-049 | August 1, 2017 | ML17089A617 |
| 2.7 | 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 2018-011 | April 10, 2018 | ML18100A270 |
| 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 |
| NA | NRC approval of relaxation request of the schedule requirements for Order EA-12-049 from Fall 2015 until July 2016 | October 4, 2015 | ML15243A450 |
| NA | NRC approval of relaxation request of the schedule requirements for Order EA-12-049 from July 2016 to September 2016 | July 25, 2016 | ML16187A160 |

| 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 Overall Integrated Plan (OIP) | | |
| | Licensee OIP | February 28, 2013 | ML13063A099 |
| | Response to NRC RAI | August 28, 2013 | ML13247A338 |
| | OIP 1st six month status report | August 28, 2013 | ML13242A272 |
| | OIP 2nd six month status report | February 27, 2014 | ML14063A201 |
| | OIP 3rd six month status report | August 28, 2014 | ML14245A404 |
| | Response to NRC RAI | October 29, 2014 | ML14304A538 |
| | OIP 4th six month status report | February 27, 2015 | ML15062A008 |
| | OIP 5th six month status report | August 20, 2015 | ML15237A041 |
| 3.3 | NRC Interim Staff Evaluation of OIP and RAI | December 5, 2013 | ML13305A100 |
| 3.4 | NRC Audit of EA-12-051 | | |
| | NRC Notification of Audit of EA-12-051 | March 26, 2014 | ML14083A620 |
| | NRC Audit Report of AREVA SFPI design specifications | September 15, 2014 | ML14203A326 |
| | NRC Site-Specific Audit Plan | June 2, 2015 | ML15147A056 |
| | NRC Audit Report | September 16, 2015 | ML15253A721 |
| 3.5 | Licensee Compliance Letter for EA-12-051 | January 22, 2016 | ML16028A196 |
| 3.6 | NRC Safety Evaluation of Implementation of EA-12-051 | August 1, 2017 | ML17089A617 |
| 3.7 | 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 2018- 011 | April 10, 2018 | ML18100A270 |

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

| 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 NTF 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 (SHSR) | | | |
| 5.8 | Licensee SHSR | March 26, 2014 | ML14092A250 |
| 5.9 | NRC Staff Assessment of Reevaluated Seismic Hazard Information | July 25, 2015 | ML15194A055 |
| 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 |
| 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 17, 2014 | ML14357A168 |
| | NRC Response Letter for the ESEP Submittal | October 19, 2015 | ML15208A216 |
| 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 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 | Not Required | Not Required |
| | Spent Fuel Pool Evaluation | March 30, 2017 | ML17089A578 |
| | Relay Chatter Evaluation | Not Required | Not Required |
| | Seismic Probabilistic Risk Assessment | September 28, 2018 | ML18271A109 |
| 5.20 | Audit plan of seismic evaluations submittals | July 6, 2017 | ML17177A446 |
| 5.21 | NRC Staff Assessment of Seismic Evaluations | | |
| | High Frequency Confirmation | Not Required | Not Required |
| | Spent Fuel Pool Evaluation | May 10, 2017 | ML17128A355 |
| | Relay Chatter Evaluation | Not Required | Not Required |
| | SPRA Response Letter | September 6, 2019 | ML19199A696 |
| 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-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 Flood Hazard Reevaluation Report | | |
| | Licensee FHRR Submittal | March 12, 2013 | ML13073A114 |
| | Licensee FHRR Supplement | August 22, 2013 | ML13240A005 |
| | Licensee Response to RAIs | March 26, 2014 | ML14093A320 |
| | Licensee Clarification to FHRR | November 24, 2014 | ML14329B257 |
| 6.8 | FHRR Regulatory Audit | Not Required | Not Required |
| 6.9 | NRC Inspection of licensee interim actions (if applicable) | | |
| | NRC TI 2515/190, Revision 0, Inspection of proposed interim actions as a result of FHRR | August 30, 2013 | ML13217A436 |
| | NRC TI 2515/190 Integrated Inspection Report 05000395/2013005 and 05000395/2013502 | February 10, 2014 | ML14041A474 |
| 6.10 | NRC Interim Staff Response to Reevaluated Flood Hazards (Supplement to FHRR SA) | November 3, 2015 | ML15296A377 |
| 6.11 | NRC Staff Assessment of FHRR | December 23, 2014 | ML14356A002 |
| 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 |

| TABLE 6 | | | |
|---|--|--------------------|------------------------|
| Request for Information under Title 10 of the <i>Code of Federal Regulations</i>, Section 50.54(f), Enclosure 2: Recommendation 2.1 Flooding Hazard Reevaluation | | | |
| Ref | Document | Date | ADAMS Accession No. |
| 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 |
| 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 | June 30, 2017 | ML17181A513 |
| 6.21 | NRC Staff Assessment of Focused Evaluation | October 24, 2017 | ML17272A929 |
| 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 | NRC Guidance for Regulatory Decisionmaking of reevaluated flooding and seismic hazards | September 21, 2016 | ML16237A103 |
| 6.25 | NRC Treatment of Reevaluated Flooding Hazard Information (flooding binning letter) | August 20, 2019 | ML19067A247 |

| 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 2 - JLD-ISG-2012-01, Revision 1 | February 8, 2017 | ML17005A182 |
| 7.6 | Licensee's MSA submittal - Flooding | December 22, 2016 | ML16357A603 |
| 7.7 | NRC Staff Assessment of MSA - Flooding | March 22, 2017 | ML17072A259 |
| 7.8 | Licensee's MSA submittal - Seismic | October 29, 2018 | ML18302A363 |
| 7.9 | NRC Staff Assessment of MSA - Seismic | Suspended | Suspended ² |
| 7.10 | NRC MSA Audit Plan | December 5, 2016 | ML16259A189 |

² As noted in the seismic binning letter (Reference 5.22), the staff's review of the seismic MSA for Summer was suspended. The MSA was considered in the staff's assessment of the SPRA report.

| 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 | | |
| | Licensee Seismic Hazard Walkdown Report Package | November 26, 2012 | ML130220008 |
| | Response to generic RAIs | November 25, 2013 | ML13333A163 |
| 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 7, 2013 | ML13038A608 |
| 8.5 | Licensee subsequent (delayed items) seismic walkdown report | Not Required | Not Required |
| 8.6 | NRC Staff Assessment of Seismic Walkdown Report | January 30, 2014 | ML14010A415 |

| 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 package | November 26, 2012 | ML12332A203 |
| | Update to Flooding Hazard Walkdown Report – APM Assessment | January 31, 2014 | ML14035A227 |
| 9.4 | NRC Inspection of Flooding Walkdowns | | |
| | NRC TI 2515/187 | June 27, 2012 | ML12129A108 |
| | NRC Integrated Inspection Report 2012-005 (TI 2515/187 inspection discussed) | February 7, 2013 | ML13038A608 |
| | NRC Integrated Inspection Report 2013-002 (TI 2515/187 inspection closed) | May 6, 2013 | ML13127A132 |
| 9.5 | NRC Staff Assessment of Flooding Walkdown Report | June 6, 2014 | ML14141A461 |

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 | V.C. Summer 60 day response and proposed alternative course of action (non-public) | May 9, 2012 | ML12135A089 |
| 10.3 | V.C. Summer 90 day response to communications and staffing information requests | June 8, 2012 | ML12164A380 |
| 10.4 | NRC letter – status of 90-day response | July 26, 2012 | ML12200A106 |
| 10.5 | Licensee communications assessment | | |
| | Licensee communications assessment | October 30, 2012 | ML12307A032 |
| | NRC letter on generic technical issues | January 23, 2013 | ML13010A162 |
| | Licensee communications assessment supplement | February 21, 2013 | ML13057A111 |
| 10.6 | NRC staff assessment of licensee's communications assessment | September 26, 2017 | ML17206A459 |
| 10.7 | Licensee Phase 1 staffing assessment (multi-unit sites only) | 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 | June 16, 2015 | ML15169A090 |
| 10.10 | NRC Phase 2 staff assessment response | February 7, 2016 | ML15351A347 |
| 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 2018-011 | April 10, 2018 | ML18100A270 |

| 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 16, 2015 | ML15356A052 |
| 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 | June 26, 2013 | ML13182A506 |
| 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 2018-011 | April 10, 2018 | ML18100A270 |
| 11.16 | NEI 13-06, “Enhancements to Emergency Responses 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: 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 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: VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1 – DOCUMENTATION OF THE COMPLETION OF REQUIRED ACTIONS TAKEN IN RESPONSE TO THE LESSONS LEARNED FROM THE FUKUSHIMA DAI-ICHI ACCIDENT DATED JUNE 9, 2020

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