POLICY ISSUE

(Information)

October 21, 2014 SECY-14-0114

FOR: The Commissioners

FROM: Mark A. Satorius
Executive Director for Operations

SUBJECT: SIXTH 6-MONTH STATUS UPDATE ON RESPONSE TO LESSONS LEARNED FROM JAPAN'S MARCH 11, 2011, GREAT TŌHOKU EARTHQUAKE AND SUBSEQUENT TSUNAMI

PURPOSE:

The purpose of this paper is to provide a status update on the U.S. Nuclear Regulatory Commission (NRC) staff's activities related to lessons learned from the March 2011 accident at Japan's Fukushima Dai-ichi facility. This paper does not address any new commitments or resource implications.

BACKGROUND:

In the staff requirements memorandum (SRM) to SECY-11-0117, "Proposed Charter for the Longer-Term Review of Lessons Learned from the March 11, 2011, Japanese Earthquake and Tsunami," dated October 19, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML112920034), the Commission approved a charter that established the structure, scope, and expectations for the NRC's longer-term review of the events in Japan. The charter required, among other things, status updates every 6 months for 2 years on the work conducted under the charter.

CONTACT: Robert J. Bernardo, NRR/JLD
301-415-2621

In SRM-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," dated November 13, 2013 (ADAMS Accession No. ML13317A271), the Commission directed the NRC staff to continue to provide the Commission a status report every 6 months until completion of the implementation of Tier 1 actions.

The NRC staff provided its first 6-month status update in SECY-12-0025, "Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tōhoku Earthquake and Tsunami" dated February 17, 2012 (ADAMS Accession No. ML12039A103). The second 6-month update was provided as Enclosure 1 to SECY-12-0095 (ADAMS Accession No. ML12165A092). The third update was provided in SECY-13-0020 (ADAMS Accession No. ML13031A512), the fourth update was provided in SECY-13-0095 (ADAMS Accession No. ML13213A304), and the fifth update was provided in SECY-14-0046 (ADAMS Accession No. ML14064A523). This is the staff's sixth 6-month status update, which covers March 2014 through August 2014.

In SECY-11-0137, the NRC staff prioritized the Near-Term Task Force (NTTF) recommendations provided in SECY-11-0093, "Near-Term Report and Recommendations for Agency Actions Following the Events in Japan," dated July 12, 2011 (ADAMS Accession No. ML11186A950), into three tiers. SECY-11-0137 also provided the staff's assessment of the Tier 1 and Tier 2 items, including recommendations for regulatory action on Tier 1 items. SECY-12-0095 provided assessments and program plans for the Tier 3 items, along with six additional recommendations identified in SECY-11-0137.

On March 12, 2012, the NRC issued Orders EA-12-049 ("Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events"), EA-12-050 ("Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents"), and EA-12-051 ("Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation"), and a request for information (RFI) letter to licensees (ADAMS Accession Nos. ML12054A735, ML12054A694, ML12054A679, and ML12053A340, respectively). These regulatory actions addressed the majority of the Tier 1 items. On June 6, 2013, the NRC issued Order EA-13-109 ("Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions," ADAMS Accession No. ML13143A321) that modified and superseded Order EA-12-050. Implementation of these regulatory actions, along with additional efforts to employ the rulemaking process for the remaining Tier 1 activities, has remained the primary focus of the staff's effort since the last 6-month update. In addition, the NRC staff has made progress on the Tier 2 and Tier 3 recommendations.

DISCUSSION:

This update covers the period from March 2014 through August 2014. Status updates specific to each lessons learned activity are contained within the enclosures. Enclosure 1 addresses Tier 1 activities, Enclosure 2 addresses Tier 2 activities, Enclosure 3 addresses Tier 3 activities, and Enclosure 4 addresses activities that are not contained within a tier.

Enclosure 5 explains the overall NRC response and how the various lessons learned activities work together as part of the NRC's defense-in-depth approach to nuclear reactor safety. Table 1 in Enclosure 5 provides information on the status of activities in terms of the various

steps in the regulatory process (e.g., assessment, decisionmaking, regulatory action, implementation, and inspection). The table also organizes the activities by outcome instead of only by the numbering system used by the NTTF for its recommendations.

Decommissioning Reactors

Four reactor units at three sites have permanently ceased operations and begun the decommissioning process since the Fukushima lessons learned orders and RFI letter were issued in March 2012. The licensees for Crystal River, Unit 3, Nuclear Generating Plant (Crystal River), the Kewaunee Power Station (Kewaunee), and San Onofre Nuclear Generating Station (SONGS), Units 2 and 3, have submitted the certifications required by Title 10, "Energy," of the *Code of Federal Regulations* (10 CFR) 50.82(a)(1)(i) and (ii) and are no longer authorized to operate the reactor or place or retain fuel in the reactor vessel. Two additional licensees, the Vermont Yankee Nuclear Power Station (Vermont Yankee) and the Oyster Creek Nuclear Generating Station (Oyster Creek), have also publicly announced plans to permanently shut down. The NRC staff has received requests from the three shutdown sites to relax or rescind the applicable orders and relieve them from the obligations of the RFI letter. The staff has rescinded Orders EA-12-049 (for mitigation strategies) and EA-12-051 (for spent fuel pool instrumentation) for Crystal River, Kewaunee, and SONGS. Additionally, the staff confirms that Order EA-13-109 (for severe-accident-capable hardened vents) is not applicable to Crystal River, Kewaunee, or SONGS. Crystal River, Kewaunee, and SONGS have all been relieved of the obligations of the RFI letter.

The NRC staff received a request from Vermont Yankee to relax and rescind Order EA-13-109. The staff has approved relaxing of the schedule requirements and rescission of Order EA-13-109 pending docketing of the 10 CFR 50.82(a)(1)(i) and (ii) certifications for permanent cessation of operations and removal of fuel from the reactor vessel. The NRC staff has also received requests from Vermont Yankee to rescind Orders EA-12-049 and EA-12-051 upon Entergy's docketing of the 10 CFR 50.82(a)(1) certifications for permanent cessation of operations and removal of fuel from the reactor vessel. The NRC staff is currently evaluating these requests. Vermont Yankee notified the NRC of their intent to defer the RFI response obligations until June 30, 2015. NRC staff acknowledged the request and agreed that the revised regulatory commitment dates are acceptable.

Oyster Creek submitted a request for extension to comply with Order EA-13-109 until January 31, 2020. The plant is expected to be permanently shut down at that time. Oyster Creek is currently required to implement Phase 1 (wetwell venting system) by startup after the Fall 2016 refueling outage and Phase 2 (drywell venting system) by startup after the Fall 2018 refueling outage. The NRC staff is evaluating the request.

Consolidated Rulemaking Activities (Mitigation of Beyond-Design-Basis Events Rulemaking)

The NRC staff has consolidated the Station Blackout Mitigation Strategies rulemaking with the Onsite Emergency Response Capabilities rulemaking as well as the portions of NTTF Recommendations 9, 10, and 11 that are already being addressed as part of the Mitigating Strategies Order (NRC Order EA-12-049) implementation (NTTF Recommendation 4.2), NTTF Recommendation 8, and items already being implemented by industry, in accordance with the Commission SRM that approved the staff's proposal in Enclosure 6 to COMSECY-14-0046 (ADAMS Accession No. ML14190A347). The combined rulemaking will now be referred to as

the Mitigation of Beyond-Design-Basis Events rulemaking. As part of its efforts to develop and provide the proposed rule package to the Commission at the end of this year, the staff held a public meeting on August 26, 2014, to discuss draft language; potential requirements for severe accident management guidelines, including the draft supporting backfit justification concepts; and comments on supporting guidance.

Reorganization of the Office of Nuclear Reactor Regulation's Japan Lessons Learned Division

On June 15, 2014, the Office of Nuclear Reactor Regulation (NRR) reorganized to centralize the day-to-day activities associated with implementing the lessons learned from the Fukushima Dai-ichi nuclear power plant accident in the new Japan Lessons Learned Division (JLD). The functions of the Japan Lessons Learned Directorate and the Mitigating Strategies Directorate have been incorporated into the new division.

The JLD is tasked with executing the NTTF Recommendations as approved by the Commission, providing sufficient management oversight to support these agency high-priority activities, and promote the flexible use of agency resources to most efficiently accomplish specific key milestones. The new organization consists of two directorates that are supported by a total of five branches. The Program Management, Policy, and Support Directorate is supported by the Orders Management Branch, Hazards Management Branch, and the Policy and Support Branch. The Technical Support Directorate is supported by the Electrical and Reactor Systems Branch, as well as the Containment and Balance-of-Plant Branch.

The new division will provide a baseline capability on Tier 1 activities and other Fukushima support activities to accomplish its day-to-day mission and will reach out to other divisions in NRR as additional resources are needed to handle workload peaks.

NRR plans to continue JLD functions through fiscal year 2016. The NRC staff will continue to evaluate and report on its plans to sunset the longer-term review organization in future 6-month status updates.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection.

/RA Michael R. Johnson Acting for/

Mark A. Satorius
Executive Director
for Operations

Enclosures:
1. Update on Tier 1 Activities
2. Update on Tier 2 Activities
3. Update on Tier 3 Activities
4. Update on Activities Not Within a Tier
5. Overview of Fukushima-Related Recommendations and Related Activities

Update on Tier 1 Activities

Mitigation Strategies Order EA-12-049

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12056A045). The order requires a three-phase approach for mitigating beyond-design-basis external events. The initial phase requires the use of installed equipment and resources to maintain or restore core cooling, containment, and spent fuel pool (SFP) cooling capabilities. The transition phase requires providing sufficient portable onsite equipment and consumables to maintain or restore these functions until they can be performed with resources external to the site (i.e., offsite). The final phase requires obtaining sufficient offsite resources to sustain those functions indefinitely.

As described in the update of August 29, 2012, the NRC staff issued interim staff guidance (ISG) JLD-ISG-2012-01, Revision 0, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML12229A174). This document assists nuclear power reactor licensees with the identification of measures needed to comply with the requirements of the order. The ISG endorses, with clarifications, the methodologies described in the industry guidance document, Nuclear Energy Institute (NEI) 12-06, "Diverse and Flexible Coping Strategies Implementation Guide," Revision 0 (ADAMS Accession No. ML12242A378). This industry document outlines one possible approach that can be used by licensees, construction-permit holders, and combined license holders to address the requirements of the order. Both the ISG and NEI 12-06 support implementation of the order by the Commission-directed completion date of December 2016.

By February 28, 2013, all licensees submitted their integrated plans to the NRC (except for Crystal River, Unit 3, because of its plan to permanently cease operations). These integrated plans contain each licensee's site-specific implementation details for meeting the requirements of the order. To accomplish the review of the integrated plans on the desired timeline, the Mitigation Strategies Directorate (MSD) was created on August 12, 2013. Subsequently, on June 15, 2014, MSD and the Japan Lessons Learned Directorate combined to create the Japan Lessons Learned Division (JLD) within the Office of Nuclear Reactor Regulation (NRR).

In their review of mitigation strategies, the NRC staff interacts with industry and other stakeholders to resolve generic concerns and initiated a formal audit process (according to NRR Office Instruction LIC-111, "Regulatory Audits") (ADAMS Accession No. ML082900195) to complete a timely review of licensees' integrated plans. In addition to issuing the associated audit plan (ADAMS Accession No. ML13234A503), staff developed supplemental staff guidance for the review of beyond-design-basis external events (ADAMS Accession No. ML13238A263). Following the audit plan and associated guidance, staff reviewed licensees' integrated plans and issued Interim Staff Evaluations (ISEs) between November 22, 2013, and February 26, 2014, for each licensee about whether their integrated plan, if implemented as described, would provide a reasonable path for compliance with the order. For areas in which

insufficient information was available, open and confirmatory items were identified for the staff to review as the details become available.

After the issuance of the ISEs, the NRC staff began conducting both electronic and onsite audits. The onsite audits are being performed through close engagement with the regions before the compliance date for the first unit at a site. Though the scope and specifics of each review might vary, the purpose of these audits is to review the closeout of the open and confirmatory items identified in the ISEs. In accordance with the requirements of the order, licensees will notify the NRC when full compliance is achieved. Once all units at a site are in compliance, the NRC staff will issue a final safety evaluation (SE) documenting the staff's review of the licensees' last update to their program.

The first operating units are scheduled to comply with the requirements of the order by the Fall 2014. The order established a schedule for all licensees to achieve full compliance within two refueling outages after submittal of the integrated plans (and no later than December 2016). Licensees for nine sites requested, and have been granted, schedule relaxation to allow three refueling outages until compliance. All nine of these licensees will still come into compliance by December 2016. Licensees for an additional six sites have requested, and been granted, schedule relaxation to align with the schedule requirements of Order EA-13-109, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions" (ADAMS Accession No. ML13130A067). The compliance date for these licensees will extend past December 2016.

The NRC staff plans to conduct post-compliance inspections after all units at a site indicate compliance and an SE is issued for that site. A temporary instruction (TI) has been issued and the first onsite inspection will occur in January 2015 at Watts Bar Nuclear Plant, Units 1 and 2. Additional site inspections will begin at other sites in Summer 2015.

Spent Fuel Pool Instrumentation Order EA-12-051

On March 12, 2012, the NRC issued Order EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation" (ADAMS Accession No. ML12056A044), requiring all U.S. nuclear power plants to install reliable water-level measurement instrumentation in their SFPs. The instrumentation must remotely report at least three distinct water levels: (1) normal level, (2) low level but still high enough to shield workers above the pools from radiation, and (3) a very low level near the top of the spent fuel rods (indicating that more water should be added without delay).

On August 29, 2012, the NRC staff issued its guidance document, ISG JLD-ISG-2012-03, Revision 0, "Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation" (ADAMS Accession No. ML12221A339). This document provides an acceptable approach for satisfying the requirements of Order EA-12-051. At the end of February 2013, each of the overall integrated plans (OIPs) for the SFP instrumentation order was received.

The NRC staff issued ISEs for all plants affected by this order between September 23, 2013, and December 12, 2013, except for Kewaunee, Crystal River, and San Onofre Nuclear Generating Station (SONGS) because they are in the process of permanently shutting down.

These ISEs included requests for additional information (RAI) with a due date no later than 6 months before the date when full compliance is required.

In March 2014, the NRC staff notified all licensees and construction-permit holders that audits will be conducted on their responses to Order EA-12-051, in accordance with NRR Office Instruction LIC-111, "Regulatory Audits," as discussed above. Licensees for the first affected units are scheduled to complete the required actions by the end of each unit's Fall 2014 refueling outage. As part of the review, the staff completed SFP instrument vendor audits for the three vendors (Westinghouse, AREVA, and MOHR) of this level-measurement technology. The staff's vendor audit reports for the three pilot plants (Watts Bar, McGuire, and D.C. Cook) have been issued. Public meetings were held in November 2013 and February 2014 to solicit industry and public comments regarding staff expectations for RAI responses, the conduct of vendor audits, and the level of detail for information provided to allow the staff to complete its assessments efficiently and effectively. Industry and NRC staff have aligned on expectations and do not anticipate that further RAIs will be necessary to complete the evaluations.

The NRC staff plans to conduct post-compliance inspections after all units at a site indicate that they are in compliance and an SE is issued for that site. A TI has been issued and the first onsite inspection will occur in January 2015 at Watts Bar Nuclear Plant, Units 1 and 2. Additional site inspections will begin at other sites in Summer 2015.

<u>Reliable Hardened Containment Vents for Boiling Water Reactors (BWRs) with Mark I and II Designs (Order EA-12-050 and Order EA-13-109)</u>

The NRC issued Order EA-12-050, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents," on March 12, 2012 (ADAMS Accession No. ML12054A696), requiring all operating BWRs in the U.S. with Mark I and Mark II containments to install a reliable hardened vent. After issuing the order, additional NRC evaluations examined the benefits of venting after reactor core damage occurs. SECY-12-0157, "Consideration of Additional Requirements for Containment Venting Systems" (ADAMS Accession No. ML12345A030), was submitted to the Commission on November 26, 2012. In the staff requirements memorandum (SRM) for SECY-12-0157 on March 19, 2013 (ADAMS Accession No. ML13078A017), the staff was directed to require licensees with Mark I and Mark II containments to "upgrade or replace the reliable hardened vents required by Order EA-12-050 with a containment venting system designed and installed to remain functional during severe accident conditions." On June 6, 2013, the staff issued the modified Order EA-13-109, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions" (ADAMS Accession No. ML13130A067), to ensure that those vents will remain functional in the conditions following reactor core damage.

The revised order contains two distinct phases of implementation. Phase 1, which all licensees are required to implement by June 2018, requires licensees to upgrade the venting capabilities from the containment wetwell to provide reliable hardened vents to assist in preventing core damage and also to remain functional during severe accident conditions. Phase 2, which all licensees are required to implement by June 2019, requires licensees to: (a) provide additional protections for severe accident conditions through installation of a reliable severe-accident-capable drywell vent system, or (b) develop a reliable containment venting

strategy that makes it unlikely to need to vent from the containment drywell during severe accident conditions, and (c) submit an OIP by December 31, 2015.

Since the issuance of the revised order, the NRC staff issued the ISG for Phase 1 of Order EA-13-109 on November 14, 2013. The ISG endorses, with exceptions and clarifications, the methodologies described in NEI 13-02, Rev. 0, "Industry Guidance for Compliance with Order EA-13-109." All applicable licensees submitted an OIP for NRC review on or before June 30, 2014, which included a description of how compliance with Phase 1 requirements will be achieved. The staff is currently reviewing the Phase 1 OIPs and conducting audits of licensee progress towards compliance with Phase 1 of Order EA-13-109. By June 30, 2015, the staff plans to issue ISEs to all applicable licensees documenting open and confirmatory items associated with implementation of the Phase 1 OIPs. In lieu of a Phase 1 OIP, the Oyster Creek Nuclear Generating Station submitted a request for an extension to comply with Order EA-13-109 on June 2, 2014. The staff is currently evaluating the extension request.

The Phase 2 portion of Order EA-13-109 builds on the Phase 1 activities, and also takes advantage of studies related to the development of a regulatory basis for the accident management, containment protection, and release reduction rulemaking. The NRC staff plans to issue the ISG for Phase 2 by April 30, 2015. Licensees are required to submit their OIPs for Phase 2 by December 31, 2015.

Containment Protection and Release Reduction Rulemaking

After issuing Order EA-12-050, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents," on March 12, 2012, additional NRC evaluations examined the benefits of venting after reactor core damage occurs. SECY-12-0157, "Consideration of Additional Requirements for Containment Venting Systems," was submitted to the Commission on November 26, 2012. In the SRM for SECY-12-0157, dated March 19, 2013, the Commission directed the NRC staff to develop the regulatory basis and proceed with a rulemaking for filtering strategies with drywell filtration and severe accident management of BWRs with Mark I and Mark II containments. The Commission directed the staff to provide to the Commission the regulatory basis for the rulemaking on March 19, 2014; the proposed rule and draft staff guidance on March 19, 2015; and the final rule and guidance on March 19, 2017.

Since the issuance of the SRM for SECY-12-0157, the NRC staff has held several public meetings to discuss the Commission's decision and the regulatory basis for the rulemaking. The public meetings included interaction with the public on potential performance measures, probabilistic risk assessments (PRAs), and accident-progression event trees for the regulatory basis.

Technical activities that support the development of regulatory basis for rulemaking include the following five components. These technical activities are: (1) development of core damage event tree and accident progression event tree as front-end PRA to identify and select risk-dominant accident sequences; (2) accident progression and source term analyses of selected accident sequences using MELCOR; (3) consequence analysis, based on MELCOR source terms using MACCS; (4) risk assessment based on MACCS consequence results and PRA; and (5) regulatory analysis and backfit analysis using risk assessment results. The first three steps have been completed and the last two steps are continuing. Also, sensitivity analyses are in progress as is the documentation of the completed work.

In August 2014, NRC staff briefed the Advisory Committee on Reactor Safeguards Joint Subcommittee on Reliability and PRA and Fukushima on the methodology and status of the rulemaking.

The regulatory basis and proposed rule dates were previously extended by 9 months. The NRC staff requested and has received Executive Director for Operations approval for extension of the rulemaking dates as shown below. Commission action on the requested extension is pending. The staff continues to work through normal rulemaking activities and will keep the Commission apprised of any challenges that could impact the schedule.

(1) Regulatory basis: From March 12, 2014, to September 12, 2015;

(2) Proposed rule and draft staff guidance: From March 5, 2015, to September 4, 2016; and

(3) Final rule: From March 3, 2017, to December 12, 2017.

The NRC staff continues to work with a Division Director Steering Committee to guide this activity. This is a normal step taken for complex rulemakings, done in accordance with agency rulemaking procedures. The working group and Division Director Steering Committee will keep senior management informed of progress on this activity.

Seismic Hazard Walkdowns

On March 12, 2012, the NRC staff issued a request for information (50.54(f) letter) requesting that licensees of U.S. nuclear power plants perform a detailed inspection, or walkdown, of their currently installed seismic-protection and -mitigation features. The industry developed—and the NRC endorsed—Electric Power Research Institute 025286, “Seismic Walkdown Guidance,” to conduct these walkdowns. All plants had to ensure that the features met current licensing-basis requirements and had to identify, correct, and report any degraded conditions. The walkdowns were completed and reports were submitted to the NRC staff by November 2012. NRC resident inspectors used TI-2515/188, “Inspection of Near-Term Task Force Recommendation 2.3 Seismic Walkdowns,” to independently verify, using a sampling process, that each licensee’s seismic walkdown activities were conducted using the walkdown methodology endorsed by the NRC. Resident inspectors completed the inspection requirements set forth in TI-2515/188 concurrently with the licensee’s walkdown activities and documented the inspection results in their quarterly reports.

If the licensees discovered deficiencies during their walkdowns, the issues were entered in the licensee’s corrective-action program. These corrective actions are being followed up by the NRC resident inspectors in accordance with normal NRC processes.

Several findings were identified by resident inspector during their walkdown related inspections. These findings were all of very low safety significance (Green). The majority of the issues were identified as a result of licensee seismic walkdowns. Potential seismic issues were mostly related to the following three broad areas:

(1) Degraded equipment / hardware (e.g. missing bolts, corrosion, open s-hooks);

(2) Spatial seismic interactions; and

(3) Problems associated with housekeeping procedures and/or implementation (e.g. temporary installations, portable equipment).

Since the last 6-month update paper, the NRC staff completed issuance of the staff assessment reports for the operating reactor fleet from December 2013 through June 2014. The staff assessments determined that the plant walkdowns were conducted consistently with the intent of the endorsed guidance, thereby verifying that the walkdowns met the objectives in Enclosure 3 of the 50.54(f) letter.

Although NRC staff review has found that licensees have properly implemented the walkdown guidance, a number of plants are in process of completing and reporting their review of delayed walkdowns on items that were inaccessible while at power. The staff expects that the last licensee walkdown update on the inaccessible items will be provided to the NRC by March 31, 2015.

Flooding Hazard Walkdowns

On March 12, 2012, the NRC staff issued a request for information (50.54(f) letter) requesting that licensees for the U.S. nuclear power plants to perform a walkdown of their currently installed flooding-protection and -mitigation features, including a review of associated manual actions. The industry developed—and the NRC endorsed—NEI 12-07, "Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features," to conduct these walkdowns. All plants had to ensure that the features met current licensing-basis requirements and had to identify, correct, and report any degraded conditions. The walkdowns were completed and reports were submitted to the NRC staff by November 2012. NRC resident inspectors used TI-2515/187, "Inspection of Near-Term Task Force [NTTF] Recommendation 2.3 Flooding Walkdowns," to independently verify, using a sampling process that each licensee's flooding walkdown activities were conducted using the walkdown methodology endorsed by the NRC. Resident inspectors completed the inspection requirements set forth in TI-2515/187 concurrently with the licensee's walkdown activities and documented the inspection results in their quarterly reports.

If the licensees discovered deficiencies during their walkdowns, the issues were entered in the licensee's corrective-action program. These corrective actions are being followed up by the NRC resident inspectors in accordance with normal NRC processes.

Since the last 6-month update, the NRC staff has continued to assess each plant's walkdown report. On July 17, 2014, the NRC staff completed issuance of the staff assessments of the flooding walkdown reports for all of the operating nuclear power plants.

Additionally, the NRC staff will be developing a lessons-learned report to document insights from the flooding walkdowns.

The NRC staff's preliminary review of lessons learned notes that from the end of 2012 through early 2014, nine greater-than-Green findings were identified related to licensee vulnerability to

external flooding. The majority of the findings were identified as a result of licensee flooding walkdowns. The findings noted deficiencies in three broad areas:

(1) Inadequate seals that would allow flood waters into safety-related spaces;

(2) Procedurally directed actions that could not be accomplished in the time allotted by the final safety analysis report for design-basis flooding events; and

(3) Incomplete procedures that did not provide sufficient direction during design-basis flooding events.

Seismic Hazard Reevaluations

On March 12, 2012, the NRC staff asked U.S. nuclear power plant licensees to use current regulations and guidance to reevaluate the seismic hazards that could impact their site. These newly reevaluated hazards, if they are higher than the plant was designed for, will be analyzed by licensees to determine whether interim measures are needed to protect against the reevaluated levels of hazard.

Since the last 6-month update paper, a significant amount of work has been completed on the seismic reevaluations. By March 31, 2014, licensees of nuclear plants in the Central and Eastern United States (CEUS) submitted reports on the reevaluated seismic hazard for their sites (NTTF Recommendation 2.1—Seismic). NRC staff geologists, geophysicists, structural engineers, and risk analysts reviewed the CEUS reports in accordance with the NRC-endorsed industry guidance document, which specifies the screening, prioritizing, and implementation details (ADAMS Accession No. ML12333A170). By letter dated May 9, 2014 (ADAMS Accession No. ML14111A147), the staff issued a screening review and prioritization letter to the 61 CEUS sites for the need to complete future seismic risk evaluations. The letter placed 44 CEUS sites into 3 priority groups for completion of seismic risk evaluations. The remaining 17 sites either are required to respond only to limited-scope evaluations (i.e., high-frequency evaluation, low-frequency evaluation, or spent fuel pool evaluation) or have screened-out of all further evaluations.

During the NRC screening and prioritization review, the NRC staff identified some sites for which a determination could not be made during the 30-day review period and interactions with licensees were needed to resolve technical issues. These issues generally involved differences between NRC independent estimates and licensee estimates of the seismic hazard, or the extent of existing Individual Plant Examination of External Events analyses. The staff determined that 15 sites were conditionally screened-in for the purposes of prioritizing and conducting additional evaluations. Most of the 15 sites are in priority Group 3 for which the amount of exceedance above the plant design-basis safe-shutdown earthquake in the 1- to 10-Hz range is relatively small and the maximum ground motion in the 1- to 10-Hz range is also relatively small. As of September 30, 2014, final screening decisions were completed for 11 conditionally screened-in sites. Letters with the final screening decision have been issued to Brunswick Steam Electric Plant, Duane Arnold Energy Center, Monticello Nuclear Generating Plant, and Fort Calhoun Station. With the exception of Monticello, the licensees screened-out. (Vermont Yankee has also conditionally screened-in; however, the plant's submittal has been

deferred until June of 2015[1]). Final screening decision letters for the other eight sites will be issued in the near future.

After the May 9, 2014, screening and prioritization letter, by memorandum dated May 21, 2014 (ADAMS Accession No. ML14136A126), NRC staff released preliminary ground-motion response spectra to support stakeholder understanding of staff decisions and to support near-term resolution of technical differences between licensees' and NRC staff's seismic hazard estimates. During June and July 2014, the NRC staff completed eight public meetings[2] with licensees to understand these technical differences and establish a path forward for reviewing the hazard analyses.

The NRC staff is preparing to review the Expedited Approach submittals required for those sites that screen-in for further seismic evaluations. The Expedited Approach submittals, due December 2014, serve as an engineering review of interim evaluations. The evaluations look at the systems and components that can be used to safely shut down a plant under the conditions of a station blackout (i.e., no alternating current power is available) and loss of ultimate heat sink. The expedited approach will either confirm that a plant has sufficient margin to continue with a longer-term evaluation without any modifications, or identify the need to enhance the seismic capacity. Several public meetings have been conducted with stakeholders to support development of guidance for the format and content of the Expedited Approach submittals[3] that will support effective and efficient NRC staff reviews. In response to Commission direction in SRM-COMSECY-13-0030, the staff also began to consider whether SFP evaluations were needed as part of the NTTF Recommendation 2.1 seismic activities.

Flooding Hazard Reevaluations

On March 12, 2012, the NRC staff issued a request for information (50.54(f) letter) asking all U.S. power reactor licensees and holders of construction permits in active or deferred status to reevaluate the flooding hazards that could impact their site. If the reevaluated flooding hazard at a site is not bounded by the current design basis, respondents are requested to perform an assessment of the plant's ability to cope with the reevaluated flood hazard (referred to as the integrated assessment). The staff will review the responses to the request for information and determine whether regulatory actions are necessary to provide additional protection against flooding.

Since the last 6-month update SECY paper, many activities associated with the flooding reevaluations have been completed. For example, the NRC staff has held numerous public meetings associated with either the flooding hazard reevaluations or the integrated assessment.

The NRC staff received requests for assistance from licensees to obtain information on dams upstream of eight nuclear power plants in order to complete their flooding hazard reevaluations.

---

[1] Vermont Yankee, by letter dated March 12, 2014 (ADAMS Accession No. ML14079A025), notified the NRC of Entergy's intent to defer March 12, 2012, response obligations until June 30, 2015. The NRC staff acknowledged this request by letter on July 28, 2014 (ADAMS Accession No. ML14134A163).

[2] NRC summaries of public meetings with licensees regarding seismic hazards can be found under ADAMS Accession Nos. ML14167A159, ML14175A518, ML14197A583, ML14210A021, ML14197A593, ML14210A050, ML14197A608, and ML14209A942.

[3] The Expedited Approach guidance document is found in ADAMS under Accession No. ML13102A142.

These requests were received between August 2013 and March 2014. The NRC entered into an interagency agreement with the U.S. Army Corps of Engineers (USACE) to perform upstream dam failure analyses for the eight sites. All calculations will be performed in accordance with NRC's guidance document JLD-ISG-2013-01, "Guidance for Estimating Flooding Hazards due to Dam Failure." Because of the dates of the assistance request letters and the amount of effort required by the USACE to complete these evaluations, licensees requiring assistance submitted extension requests to allow them time to include the USACE results in their flooding hazard reevaluation submittal.

In March 2014, the second set of flooding hazard reports was submitted. Eleven sites (out of 24) that were due to provide their flooding hazard reports by March 2014 requested extensions. Eight of the extensions were associated with the need to interact with the USACE regarding upstream dam failures. Two of the three remaining extensions involved analysis of complex watersheds, and the remaining extension was based on the need to further refine the flooding hazard model for the site because the results were not consistent with the plant's observational experience. After a series of public interactions to better understand the basis for each extension request, 9 of the 11 sites were granted extensions, as requested. The other two extensions, for Prairie Island Nuclear Generating Plant, Units 1 and 2, and Monticello Nuclear Generating Plant, Unit 1, were granted for 4 months less than the licensee requested. The NRC staff granted these sites a shorter extension because the licensee justification for the extension included time to develop evaluations that will be provided to them based on the USACE failure analysis. The NRC staff is currently reviewing the flood hazard reevaluation reports; and as completed, the staff began issuing assessments of the flood hazard reevaluations in July 2014. The third (final) set of flood hazard reevaluation reports (20) is due in March 2015.

If the reevaluated hazard exceeds the capability of existing flood protection or mitigation, the 50.54(f) letter requests that licensees describe interim actions taken, or planned, to address the reevaluated hazard. Examples of interim actions proposed by licensees include the use of sandbags or other temporary barriers, and use of FLEX strategies. The NRC staff issued TI 2515/190, "Inspection of The Licensee's Proposed Interim Actions as a Result of the Near-Term Task Force Recommendation 2.1 Flooding Reevaluation," to facilitate inspection of those actions.

Based on the flood hazard reevaluation reports received to date, the majority of sites indicated that they will be performing an integrated assessment. All sites have indicated that, if an integrated assessment is needed, they intend to use JLD-ISG-2012-05, "Guidance for Performing the Integrated Assessment for External Flooding." The integrated assessments are due to the NRC two years after the submittal of the hazard reevaluation report. The NRC staff has engaged with industry to support the development of several examples of applying JLD-ISG-2012-05. After the integrated assessments are received from the required plants, the staff will use existing regulatory processes to document and, if appropriate, take actions based on the information received.

Emergency Preparedness Staffing and Communications

The March 12, 2012, RFI letter asked licensees to assess a large-scale event that causes the loss of all alternating current power and might affect multiple reactors at their site. It also requested that licensees assess and implement enhancements to help ensure that communications can be maintained during such an event.

All licensees submitted their communications assessments by October 31, 2012. The NRC staff issued safety assessments documenting the staff's review to each licensee by July 2013 with the exception of SONGS, Units 2 and 3, which have ceased operation.

On April 30, 2013, licensees submitted their staffing assessments based on existing station blackout coping strategies with an assumption of multiple reactors being affected concurrently. On October 23, 2013 (ADAMS Accession No. ML13233A183), the NRC staff issued the Phase 1 staffing-assessment response letters for all of the multiunit sites except Arkansas Nuclear One (ANO), Units 1 and 2; Indian Point Nuclear Generating (Indian Point) Unit Nos. 2 and 3; and SONGS. On April 28, 2014, the staff issued letters for ANO (ADAMS Accession No. ML14112A372) and Indian Point (ADAMS Accession No. ML14112A363) after reviewing the responses to requests for additional information.

By June 2014, the NRC staff received Phase 2 staffing assessments for the licensees required to submit additional staffing details four months prior to the second refueling outage occurring in Fall 2014. The staff has reviewed those licensee assessments and has begun to issue Phase 2 staffing assessments for those respective plants.

Rulemaking concerning staffing and communications is included in the consolidated rulemaking activity approved in SRM-SECY-14-0046.

Mitigation of Beyond-Design-Basis Events Rulemaking

The NRC staff has consolidated the Station Blackout Mitigation Strategies rulemaking with the Onsite Emergency Response Capabilities rulemaking as well as the portions of NTTF Recommendations 9, 10, and 11 that are already being addressed as part of the Mitigating Strategies Order (NRC Order EA-12-049) implementation (NTTF Recommendation 4.2), NTTF Recommendation 8, and items already being implemented by industry, in accordance with the Commission SRM that approved the staff's proposal in Enclosure 6 to COMSECY-14-0046 (ADAMS Accession No. ML14190A347). The combined rulemaking will now be referred to as the Mitigation of Beyond-Design-Basis Events rulemaking. As part of its efforts to develop and provide the proposed rule package to the Commission at the end of this year, the staff held a public meeting on August 26, 2014, to discuss draft language; potential severe accident management guidelines requirements, including the draft supporting backfit justification concepts; and comments on supporting guidance.

In accordance with SRM-COMSECY-14-0046, the proposed rule due date to the Commission changed from July 25, 2014, to December 31, 2014; and the final rule due date changed from March 11, 2016, to December 27, 2016. The staff plans to issue supporting guidance for the rule that cites industry guidance currently under development by NEI. The staff continues to work with industry to ensure that supporting guidance is developed on a timeline commensurate with the rule schedule.

This update closes SECY tracking 201300052 based on COMSECY-13-0002.

Enhancements to the Capability To Prevent or Mitigate Seismically-Induced Fires and Floods

This lessons learned activity originated from NTTF Recommendation 3, and was intended to evaluate potential enhancements to the capability to prevent or mitigate seismically-induced fires and floods. In SRM-SECY-11-0137, the Commission directed the staff to initiate development of a PRA methodology to evaluate potential enhancements to plants' capability to prevent or mitigate seismically-induced fires and floods as part of Tier 1 activities. However, to be consistent with the program plan for NTTF Recommendation 3 in SECY-12-0095, "Tier 3 Program Plans and 6-Month Status Update in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Subsequent Tsunami" (ADAMS Accession No. ML12165A092), carrying out the broader evaluation (i.e., beyond the PRA methodology) of potential enhancements to the capability to prevent or mitigate seismically-induced fires and floods would remain a longer-term Tier 3 activity. In SECY-12-0095, the NRC staff supplied the following schedule and milestones to address NTTF Recommendation 3 for seismically-induced fires and floods:

(1) Continue development of PRA methodology for seismically-induced fires and floods. This will include two main subtasks:

   (a) Engagement with PRA-standards development organizations to develop the technical elements and standards for the PRA method (ongoing); and

   (b) Completion of a feasibility scoping study to evaluate PRA approaches for assessing multiple concurrent events (December 2015).

(2) Reevaluate NTTF Recommendation 3 based on information obtained from Tier 1 activities and PRA-method development activities, as well as recommend further activities (December 2016).

The NRC staff continues engagement with the ASME (formerly the American Society of Mechanical Engineers) and the American Nuclear Society (ANS) Joint Committee on Nuclear Risk Management (JCNRM) to leverage external stakeholders' expertise and to better focus future method-development efforts. Following JCNRM approval of the incorporation of a number of crosscutting issues in the ASME/ANS PRA standard, including concurrent initiating events such as seismically-induced fires and floods, implementation guidance has been provided to the PRA writing groups associated with affected parts of the standard. The NRC staff will continue engagement with ASME and ANS to support development of detailed standards requirements in this area.

Following the December 2013 public workshop held in Rockville, Maryland, and issuance of the associated workshop report (ADAMS Accession No. ML14022A249), work is continuing on the feasibility scoping study. The main objective of this scoping study is to better define the objectives and potential approaches for a PRA method suitable for assessing seismically-induced fires and floods. This work is expected to benefit from the information and recommendations gathered in the workshop. As a part of the technical work plan developed for this project, a draft feasibility report is being prepared in calendar year 2014. Based on input received at the workshop and subsequent discussion with some workshop participants, the feasibility report will also discuss risk analysis approaches, such as screening methods, that will not necessarily lead to complete PRAs.

Two expert panels have been identified to comment on the report and provide additional guidance that will be included in the report, which will then be issued in 2015 as the final product of the present work scope. The expert panels will include subject matter experts (i.e., seismic analysis, PRA, and internal-fire analysis) from industry, national labs, and the NRC. One panel will address seismically-induced fire issues and will include experts in both seismic and fire risk analysis. The other panel will address seismically-induced floods and will include experts in seismic risk analysis and flooding risk. Both panels will be asked to provide guidance on: (1) what structures, systems, and components (SSCs) can be screened from a seismically-induced fire or flood analysis, (2) how the unscreened SSCs can best be treated, and (3) what other issues (e.g., operator response) need special considerations in seismically-induced fire and flood scenarios.

The NRC staff will continue to monitor the progress of other NTTF recommendations related to this issue to appropriately factor additional information related to seismic and flooding hazards and mitigation strategies into the eventual resolution of NTTF Recommendation 3.

Update on Tier 2 Activities

Emergency Preparedness

The U.S. Nuclear Regulatory Commission (NRC) prioritized three items related to emergency preparedness (EP) as Tier 2. These items are:

(1) To conduct periodic training and exercises for multi-unit and prolonged station blackout (SBO) scenarios and to practice (simulate) the identification and acquisition of offsite resources, to the extent possible;

(2) To ensure that EP equipment and facilities are sufficient for dealing with multi-unit and prolonged SBO scenarios; and

(3) To add guidance to the emergency plan that documents how to perform a multi-unit dose assessment (including releases from spent fuel pools) using the licensee's site-specific dose-assessment software and approach.

Although items 1 and 2 above are being addressed through the implementation of mitigation strategies, on November 19, 2013, the NRC staff conducted a combined public meeting with the working group for the Onsite Emergency Response Capabilities rulemaking. This meeting discussed a draft version of the Nuclear Energy Institute's (NEI's) guidance document NEI 13-06, "Guidance for the Closure of Tier 2 Emergency Preparedness Enhancements from the NRC Near-Term Task Force Report [NTTF]," which is intended to address EP equipment, facilities, training, drills, and multi-unit dose assessment. Additionally, on March 4, 2014, the staff conducted a combined public meeting with the consolidated rulemaking working group to discuss additional comments on the revised draft of NEI 13-06, now titled "Enhancements to Emergency Response Capabilities for Beyond Design Basis Accidents and Events," and the new draft document NEI 14-01 "Emergency Response Procedures and Guidelines for Extreme Events and Severe Accidents." Given the level of integration between mitigation strategies, onsite emergency-response procedures, and items 1 and 2 above, the staff intends to conduct additional public meetings to finalize both guidance documents. The staff has consolidated the Station Blackout Mitigation Strategies rulemaking with the Onsite Emergency Response Capabilities rulemaking, as well as the portions of NTTF Recommendations 9, 10, and 11 that are already being addressed as part of the Mitigating Strategies Order (NRC Order EA-12-049) implementation (NTTF Recommendation 4.2), NTTF Recommendation 8, and items already being implemented by industry, in accordance with the Commission staff requirements memorandum that approved the staff's proposal in Enclosure 6 to COMSECY-14-0046 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14190A347). The staff conducted a public meeting to discuss NEI 13-06 and NEI 14-01 and the proposed consolidated rulemaking on August 26, 2014.

In COMSECY-13-0010, "Schedule and Plans for Tier 2 Order on Emergency Preparedness for Japan Lessons Learned," dated March 27, 2013 (ADAMS Accession No. ML12339A262), the NRC staff informed the Commission that licensees would provide information about their current multi-unit/multi-source capability (or a schedule for implementing such capability for

those licensees who do not currently have it) and that implementation of the dose-assessment capability would occur by the end of 2014. The staff received all licensee submittals on this topic and issued a response letter to the majority of licensees, dated January 29, 2014 (ADAMS Accession No. ML13233A205), that acknowledges that licensees intend to have multi-unit and/or multi-source dose-assessment capabilities by December 31, 2014. The staff issued the response letters by April 2, 2014, to the remaining licensees, with whom clarifying public teleconferences were conducted and from whom subsequent supplemental responses were submitted to the NRC. All response letters note that as part of the implementation of new multi-unit and multi-source dose-assessment capabilities, there is a need for an appropriate level of site procedures and training to ensure adequate integration and licensee staff familiarity, and that implementation of dose-assessment capabilities would be verified through the inspection program.

Consideration of Other Natural External Hazards

By letter dated October 13, 2011 (ADAMS Accession No. ML11284A136), the Advisory Committee on Reactor Safeguards recommended expanding NTTF 2.1 to include natural external hazards other than seismic and flooding hazards. The Consolidated Appropriations Act, Public Law 112-074, directed the NRC to require reactor licensees to reevaluate the external hazards at their sites and to require updates to their design basis, if necessary. Reevaluation of other natural external hazards was prioritized as a Tier 2 activity because of the lack of availability of the critical skill sets on the part of both the NRC staff and external stakeholders, as well as because the staff considered the seismic and flooding reevaluations to be of relatively higher priority.

The project plan for this activity was provided in Enclosure 3 of SECY-12-0025. The project plan calls for the NRC staff to follow the same general process as used for the Tier 1 seismic and flooding reevaluations. The staff expects to restart stakeholder interactions that occurred in February 2012 to discuss the technical basis and acceptance criteria for conducting a reevaluation of site-specific external natural hazards to help define the guidelines for the application of current regulatory guidance and methodologies at operating reactors. As with the reevaluations of seismic and flooding hazards, the staff is assessing how the revised estimates for other external events will be addressed within requirements for mitigating strategies for beyond-design-basis external events and possible plant-specific modifications.

The NRC staff held no public meetings or produced any project-significant documents during the last 6 months. However, the staff expects to begin work on this topic as soon as significant resources become available, following implementation of Tier 1 actions related to seismic- and flooding-hazard walkdowns and reevaluations.

Update on Tier 3 Activities

Periodic Confirmation of Seismic and Flooding Hazards

Near-Term Task Force (NTTF) Recommendation 2.2 recommended that the U.S. Nuclear Regulatory Commission (NRC) require licensees to periodically update external hazards based on any new and significant information since the most recent reevaluation. In SECY-11-0137, "Prioritization of Recommended Actions To Be Taken in Response to Fukushima Lessons Learned," dated October 3, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11272A111), the NRC staff prioritized NTTF Recommendation 2.2 as Tier 3 because it will be developed from NTTF Recommendation 2.1, "Seismic and Flooding Reevaluations," a Tier 1 item requiring licensees to reevaluate flooding and seismic hazards using present-day methodologies and guidance. This recommendation depends on the insights gained from the seismic and flooding reevaluations and, because those evaluations are not complete, no updates are currently available to report.

The NRC staff held no public meetings or produced any project-significant documents during the last 6 months. However, when sufficient insights are gained from the seismic and flooding reevaluations, the staff plans to start the rulemaking process to address this recommendation. The staff expects to first develop a technical basis and then engage stakeholders for public participation.

Enhancements to the Capability To Prevent or Mitigate Seismically-Induced Fires and Floods

This activity is unique in that it has a Tier 1 aspect and a Tier 3 aspect. The status update for all parts of this activity is included in Enclosure 1 under the same heading as this section.

Reliable Hardened Vents for Other Containment Designs; and

Hydrogen Control and Mitigation Inside Containment or Other Buildings

Both of these lessons learned activities originated from the NTTF report. NTTF Recommendation 5.2 identified a need to reevaluate hardened vents for containment designs other than boiling water reactor Mark I and Mark II containments (which are being addressed under Tier 1). NTTF Recommendation 6 was to identify insights from Fukushima related to hydrogen control and mitigation inside containment or in other buildings and to determine whether additional regulatory action is warranted. While these activities are separate, the NRC staff expects that insights from implementation of the order related to severe-accident-capable vents for Mark I and Mark II containments (Order EA-13-109, ADAMS Accession No. ML13130A067) will inform further evaluation and action for both activities. Additionally, the staff of the Office of Nuclear Regulatory Research is participating as a working group member in a study related to hydrogen generation, transport, and risk management organized by the Organisation for Economic Co-operation and Development. The report has been completed and is under staff review. Initial insights indicate that use of passive autocatalytic recombiners in foreign plants is a dominant feature. Hydrogen-control strategies outside the primary containment have not been fully developed and more work is needed. The report also noted that use of an external filter should be considered in conjunction with other severe-accident

management measures. Once the reviews are complete, the staff will make recommendations as how these insights can support addressing NTTF Recommendations 5.2 and 6.

The NRC staff issued the interim staff guidance (ISG) for Phase 1 (JLD-ISG-2013-02) of Order EA-13-109 on November 14, 2013 (ADAMS Accession No. ML13304B836). As required by the order, all licensees submitted an overall integrated plan by June 30, 2014. Currently, the staff is reviewing these plans and will start issuing interim staff evaluations by December 2014. The staff will evaluate existing plans for other containment designs (e.g., Mark III, ice condenser, and large dry containments) and hydrogen control as progress is made with the Mark I and Mark II issues. Once the staff has determined that sufficient insights have been gained from the Mark I and Mark II work and other related activities, it will commence evaluation of other containment designs and of hydrogen control to determine whether regulatory action is warranted for the activities.

Activities Related to Emergency Preparedness

In SECY–12–0095 (ADAMS Accession No. ML12165A092), the following four Tier 3 items were included within one program plan:

(1) Emergency preparedness (EP) enhancements for prolonged station blackout (SBO) and multi-unit events;

(2) Emergency Response Data System (ERDS) capability;

(3) Additional EP topics for prolonged SBO and multi-unit events; and

(4) EP topics for decisionmaking, radiation monitoring, and public education.

These four items collectively originated from NTTF Recommendations 9.1, 9.2, 9.3, 10.1, 10.2, 10.3, 11.1, 11.2, 11.3, and 11.4. The program plan outlined in SECY-12-0095 described an approach to collectively address these items using an advance notice of proposed rulemaking (ANPR). An ANPR is a tool that allows the NRC staff to solicit early written stakeholder input on a new potential rulemaking effort. The staff still intends to take this approach for certain Tier 3 EP activities (9.2, 9.3, and 10.3 related to ERDS; 10.1; 11.2; 11.3; and 11.4) and expects to use the ANPR feedback to help determine whether there is a need for rulemaking and, if so, what its scope and content should be.

No work was done during this period; however, the NRC staff expects to issue the ANPR in fiscal year 2016. Several of the Tier 3 EP activities (9.1, 9.2, 9.3, with the exception of maintenance of ERDS capability throughout an accident, 9.4, 10.2, and 11.1) are being addressed through a consolidated rulemaking approved in SRM-SECY-14-0046.

Reactor Oversight Process Modifications to Reflect Recommended Defense-in-Depth Framework

This lessons learned activity originated from NTTF Recommendation 12.1 to expand the scope of the annual Reactor Oversight Process (ROP) self-assessment and biennial ROP realignment to include more fully any defense-in-depth considerations that might result from resolution of

NTTF Recommendation 1. In SRM-13-0132, "U.S. Nuclear Regulatory Commission Staff Recommendation for the Disposition of Recommendation 1 of the Near-Term Task Force Report" (ADAMS Accession No. ML14139A104), the Commission provided the following guidance regarding NTTF Recommendation 1:

> The objectives of Improvement Activities 1 [design-basis extension category] and 2 [defense-in-depth] should be reevaluated, as appropriate, in the context of the Commission direction on a long-term Risk Management Regulatory Framework (RMRF), more specifically, the proposed policy statement. Work on the RMRF and other interrelated activities should be treated outside the scope of the NRC's post-Fukushima actions. With these decisions, the Near-Term Task Force Report Recommendation 1 is closed.

Therefore, implementation of NTTF Recommendation 12.1 now depends on the RMRF, which is ongoing.

However, the NRC staff is identifying and evaluating improvements to the ROP based on insights from implementing a range of other internal lessons learned reviews and external audit activities. For example, NRC inspectors have identified areas for improvement in the inspection program—a key component of the ROP—as a result of conducting inspections to review licensee walkdowns of flooding-protection features. Feedback forms suggesting changes to flood-related (external) inspection procedures have been created and are being evaluated for potential procedure changes. As part of the existing ROP self-assessment and ROP realignment processes, insights gained from lessons learned activities (e.g., conducting Temporary Instructions to verify order compliance and responses to requests for information) will use the same process.

NRC Staff Training on Severe Accidents and Severe Accident Management Guidelines

This lessons learned activity originated from NTTF Recommendation 12.2 to enhance NRC staff training on severe accidents, including resident inspector training on severe accident management guidelines (SAMGs). Because the Onsite Emergency Response Capabilities rulemaking (Tier 1) is expected to require better integration of emergency procedures, including SAMGs, this activity partially depends on the final outcome of that rulemaking activity.

However, the NRC staff is working toward implementing several potential enhancements related to severe accident training:

(1) Increasing the frequency of severe accident courses, including exporting the courses to the regional offices;

(2) Updating courses with lessons learned from the Fukushima accident;

(3) Modifying existing qualification programs to include requirements for severe accident courses;

(4) Adding SAMG courses to qualification program training; and

(5) Developing new and additional courses that focus on severe accidents.

The NRC staff recognizes that additional changes could be developed as a result of the State-of-the-Art-Reactor Consequence Analysis (SOARCA) study, the ongoing Level 3 probabilistic risk-assessment (PRA) study, and any future Fukushima lessons learned insights.

While part of this activity depends on the outcome of the Mitigation of Beyond Design Basis Events rulemaking, the NRC staff currently has information on severe accidents and believes that increasing its knowledge in this area is beneficial.

The NRC staff has started holding a series of agencywide seminars on the state-of-the-art understanding of severe accidents. Presenters include at least two experts—an in-house expert and an external expert—to provide diverse perspectives to enable staff to more fully understand each severe accident phenomenon. The first seminar, held on March 6, 2014, used the SOARCA study and the Fukushima accident to walk through accident progression chronologically on a design-specific and scenario-specific basis. The second seminar, held on June 10, 2014, covered fission product release, transport, and deposition within the reactor coolant system, containment, and the surrounding buildings. More than 70 staff memebers from across the agency attended each seminar. The third seminar, held on October 7, 2014, covered severe accident induced steam generator tube rupture. More than 70 staff members from across the agency attended each seminar. The fourth seminar, planned for December 3, 2014, will cover steam explosions. Future seminars will be held quarterly, each covering one severe-accident phenomenon (e.g., hydrogen combustion or molten core/concrete interactions). Video recordings of the seminars are being added to iLearn for knowledge management purposes.

Basis of Emergency Planning Zone Size and Pre-Staging Potassium Iodide Beyond 10 Miles

These activities were not in the original NTTF report; however in SECY-11-0137, the NRC staff recommended that evaluating the basis of the Emergency Planning Zone (EPZ) size warranted further consideration.

The NRC staff remains confident that the EP programs in support of nuclear power plants provide an adequate level of protection of the public health and safety and that appropriate protective actions can and will be taken in the event of a radiological event. This includes evacuations as well as the use of potassium iodide (KI). Available information and studies from the Fukushima accident have not weakened the staff's position. Current size of EPZs provides reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at an existing nuclear power plant. Nonetheless, the staff plans to use insights from the NRC's Level 3 PRA project, as well as information obtained from the international organizations, to inform the resolution of this recommendation. The United Nations Scientific Committee on the Effects of Atomic Radiation is preparing a scientific report to assess the radiation doses and associated effects on health and the environment. Also, the Fukushima Prefecture launched the Fukushima Health Management Survey to investigate long-term low-dose radiation exposure caused by the accident. The World Health Organization is also conducting studies of the protective actions taken during the accident. Currently, the staff is

engaged with the Nuclear Energy Agency, International Atomic Energy Agency (IAEA), and scientific forums to actively study the impact of releases from Fukushima on public health, the use of KI, and thyroid disease. The staff will monitor the results of these efforts for applicability to the NRC's EP regulatory framework and guidance, including EPZ size and KI use.

Expedited Transfer of Spent Fuel to Dry Cask Storage

In SRM-COMSECY-13-0030, "Staff Requirements - Staff Evaluation and Recommendation for Japan Lessons Learned Tier 3 Issue on Expedited Transfer of Spent Fuel to Dry Cask Storage," dated May 23, 2014, the Commission agreed with the NRC staff's recommendation that this issue be closed. The Commission also directed the staff to complete the following related activities:

(1) Develop an Information Notice to inform licensees of the potential added safety benefit of adopting a "1 × 8" spent fuel pool (SFP) loading configuration;

(2) Modify the regulatory analysis to explain why the "1 × 8" configuration was not found to provide a substantial increase in safety;

(3) Evaluate whether to modify through amendment or errata the existing process for seismic-hazard reevaluation (Phase 1 of 10 CFR 50.54(f)) to eliminate the SFP evaluation step;

(4) Provide an information paper detailing staff's views and considerations regarding the treatment of limited-term operational vulnerabilities associated with the discharge of spent fuel from cores into pools; and

(5) Provide a technical overview of the operational and safety attributes of spent fuel rack designs used in other countries.

Items (2) and (5) have been completed. The rest of these activities are in progress.

Enhanced Reactor and Containment Instrumentation for Beyond-Design-Basis Conditions

During its review of the NTTF recommendations in SECY-11-0124 and SECY-11-0137, the Advisory Committee on Reactor Safeguards (ACRS) noted that Section 4.2 of the NTTF report discusses how the Fukushima operators faced significant challenges in understanding the condition of the reactors, containments, and SFPs because the existing design-basis instrumentation was either lacking electrical power or providing erroneous readings. As a result, an additional recommendation was developed to address the regulatory basis for requiring reactor and containment instrumentation to be enhanced to withstand beyond-design-basis accident conditions. This activity was prioritized as Tier 3 because it requires further staff study and depends on the outcome of other lessons learned activities. The program plan for this recommendation, "Enhanced Reactor and Containment Instrumentation," was detailed in SECY-12-0095.

The program plan for Enhanced Reactor and Containment Instrumentation outlined several steps needed to achieve a basis for a regulatory decision. The first step was to ensure that licensees appropriately consider instrumentation needs during implementation of actions for NTTF Recommendations 2.3, 4.1, and 8 and Orders EA-12-049, EA-12-051, and EA-13-109. Next, the current step is to obtain and review information from previous and ongoing research efforts for severe accident management analysis; to monitor the results of the U.S. Department of Energy (DOE) and international research activities; and to influence guidance being developed by domestic and international organizations. The NRC staff has performed, or is performing, the following tasks consistently with the plan. The staff has: (1) reviewed the DOE modeling of the Fukushima event, (2) met with DOE and the Electric Power Research Institute (EPRI) regarding research activities, (3) participated in the EPRI Working Group for Severe Accident Instrumentation, (4) participated in the development of the IAEA Nuclear Energy series of documents on accident instrumentation, (5) met with the American Nuclear Society Standards Board, and (6) interfaced with the Institute of Electrical and Electronics Engineers (IEEE) Standards Committee for IEEE-497, “Standard Criteria for Accident Monitoring Instrumentation for Nuclear Power Generating Stations.” In addition, the International Electrotechnical Commission standards organization has designated Working Group 9 under Subcommittee 45B to explore the publication of a possible joint-logo standard on accident monitoring with the IEEE-497 standard. At the July 2014 Nuclear Power Engineering Committee (NPEC) Meeting, the working group submitted the latest draft standard for consideration by the NPEC balloting committee.

The next task for this recommendation will be to analyze appropriate Tier 1 activities to review instrumentation needs formulations. In addition, the NRC staff will continue to work with the standards-development organizations to identify criteria for severe accident instrumentation, support IAEA in issuing its document on accident-monitoring instrumentation, and continue research collaboration with EPRI and DOE. The staff has also been requested to brief the ACRS in September 2014 regarding its findings to date.

Once the NRC staff has accumulated sufficient knowledge and data, regulatory action will be taken through the appropriate mechanism, such as rulemaking or generic communication for any safety-significant instrumentation performance gaps. The staff will also consider the endorsement of any appropriate industry standards addressing severe-accident instrumentation in its guidance documents (e.g., Regulatory Guide 1.97, “Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants”).

The NRC staff plans on making a regulatory determination by December 2015.

Update on Activities Not Within a Tier

Near-Term Task Force (NTTF) Recommendation 1 - Regulatory Framework

This lessons learned activity originated from NTTF Recommendation 1, to establish "a logical, systematic, and coherent regulatory framework for adequate protection that appropriately balances defense-in-depth and risk considerations." In the staff requirements memorandum (SRM) to SECY-11-0093, "Near-Term Report and Recommendations for Agency Actions Following the Events in Japan," dated August 19, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML112310021), the Commission directed that NTTF Recommendation 1 be pursued independently of activities associated with the review of the other NTTF recommendations.

On December 6, 2013, the U.S. Nuclear Regulatory Commission (NRC) staff sent to the Commission SECY-13-0132, "U.S. Nuclear Regulatory Commission Staff Recommendation for the Disposition of Recommendation 1 of the Near-Term Task Force Report" (ADAMS Accession No. ML13277A413). The SECY paper requested the Commission's approval of the staff's recommendation to move forward on three potential regulatory improvement activities to disposition NTTF Recommendation 1. These potential improvement activities were developed after evaluation of the considerations underlying the NTTF's recommendation and consideration of the Risk Management Task Force's recommendations for power reactors, and included:

(1) Establishing a new design-basis extension category of events and requirements and associated internal NRC guidance, policies, and procedures;

(2) Establishing Commission expectations for defense-in-depth through the development of a policy statement; and

(3) Clarifying the role of voluntary industry initiatives in the NRC regulatory process.

On May 19, 2014, the Commission issued SRM-SECY-13-0132 (ADAMS Accession No. ML14139A104), which disapproved the NRC staff's proposed improvement activities. The SRM also directed that:

(1) Objectives of Improvement Activities 1 and 2 should be reevaluated in the context of the Commission direction on a long-term Risk Management Regulatory Framework (RMRF);

(2) Enclosure 3 to SECY-13-0132, "Defense-in-Depth Observations and Detailed History," should be enshrined as an agency management tool and republished in other formats; and

(3) For Improvement Activity 3, the staff should evaluate the current status of implementation on the most risk- or safety-significant Type 2 initiatives and verify that these voluntary initiatives are being adequately implemented.

Work on the RMRF and other interrelated activities should be treated outside the scope of the NRC's post-Fukushima actions. The SRM concluded that the NTTF Recommendation 1 is closed.

Other NRC-Regulated Facilities

This lessons learned activity originated from the SRM to the Chairman's tasking memorandum COMGBJ-11-0002, "NRC Actions Following the Events in Japan," dated March 23, 2011 (ADAMS Accession No. ML110820875). The Commission directed the NRC staff to consider the applicability of lessons learned from the event to "non-operating reactor and nonreactor facilities."

The NRC staff has developed a process to evaluate the potential applicability of lessons learned activities to facilities other than power reactors. The NRC offices responsible for these classes of licensees have created working groups to perform the evaluations. The offices include the Office of Nuclear Reactor Regulation (NRR), the Office of Nuclear Material Safety and Safeguards (NMSS), and the Office of Federal and State Materials and Environmental Management Programs (FSME)[1], while the associated licensees include:

(1) NRR – Research reactors, test reactors, and medical isotope production facilities

(2) NMSS – Fuel cycle facilities and spent fuel storage and transportation

(3) FSME – Materials decommissioning facilities, decommissioning reactors, uranium-recovery and uranium-milling facilities, low level waste, waste treatment, irradiators, medical facilities, and academic and industrial-use licensees

As described in a previous update, the NRC staff has completed inspections at selected fuel facilities and the results were used to perform a systematic evaluation of the processes and regulations applicable to fuel facilities. The results of the evaluation allow the staff to conclude that the current regulatory approach and requirements of these licensees continue to serve as a basis for reasonable assurance of adequate protection of public health and safety. However, the staff identified generic issues regarding compliance with the current regulatory framework with regards to the treatment of certain natural phenomena events in the facilities' (uranium conversion, enrichment, and fuel fabrication) safety assessments. The staff is in the process of developing a generic letter to request information from licensees to verify that compliance is being maintained with regulatory requirements and license conditions regarding the treatment of natural phenomena events. The draft generic letter was issued on August 8, 2014, for a 90-day public comment period (ADAMS Accession No. ML13157A158). The generic letter is expected to be issued early-mid 2015.

The evaluations of each type of facility or licensee are currently underway. The NRC staff will document the results of each evaluation and expects to present the results to the Commission,

[1] NMSS and FSME were merged into one office on October 5, 2014. The new office will be named the Office of Nuclear Material Safety and Safeguards (NMSS). All functions of the current FSME will be retained in the new merged office.

along with a proposed path forward to address any identified issues, in a paper scheduled for the second quarter of fiscal year 2015.

National Academy of Sciences Study on Fukushima

On July 24, 2014, the National Academy of Sciences (NAS) published a report sponsored by the NRC entitled, "Lessons Learned from the Fukushima Nuclear Accident for Improving Safety and Security of U.S. Nuclear Plants." On July 31, 2014, the Chair and Vice-Chair of the study committee participated in a Commission meeting and presented a high-level overview of the report. The NRC staff is reviewing that report and the Commission will be informed of any new and significant information.

NAS has stated that because of unforeseen delays, the original charter for the study has been separated into two phases. The first phase has been completed, as noted above, and addressed the topics of the charter related to Fukushima lessons learned. The second phase of the study will address spent fuel safety and security issues and will be completed on a later schedule. The NRC staff is in the process of modifying the grant to allow for an extension and plans to provide additional funding to NAS for the completion of this study. The staff plans to separately inform the Commission of the modification of the grant, including the financial details.

Support of International Activities

The NRC staff continues to be actively engaged in various international activities related to the evaluation and response to lessons learned from the Fukushima Dai-ichi accident. The staff is participating in several working groups within the International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency (NEA) on efforts to better understand the accident and develop appropriate changes in nuclear power plants to improve their ability to cope with severe natural events.

From March 24, 2014, through April 4, 2014, a delegation from the U.S. participated in the 6th Convention on Nuclear Safety (CNS) in Vienna, Austria. The delegation was led by the NRC Chairman and included the NRC Executive Director for Operations and the President of the Institute of Nuclear Power Operations. The NRC staff also held two officer positions in the 6th CNS, which included 76 countries, as contracting parties to CNS. One full day of the convention was devoted to discussing lessons learned from the Fukushima Dai-ichi accident.

In March 2014, the NRC staff participated in an "International Experts' Meeting on Severe Accident Management in the Light of the Accident at the Fukushima Dai-ichi Nuclear Power Plant." The specific objectives of the meeting were to:

(1) Share improvements made to severe accident management programs following the Fukushima accident;

(2) Discuss the appropriate regulatory treatment of severe accident management;

(3) Discuss how to effectively train and equip operators to implement severe accident management guidelines (SAMGs);

(4) Identify any knowledge gaps related to the implementation of SAMGs and the ways to fill these gaps;

(5) Discuss linkages between onsite and offsite response plans during a severe nuclear accident; and

(6) Identify potential priority areas for research and development.

In April 2014, the NRC staff participated in development of an international technical document that details actions needed to cope with an extended loss of offsite and onsite alternating current power systems known as station blackout (SBO). The proposed document will establish guidelines to ensure that safe-shutdown conditions can be maintained at nuclear plants following an SBO event.

In April 2014, the NRC staff participated in an "International Workshop on Robustness of Electrical Systems of NPPs [nuclear power plants] in Light of the Fukushima Dai-ichi Accident," which was organized by the NEA's Committee on the Safety of Nuclear Installations (CSNI) Senior Task Group on the Robustness of Electrical Systems of NPPs.

In April 2014, the NRC staff participated as the U.S. member of consultancy group to revise IAEA Safety Guide NS-G-2.15 for severe accident management based on insights from the Fukushima Dai-ichi accident.

In April 2014, the NRC staff participated in a CSNI meeting to provide details on the United States' efforts (regulatory and industry) to develop requirements for protecting plants from external events that can result in an extended SBO.

In May 2014, the NRC staff briefed Japanese regulators on operating and new reactor assessments. The staff discussed actions taken by the NRC and the industry under Section B.5.b of Order EA-02-026, "Order for Interim Safeguards and Security Compensatory Measures," but did not share specific information contained in the NRC's detailed studies. The briefings included discussions on B.5.b assessments imposed on licensees by order and reviewed by staff, as well as mitigating strategies being implemented by the industry in response to the Fukushima event under Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML12054A735). Staff also explained, in general terms, the assessment being conducted for new reactor designs under Title 10, "Energy," of the *Code of Federal Regulations* 50.150, "Aircraft Impact Assessment."

In June 2014, the NRC staff attended the Working Group on Analysis and Management of Accidents (WGAMA) Coordinated Action Project (CAP) meeting on filtered containment venting systems and presented the NRC's input to the initial country-specific information requested by the WGAMA coordinator. WGAMA is one of the working groups of the CSNI of the Organisation for Economic Co-operation and Development (OECD). The WGAMA CAP activity was previously approved by CSNI based on the strong interest expressed by the OECD member countries on the subject of containment venting. The NRC is an active participant in the project.

In June 2014, the NRC staff participated in the 31st OECD/NEA Committee on Nuclear Regulatory Activities. During the meeting, CSNI presented the status of its Fukushima-related

research activities. An IAEA working group's draft "IAEA Fukushima Report" was presented by IAEA. NRC staff is participating in the IAEA working group.

In August 2014, Clinton Power Station, Unit 1, hosted an IAEA Operational Safety Review Team (OSART) mission. OSART is an international peer review of IAEA standards that provides an independent check of plant operations. One review area of the Clinton OSART mission was severe accidents, for which, in part, Fukushima lessons learned were considered. NRC has maintained oversight of the mission for any potential safety issues, violations, or NRC improvement opportunities. NRC's oversight included periodic debriefings from the OSART team and management attendance at the entrance and exit meetings. The draft report of the mission was issued in September 2014.

Bilateral exchanges have continued to include Fukushima lessons learned as a topic of discussion. In particular, bilateral meetings have been held with Japan and a French bilateral steering committee meeting was held in Paris, France.

Communications Activities

The NRC staff held over 30 public meetings from March 2014 to August 2014 related to lessons learned from the Fukushima Dai-ichi accident. Most of these meetings enabled wider public participation through webinars, webcasting, and teleconferencing. Many of these meetings centered on guidance development or implementation issues related to Tier 1 actions. Additionally, the NRC Steering Committee has continued to meet publicly with the industry's steering committee to discuss and resolve issues related to lessons learned activities. The staff expects these meetings and interactions to continue during and after transition of oversight to the line organizations.

In the last 6 months, the Japan Lessons Learned Division's strategic communications team has evaluated and implemented tools for enhancing stakeholder understanding of lessons learned activities. For example, the strategic communications team, in coordination with the appropriate technical staff and project managers, developed an extensive communication plan concerning the screening and prioritization of the seismic hazard reevaluations for plants in the Central and Eastern U.S. As part of the implementation of that communication plan, the team hosted a question-and-answer session for regional Public Affairs Officers and State Liaison Officers. The strategic communications team was also involved in the public release of the seismic hazard curves. The communications team will continue examining communication needs and developing relevant tools, with a focus on upcoming events and milestones.

Overview of Fukushima-Related Recommendations and Related Activities

The Near Term Task Force (NTTF) Report, "Recommendations for Enhancing Reactor Safety in the 21st Century" (Agencywide Document Access and Management System Accession No. ML112510271), provided an integrated assessment of possible improvements to the U.S. Nuclear Regulatory Commission's (NRC's) requirements to address lessons learned from the accident at the Fukushima Dai-ichi nuclear power plant in March 2011. The report describes measures to improve safety using the NRC's defense-in-depth philosophy by ensuring protection from external events, improving plants' capabilities to mitigate accidents, and enhancing emergency preparedness.

The NRC staff and Commission assessed the various recommendations in the NTTF report, prioritized and developed plans for the recommendations, and assigned tasks to different organizations within the agency. However, interactions with various internal and external stakeholders, including international organizations, occasionally involve questions on the overall NRC response and how the various activities work together as part of the NRC's defense-in-depth approach to nuclear reactor safety.

This enclosure provides information not only on the status of NRC activities, but also the outcome sought from each activity. Table 1 provides information on the status of activities in terms of the various steps in the regulatory process (e.g., assessment, decisionmaking, regulatory action, implementation, inspection). The table organizes the activities by outcome instead of only by the numbering system used by the NTTF for its recommendations.

Table 1 - Status Summary of Japan Lessons Learned Activities

ITEM	NTTF, Tier, and Notes	PROCESS STEP (Completion Dates)			
		Identify, Gather Information, and Assess	Deliberate and Decide	Regulatory Action	Licensee Actions
Require Confirmation of Compliance with Current Requirements (Seismic and Flooding)					
Perform seismic- and flood-protection walkdowns to verify compliance with existing seismic and flooding design bases.	NTTF 2.3 Tier 1 (Note 1)	Complete	Complete	Complete	Complete
Require Plant Changes to Improve Accident Mitigation					
Provide a three-phase approach for mitigating beyond-design-basis external events.	NTTF 4.2 Tier 1	Complete	Complete	Complete	2016 (Ongoing)
Provide a reliable indication of water level in spent fuel storage pools.	NTTF 7.1 Tier 1	Complete	Complete	Complete	2016 (Ongoing)
Provide a reliable hardened containment vent system for boiling-water reactor (BWR) Mark I and II containments.	NTTF 5.1 Tier 1 (Note 2)	Complete	Complete	Complete	2018 (Phase 1) 2019 (Phase 2)
Revise containment venting systems for BWR Mark I and II containments to address severe accident conditions.	3/19/13 staff requirements memorandum (SRM) Tier 1 (Note 2)	Complete	Complete	Complete	

Require licensees to provide reliable spent fuel pool makeup capabilities.	NTTF 7.2 through 7.5 Tier 2 (Note 3)	Complete	Complete	Complete	Incorporated in mitigating strategies
Rulemaking to codify requirements for capability to maintain plant safety throughout a prolonged station blackout (SBO) through mitigating strategies implemented above.	NTTF 4.1 Tier 1 (Note 4)	Complete	Complete	2016 (Ongoing)	N/A; codifies mitigating-strategies order

ITEM	NTTF, Tier, and Notes	PROCESS STEP (Completion Dates)			
		Identify, Gather Information, and Assess	Deliberate and Decide	Regulatory Action	Licensee Actions
Require Plant Procedure Changes to Improve Accident Management					
Require integration of onsite emergency response processes, procedures, training, and exercises.	NTTF 8 Tier 1 (Note 5)	Complete	Complete	2016 (Ongoing)	To Be Determined (TBD)
Require Offsite Emergency-Preparedness Improvements					
Perform a staffing study for responding to multiunit events, evaluate enhancements that would be needed to power communications equipment throughout a prolonged SBO, and inform the NRC of the results.	NTTF 9.3 (partial) Tier 1 (Note 6)	Complete	Complete	Complete	Incorporated in mitigating strategies
Complete the Emergency Response Data System (ERDS) modernization initiative by June 2012 to ensure multiunit site monitoring capability.	NTTF 9.4 Tier 1 (Note 17)	Complete	Complete	Complete	Complete
Require a revision to the emergency plan to address multiunit dose assessments, periodic training and exercises for multiunit and prolonged SBO scenarios, and drills on identification and acquisition of offsite resources, as well as to ensure sufficient emergency preparedness (EP) resources for multiunit and prolonged SBO scenarios.	NTTF 9.3 (partial) Tier 2 (Note 7)	Complete	Complete	Complete	These items were either accomplished separately (e.g., multi-unit dose assessment) or incorporated in mitigating strategies

ITEM	NTTF, Tier, and Notes	PROCESS STEP (Completion Dates)			
		Identify, Gather Information, and Assess	Deliberate and Decide	Regulatory Action	Licensee Actions
Certain Tier 1, 2, and 3 EP activities (9.1, 9.2, 9.3 (with the exception of maintenance of ERDS capability throughout an accident), 9.4, 10.2, and 11.1) are being addressed through a consolidated rulemaking	SRM-COMSECY-14-0046	Complete	Complete	2016 (Ongoing)	TBD as part of rule implementation

Studies and Assessments					
ITEM	**NTTF, Tier, and Notes**	**PROCESS STEP (Completion Dates)**			
		Identify, Gather Information, and Assess	**Deliberate and Decide**	**Regulatory Action**	**Licensee Actions**
Studies and Assessments: External Hazards					
Reevaluate seismic and flooding hazards against current requirements and guidance and update the design basis. Take appropriate regulatory action to resolve issues associated with updated site-specific hazards.	NTTF 2.1 Tier 1 (Note 8)	2014–2015 (Central and Eastern U.S. Sites have submitted the hazard reevaluation)	TBD	TBD	TBD
Reevaluate other natural external hazards against current requirements and guidance and update the design basis. Take appropriate regulatory action to resolve issues associated with updated site-specific hazards.	Tier 2 (Note 9)	To be coordinated with seismic and flooding reevaluations (NTTF 2.1)	TBD	TBD	TBD
Periodic confirmation of seismic and flooding hazards.	NTTF 2.2 Tier 3 (Note 10)	To be coordinated with seismic and flooding reevaluations (NTTF 2.1)	TBD	TBD	TBD
Potential enhancements to the capability to prevent or mitigate seismically-induced fires and floods.	NTTF 3 (partial) Tier 3 (Note 11)	Awaiting development of analysis tool	TBD	TBD	TBD

ITEM	NTTF, Tier, and Notes	PROCESS STEP (Completion Dates)			
		Identify, Gather Information, and Assess	Deliberate and Decide	Regulatory Action	Licensee Actions
Studies and Assessments: Severe-Accident Containment Performance					
Assess filtration and additional severe-accident performance requirements for BWR Mark I and Mark II containments.	3/19/13 SRM Tier 3 (Note 12)	2014	2017	TBD	TBD
Reliable hardened vents for other containment designs.	NTTF 5.3 Tier 3	To be coordinated with BWR Mark I/II activities (above)	TBD	TBD	TBD
Hydrogen control and mitigation inside containment or in other buildings.	NTTF 6 Tier 3	To be coordinated with BWR Mark I/II activities (above)	TBD	TBD	TBD
Reactor and containment instrumentation capable of withstanding beyond-design-basis conditions.	Advisory Committee on Reactor Safeguards item Tier 3	TBD	TBD	TBD	TBD
Studies and Assessments: Offsite Emergency Preparedness					
EP enhancements for prolonged SBO and multiunit events.	NTTF 9–11 Tier 3 (Note 13,18)	TBD	TBD	TBD	TBD
ERDS capability.	NTTF 9–11 Tier 3 (Note 13, 18)	TBD	TBD	TBD	TBD
Additional EP topics for prolonged SBO and multiunit events.	NTTF 9–11 Tier 3 (Note 13,18)	TBD	TBD	TBD	TBD

ITEM	NTTF, Tier, and Notes	PROCESS STEP (Completion Dates)			
		Identify, Gather Information, and Assess	Deliberate and Decide	Regulatory Action	Licensee Actions
EP topics for decisionmaking, radiation monitoring, and public education.	NTTF 9–11 (Note 13,18)	TBD	TBD	TBD	TBD
Basis of emergency planning zone size.	Staff item Tier 3 (Note 14)	Awaiting Level 3 Probabilistic Risk Assessment (PRA)	TBD	TBD	TBD
Pre-staging of potassium iodide beyond 10 miles.	Staff item Tier 3 Note 14	Awaiting international studies	TBD	TBD	TBD
Studies and Assessments: Spent Fuel Management					
Expedited transfer of spent fuel to dry cask storage.	Staff item Tier 3 (Note 15)	Complete COMSECY-13-0030	Complete SRM 5/2014	Not Applicable	
NRC Improvements					
Reactor Oversight Process modifications to reflect the recommended defense-in-depth framework.	NTTF 12.1 Tier 3	Note 16	TBD	TBD	TBD
Staff training on severe accidents and resident inspector training on severe-accident management guidelines.	NTTF 12.2 Tier 3	Complete	TBD (Note 19)	TBD	TBD
Other					
Related to NTTF 2.1, 2.3, 4.1, and 4.2. Include ultimate heat sink (UHS) systems in hazard reevaluations and walkdowns, include loss of UHS as a design assumption in conjunction with strategies for dealing with prolonged SBO, and	Note	Complete	Complete	Complete	Complete

ITEM	NTTF, Tier, and Notes	PROCESS STEP (Completion Dates)			
		Identify, Gather Information, and Assess	Deliberate and Decide	Regulatory Action	Licensee Actions
address loss of access to normal UHS in conjunction with measures taken to deal with beyond-design-basis external hazards.					
Develop improved regulatory framework to better address beyond-design-basis events.	NTTF 1 Tier 3 (Note 16)	Complete SECY-13-0132	Complete SRM 5/2014 (refer to Risk Management Regulatory Framework (RMRF))	Not Applicable	

NOTES FOR TABLE 1

Note 1 Licensees have completed the walkdowns and submitted the required reports. Discrepancies found during the walkdowns were entered in licensee corrective action programs to be addressed commensurate with the safety significance of the finding. The NRC staff is performing inspections and follow-up activities as part of the normal reactor oversight process.

Note 2 The NRC staff issued Order EA-13-109, "Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation under Severe Accident Conditions," to supersede the original order (EA-12-050, "Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents"), as directed by the Commission following SECY-12-0157 (i.e., to make the venting systems capable of operation during severe accident conditions).

Note 3 As discussed in COMSECY-13-0002 and the related SRM, these items are addressed by and are being incorporated into the mitigating-strategies activities (NTTF 4.2).

Note 4 As discussed in COMSECY-13-0002 and the related SRM, the primary vehicle to impose regulatory requirements and achieve the desired changes to plants is the mitigating-strategies order (EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events"). This rulemaking will incorporate the requirements in NRC regulations and will benefit from lessons learned during the implementation of the order. Some licensees may need to review and possibly modify structures, systems, and components or strategies as part

of implementing the rule if reevaluations of external hazards under Recommendation 2.1 result in changes to the functional requirements from those used to develop and implement plans for Order EA-12-049.

Note 5 The NRC staff has consolidated the Station Blackout Mitigation Strategies rulemaking with the Onsite Emergency-Response Capabilities rulemaking, as well as the portions of NTTF Recommendations 9, 10, and 11 that are already being addressed as part of the Mitigating Strategies Order (NRC Order EA-12-049) implementation (NTTF Recommendation 4.2), NTTF Recommendation 8, and items already being implemented by industry, in accordance with SRM-COMSECY-14-0046. The combined rulemaking will now be referred to as the Mitigation of Beyond-Design-Basis Events rulemaking.

Note 6 The communications assessments and Phase I staffing assessments are complete. Phase II staffing assessments are still currently underway. The final licensee response is to be coordinated with completion of mitigating strategies activities (in 2016).

Note 7 Multi-unit/source dose assessment capability plans were previously submitted to the NRC staff for review. All licensees intend to have this capability by the end of 2014. This capability, including associated training and procedures, will be confirmed through inspection. This item is also included in the combined rulemaking approved by SRM-COMSECY-14-0046.

Note 8 The reevaluations of seismic and flooding hazards required by the NRC requests for information to all U.S. plants are being completed in various steps and phases that depend on the locations and initial assessments of the external hazards. In some cases, the reevaluations might lead to additional analyses such as PRA. Plant-specific schedules are being developed for the reevaluation activities. The need for regulatory actions might likewise be decided on a plant-specific basis.

Note 9 The need to reevaluate other external hazards (beyond seismic and flood) was also identified in the Consolidated Appropriations Act, 2012 (Public Law 112-074, dated December 23, 2011).

Note 10 The need to consider periodic assessments of external hazards is also identified in the Consolidated Appropriations Act, 2012. This activity is awaiting insights from the reevaluations of the seismic and flooding hazards (NTTF 2.1).

Note 11 Although further study of seismically-induced fires and floods has been deferred because of resource limitations, the NRC staff is developing the necessary tools to help in these assessments. The development of the analytical tools was identified as a Tier 1 item.

Note 12 In accordance with the SRM for SECY-12-0157, the NRC staff is preparing a Commission paper to provide a technical analysis of possible approaches to reducing releases from Mark I and Mark II containments following core-damage events and might subsequently provide a proposed rule and a final rule within 4 years of the memorandum (by 2017).

Note 13 This item and the following items in the table relate to possible enhancements to the regulatory requirements for offsite EP. An advance notice of proposed rulemaking is planned for 2016. The items to be addressed by the advance notice of proposed rulemaking are discussed in enclosure 3, “Activities Related to Emergency Preparedness”.

Note 14 The evaluation of possible changes to the emergency planning zones around nuclear power plants is awaiting additional information expected from a level 3 PRA currently being developed for the Vogtle Nuclear Power Plant. This evaluation, as well as the following one on potassium iodide, will also benefit from the continuing collection of information and insights from the Fukushima accident as well as information from international organizations. See Enclosure 3 for details.

Note 15 In SRM-COMSECY-13-0030, the Commission approved the staff’s recommendation that this issue be closed.

Note 16 In SRM-SECY-13-0132, the Commission provided the following guidance regarding NTTF Recommendation 1: “The objectives of Improvement Activities 1 and 2 should be reevaluated, as appropriate, in the context of the Commission direction on a long-term RMRF, more specifically, the proposed policy statement. Work on the RMRF and other interrelated activities should be treated outside the scope of the NRC’s post-Fukushima actions. With these decisions, the Near-Term Task Force Report Recommendation 1 is closed.”

Note 17 While industry action is already complete, NTTF 9.4 is to be included as part of the consolidated rulemaking activity (SRM-COMSECY-14-0046).

Note 18 Several of the Tier 3 EP activities (9.1, 9.2, 9.3 (with the exception of maintenance of ERDS capability throughout an accident), 9.4, 10.2, and 11.1) are being addressed through a consolidated rulemaking approved in SRM-SECY-14-0046.

Note 19 Some severe accident training is underway, but the majority of the work on this recommendation is to be determined. See Enclosure 3.