

POLICY ISSUE INFORMATION

February 14, 2013

SECY-13-0020

FOR: The Commissioners

FROM: R. W. Borchardt */RA MJohnson for/*
Executive Director for Operations

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

PURPOSE:

The purpose of this paper is to provide the U.S. Nuclear Regulatory Commission (NRC) staff's third 6-month status update on charter activities related to lessons learned from Japan's March 11, 2011, Great Tōhoku Earthquake and subsequent tsunami. This paper does not address any new commitments or resource implications.

BACKGROUND:

In Staff Requirements Memorandum (SRM)-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, the Commission approved the staff's plans to conduct a longer-term review of the events in Japan (Agencywide Documents Access and Management System (ADAMS) Accession No. ML112920034). The charter requires, among other things, status updates every 6 months on the work conducted under the charter. The 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, "Tier 3 Program Plans and 6-Month Status Update in Response to Lessons Learned from Japan's March 11, 2011, Great Tōhoku Earthquake and Subsequent Tsunami," dated July 13, 2012 (ADAMS Accession No. ML12165A092). This is the staff's third 6-month status update, which covers July 2012 to January 2013.

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In SECY-11-0137, "Prioritization of Recommended Actions To Be Taken in Response to Fukushima Lessons Learned," dated October 3, 2011 (ADAMS Accession No. ML11272A111), the staff prioritized the Near-Term Task Force (NTTF) recommendations listed in SECY-11-0093, "Near-Term Report and Recommendations for Agency Actions Following the Events in Japan" (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. Assessments and program plans for the Tier 3 items, along with six additional issues identified in SECY-11-0137, were provided in SECY-12-0095.

On March 12, 2012, the NRC issued three orders and a request for information (RFI) to licensees related to Tier 1 items (ADAMS Accession Nos. ML12054A735, ML12054A694, ML12054A679, and ML12053A340). Implementation of these regulatory actions has remained a primary focus of the staff's effort since the last 6-month update; however, the staff also has continued to pursue implementation and resolution of other recommendations. This paper provides an update of Tier 1 and Tier 2 activities. Enclosure 1 provides an update on Tier 3 activities, including items added through the Additional Issues process (described in SECY-12-0025). Enclosure 2 provides an update on activities that are not within a Tier. Finally, Enclosure 3 provides a table summarizing the status of all Tier 1, 2, and 3 activities being addressed as lessons learned from Japan's Great Tōhoku Earthquake and tsunami.

DISCUSSION:

The staff continues its work on Tier 1, Tier 2, and Tier 3 activities consistent with the schedules established in SECY-11-0137, SRM-SECY-11-0124, "Staff Requirements—SECY-11-0124—Recommended Actions To Be Taken without Delay from the Near-Term Task Force Report," SRM-SECY-12-0025, and SECY-12-0095. Safety enhancements at nuclear power plants are being realized as implementation continues. For example, issues identified during walkdowns of structures, systems, and components that protect against seismic and flooding hazards are being corrected through licensee corrective action programs, and resolution is being monitored by the NRC's resident inspectors through the normal Reactor Oversight Process. Licensees have also procured many pieces of additional equipment that can be used to mitigate a prolonged station blackout. The staff also has maintained a high level of stakeholder engagement, conducting 82 public meetings in fiscal year (FY) 2012. The staff successfully performed these actions while ensuring that its efforts did not displace ongoing work of greater safety benefit, work that is necessary to maintain safety, or other existing high-priority work.

Tier 1 Activities

Orders Issued on March 12, 2012

On March 12, 2012, the staff issued three immediately effective orders to power reactor licensees and holders of construction permits.¹ The staff issued these orders in response to SRM-SECY-12-0025:

¹ For the combined license issued for Virgil C. Summer Units 2 and 3 on March 30, 2012, the NRC issued Order EA-12-051 in parallel, along with license conditions that address the applicable requirements of EA-12-049.

- EA-12-049, “Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events”
- EA-12-050, “Order Modifying Licenses with Regard to Reliable Hardened Containment Vents”
- EA-12-051, “Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation”

In the last 6-month update (Enclosure 1 to SECY-12-0095), the staff informed the Commission that the draft interim staff guidance (ISG) for all three orders was issued on May 31, 2012, for a 30-day public comment period. The staff subsequently reviewed, considered, and dispositioned the comments, which resulted in modifications to the guidance in some cases. The staff’s response to all public comments is referenced within each of the final ISGs, which were issued on August 29, 2012. The final ISGs provide details on acceptable approaches for complying with the requirements of the orders:

- JLD-ISG-2012-01, “Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events” (ADAMS Accession No. ML12229A174)
- JLD-ISG-2012-02, “Compliance with Order EA-12-050, Reliable Hardened Containment Vents” (ADAMS Accession No. ML12229A475)
- JLD-ISG-2012-03, “Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation” (ADAMS Accession No. ML12221A339)

The orders require each licensee to submit an update on the status of implementation of the orders every 6 months. The first set of status reports was received in October 2012. The staff reviewed the reports and issued a memorandum to the Deputy Executive Director for Reactor and Preparedness Programs that summarized its reviews (ADAMS Accession No. ML12338A186). The staff found that all licensees appear to be making appropriate progress and are on track to meet the requirements of the orders within the required timeframe.

Request for Information

On March 12, 2012, the staff issued an RFI to power reactor licensees and holders of construction permits requesting them to provide additional information to support the NRC staff’s evaluation of regulatory actions to be taken in response to lessons learned from Japan’s March 11, 2011, Great Tōhoku Earthquake and subsequent tsunami.² The request addressed the following:

² The applicable parts of this RFI relating to emergency preparedness were issued to Virgil C. Summer Units 2 and 3 on April 13, 2012.

- (1) seismic and flooding hazard walkdowns that will identify and address degraded, nonconforming, or unanalyzed conditions through the corrective action program and verify the adequacy of the monitoring and maintenance procedures;
- (2) reevaluations of seismic and flooding hazards at operating reactor sites that will facilitate the NRC's determination of whether design bases for structures, systems, and components important to safety should be updated; and
- (3) the adequacy of power supplies for communication systems, and the sufficiency of emergency preparedness staffing to fill all necessary positions during a multiunit event.

Seismic and Flooding Hazard Walkdowns

During summer and fall 2012, licensees conducted seismic and flooding hazard walkdowns and submitted the final walkdown reports to the NRC by the end of November 2012. Degraded, nonconforming, or unanalyzed conditions identified during the walkdowns were entered into the licensee's corrective action program, and NRC inspectors are monitoring the resolution under the Reactor Oversight Process.

The NRC inspectors independently verified a sampling of the walkdowns to determine if the licensees conducted them in accordance with NRC-endorsed guidance. The inspectors have also conducted walkdowns independent of the licensees. Some of these independent inspector walkdowns are still ongoing at some sites. The NRC issued the following inspection guidance to aid inspectors in conducting independent verifications:

- Temporary Instruction 2515/187, "Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns," issued June 27, 2012 (ADAMS Accession No. ML12129A108)
- Temporary Instruction 2515/188, "Inspection of Near-Term Task Force Recommendation 2.3 Seismic Walkdowns," issued July 6, 2012 (ADAMS Accession No. ML12156A052)

NRC staff and contractors are reviewing the walkdown reports. Any questions or concerns identified will be addressed by requests for additional information and site audits conducted in the spring and early summer. The audits are expected to be conducted at approximately 20 sites total (10 sites for seismic and 10 sites for flooding) based on the staff's need for further engagement with the licensees. The staff is aware that most plants have identified delayed walkdown items, primarily due to inaccessibility, that will need to be walked down at a future scheduled outage to complete the process.

For the flooding walkdowns, it appears all licensees have complied with the walkdown guidance and approximately 85 percent have identified only minor discrepancies that required entry into licensee corrective action programs. A few plants have identified issues that the staff views as potentially significant, and these concerns are being addressed by licensees in a timely manner commensurate with their potential significance using existing regulatory processes (e.g., oversight of problem identification and resolution, operability determinations, functional

assessments, and reportability requirements per 10 CFR 50.9 and 50.72). Examples of identified issues are 1) procedures that do not appear to be feasible; 2) temporary flood protection that would not perform as planned; and 3) permanent flood protection features that were degraded or missing. These issues are being evaluated by NRC staff through the Reactor Oversight Process.

For the seismic walkdowns, the staff has at this stage confirmed most licensees have complied with the walkdown guidance and approximately 90 percent of plants had only minor discrepancies that required entry into licensee corrective action programs. At this time, no significant safety issues have been reported, and only one noteworthy deviation from the walkdown guidance has been reported by NRC resident inspectors.

Seismic and Flooding Hazard Reevaluations

The staff has issued the following guidance documents related to the seismic and flooding hazard reevaluations and risk assessments:

- JLD-ISG-2012-04, "Guidance on Performing a Seismic Margin Assessment in Response to the March 2012 Request for Information Letter," Interim Staff Guidance, Revision 0, dated November 16, 2012 (ADAMS Accession No. ML12286A029)
- JLD-ISG-2012-05, "Guidance for Performing the Integrated Assessment for External Flooding," Interim Staff Guidance, Revision 0, dated November 30, 2012 (ADAMS Accession No. ML12311A214)
- JLD-ISG-2012-06, "Guidance for Performing a Tsunami, Surge, or Seiche Hazard Assessment," Interim Staff Guidance, Revision 0, dated January 4, 2013 (ADAMS Accession No. ML12314A412)

The NRC staff previously issued its prioritization for plants to complete the flooding hazard reevaluations within 1, 2, or 3 years of the RFI date. The plants prioritized into the first category are due March 12, 2013. Upon receipt, the staff will review the reevaluated hazards and issue a safety assessment for each site. The first submittals of seismic hazard reevaluations will be from plants in the central and eastern United States. These are due to the NRC in September 2013. The staff will similarly review the seismic reevaluations and issue a safety assessment for each plant.

EP Communications and Staffing

In accordance with the March 12, 2012, RFI letter, licensees were given an opportunity to provide an alternative course of action for the requested information if they could not meet the requested response date. All of the licensees supplied an alternative course for the response to the RFI regarding communications and staffing, and included a proposed response schedule. The staff reviewed and accepted the licensees' alternate approaches and schedules. Licensees provided a 90-day response on interim actions, staff notification, and methods to access the site. The staff reviewed and accepted the 90-day responses.

On October 31, 2012, the licensees supplied the first part of their communications response regarding the assessment of their communications capability for a multiunit prolonged station blackout event. The staff identified eight items generic to the submittals and requested that licensees clarify these issues. The eight items centered around maintaining power, establishing interim actions, communications with offsite response organizations, quality assurance checks of equipment, reasonably protecting equipment, procedures, assumptions, and 24-hour capability. The staff held a public meeting on January 3, 2013, with stakeholders to address the eight items, with the expectation that the licensees will supplement their October 31, 2012, communications submittal.

The licensees are expected to provide the first part of their staffing assessments regarding the staff needed to respond to a multiunit prolonged station blackout event by April 30, 2013. Since the remaining portions of the staffing and communications request will depend on the details of the mitigation strategies being developed to address order EA-12-049, the staff expects to receive these dependent portions of the assessments 4 months before the second refueling outage at each site (i.e., 4 months before each site completes full implementation of order EA-12-049).

Additional Performance Requirements for Hardened Containment Vent Systems

On November 26, 2012, the staff provided SECY-12-0157, "Consideration of Additional Requirements for Containment Venting Systems for Boiling-Water Reactors with Mark I and Mark II Containments" (ADAMS Accession No. ML12325A704), to the Commission. The paper provided options and a staff recommendation for additional performance requirements for hardened containment vent systems, including operability during severe accidents and the addition of filters. The staff will carry out the Commission's decision once an SRM is issued.

Rulemaking for Station Blackout (SBO)

On January 25, 2013, the staff sent COMSECY-13-0002, "Consolidation of Japan Lessons Learned Near-Term Task Force Recommendations 4 and 7 Regulatory Activities" (ADAMS Accession No. ML13011A034), to the Commission. In it, the staff requested approval to consolidate regulatory activities associated with NTTF Recommendations 4 (SBO mitigation capability) and 7 (spent fuel pool instrumentation and makeup capability) into a single rulemaking to be henceforth called "Station Blackout Mitigating Strategies." The request included a schedule adjustment to enable the rulemaking activity to be informed by implementation of the mitigating strategies order (EA-12-049).

The rationale for this request is that the requirements already imposed on power reactor licensees by the mitigating strategies order (EA-12-049) address many of the safety significant elements stemming from NTTF Recommendations 4.1 and 4.2, as well as Recommendation 7. The staff believes this obviates the need to accelerate the rulemaking for safety reasons. Therefore, the staff believes consolidation of these regulatory activities, along with a schedule adjustment for development of the rule, will allow for an improved rulemaking process that enables consideration of feedback on lessons learned from implementation of the mitigating strategies order. This approach would also be responsive to Commission direction in SRM-M120807B (issued following a Commission meeting on August 7, 2012) to ensure that

potential failures or challenges to the implementation of the mitigating strategies are identified and resolved appropriately.

Rulemaking for Onsite Emergency Response Procedures

In SRM-SECY-11-0137, the Commission approved the staff's proposed prioritization and recommendation for NTTF Recommendation 8 to strengthen and integrate onsite emergency response capabilities, such as emergency operating procedures, severe accident mitigation guidelines, and extensive damage mitigation guidelines. As the first step in the rulemaking process, the NRC issued an advance notice of proposed rulemaking (ANPR) (*77 Federal Register* (FR) 23161, April 18, 2012). After receiving stakeholder comments in response to the ANPR, the NRC issued a draft regulatory basis (78 FR 1154, January 8, 2013) for a 45-day comment period. The draft regulatory basis identifies regulatory deficiencies in onsite emergency response capabilities and proposes revised regulatory approaches to address these deficiencies.

During preparation of the draft regulatory basis, the staff described a lack of regulatory requirements in severe accident management guidelines and supporting procedures. Furthermore, the staff determined that accident mitigating strategies are scattered throughout several sets of procedures developed through separate initiatives with minimal integration of the procedures to ensure cohesion and effectiveness. Additionally, no regulatory requirements exist for the training and qualification, exercises, or command and control structures associated with severe accidents.

The draft regulatory basis recommends developing a proposed rule that would require the licensees to integrate accident mitigating procedures, identify requirements for a severe accident command and control organization, and amend current rules for training and emergency exercises to include requirements related to severe accidents.

The staff held a public meeting on January 31, 2013, to give the public an opportunity to ask questions about the draft regulatory basis and an opportunity to exchange information on the proposed regulatory approach. The staff briefed the Advisory Committee on Reactor Safeguards (ACRS) on the draft regulatory basis on February 6, 2013. The public comment period on the draft regulatory basis will close on February 22, 2013. The final regulatory basis is scheduled to be completed by May 2013. The NTTF Recommendation 8 proposed rule is due July 2014, and the final rule is due in February 2016.

Probabilistic Risk Assessment (PRA) Methodology for Seismically Induced Fires and Floods

In SRM-SECY-11-0137, the Commission directed the staff to initiate a probabilistic risk assessment (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, consistent with the program plan in SECY-12-0095 for NTTF Recommendation 3, 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 staff supplied the following schedule and milestones to address Recommendation 3 for seismically induced fires and floods:

- Continue development of PRA methodology for seismically induced fires and floods. This will include two main subtasks:
 - (1) engagement with PRA standards development organizations to develop the technical elements and standards for the PRA method (ongoing)
 - (2) completion of a feasibility scoping study to evaluate PRA approaches for assessing multiple concurrent events (December 2014)
- Reevaluate Recommendation 3 based on information obtained from Tier 1 activities and PRA method development activities as well as recommend further activities (December 2016).

The staff continues to engage the American Society of Mechanical Engineers/American Nuclear Society (ASME/ANS) Joint Committee on Nuclear Risk Management (JCNRM) to support formation of an informal working group to consider future standards development activities associated with concurrent initiating events, such as seismically induced fires and floods. Additionally, the staff recently met with representatives from ANS during a November 30, 2012, public meeting to discuss the staff's interest in working with ASME/ANS JCNRM to better define the technical attributes of a PRA method for seismically induced fires and floods. Although standards activities in this area have not been formalized, the staff plans to continue to engage standards organizations to effectively leverage stakeholders' expertise and to better focus future method development efforts.

Although staff resources for conducting a feasibility study to investigate methods for addressing multiple concurrent events are extremely limited because of conflicts with higher priority work (e.g., the level 3 PRA project directed by SRM-SECY-11-0089, "Options for Proceeding with Future Level 3 Probabilistic Risk Assessment (PRA) Activities," dated September 21, 2011, and development of risk tools to support the reactor oversight process), the staff has issued a request for proposal to obtain contractor assistance for this work. The staff expects to initiate work under this new contract in early 2013.

Finally, the staff continues 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 Recommendation 3.

Consideration of Loss of Ultimate Heat Sink

As described in the previous 6-month update, the staff prioritized the additional issue of loss of ultimate heat sink as a Tier 1 activity, which has been subsumed as part of other ongoing Tier 1 actions. There have been no changes to this approach.

Tier 2 Activities

Spent Fuel Pool Instrumentation and Makeup Capability

In SECY-11-0093, dated July 12, 2011, the NTTF recommended the following for spent fuel pool instrumentation and makeup capability:

- Recommendation 7.2 Order licensees to provide safety-related alternating current (ac) electrical power for the spent fuel pool makeup system.
- Recommendation 7.3 Order licensees to revise their technical specifications to address requirements to have one train of onsite emergency electrical power operable for spent fuel pool makeup and spent fuel pool instrumentation when there is irradiated fuel in the spent fuel pool, regardless of the operational mode of the reactor.
- Recommendation 7.4 Order licensees to have an installed seismically qualified means to spray water into the spent fuel pools, including an easily accessible connection to supply the water (e.g., using a portable pump or pumper truck) at grade outside the building.
- Recommendation 7.5 Initiate rulemaking or licensing activities or both to require the actions related to the spent fuel pool described in detailed recommendations 7.1–7.4.

As noted in SECY-11-0137, and approved by the Commission in the associated SRM, the staff prioritized these four recommendations as Tier 2 activities and proposed to initiate a rulemaking to address them. As also noted in SECY-11-0137, this rulemaking was proposed to be initiated after consideration of insights from (1) the RFIs and any subsequent regulatory action (e.g., orders) related to seismic and flooding hazard reevaluations (NTTF Recommendation 2.1), (2) ongoing rulemaking activities for prolonged SBO (NTTF Recommendation 4.1), and (3) industry implementation of the requirements of the March 12, 2012, order EA-12-049, requiring mitigation strategies for beyond-design-basis external events.

The staff still considers these insights to be important factors in addressing these Tier 2 items. As implementation guidance for the order on mitigating strategies was developed, the staff found that the new strategies could satisfy the underlying purpose of these Tier 2 items for enhanced spent fuel pool makeup and spray capability. In COMSECY-13-0002, "Consolidation of Japan Lessons Learned Near-Term Task Force Recommendations 4 and 7 Regulatory Activities," dated January 25, 2013 (ADAMS Accession No. ML13011A034), the staff proposed, in part, that it include these Tier 2 items within the mitigation strategies, as well as a broader rulemaking that incorporates the mitigation strategies and SBO requirements.

Tier 2 Portions of NTF Recommendation 9.3 (Remaining Actions, Except Emergency Response Data System (ERDS) Capability)

The NTF recommended the NRC order licensees to conduct the following activities until rulemaking could be completed. These three items were subsequently prioritized as Tier 2 by the staff.

- Add guidance to the emergency plan that documents how to perform a multiunit dose assessment (including releases from spent fuel pools) using the licensee's site-specific dose assessment software and approach.
- Conduct periodic training and exercises for multiunit and prolonged SBO scenarios. Practice (simulate) the identification and acquisition of offsite resources, to the extent possible.
- Ensure that EP equipment and facilities are sufficient for dealing with multiunit and prolonged SBO scenarios.

On July 9, 2012, the staff sent COMSECY-12-0014, "Revised Schedule and Plans for Japan Lessons-Learned," to the Commission, which, among other things, proposed to combine the Tier 2 items associated with Recommendation 9.3 into an ANPR together with the Tier 3 rulemaking items related to emergency preparedness (EP). However, in its SRM on August 6, 2012, the Commission disapproved this proposal, citing insufficient staff justification.

Since that time, the staff has conducted further evaluation, met with stakeholders, and is developing a revised path forward. The staff is determining whether existing Tier 1 actions, such as the mitigation strategies, could address the item on periodic training and exercises (drills), as well as the item on equipment and facilities. For the item on multiunit dose assessment capability, the staff is considering other options. The staff expects to provide its revised path forward for Commission approval (in a separate paper) in the near future.

Consideration of Other Natural External Hazards

A Tier 2 regulatory action regarding licensee reevaluations for natural external hazards other than seismic and flooding hazards was included in SECY-12-0025. As described in the previous 6-month update, the staff expects to begin preparing an RFI on this topic as resources become available, after implementation of Tier 1 actions for seismic and flooding hazard walkdowns and reevaluations. There have been no changes to this approach.

Other NRC-Regulated Facilities

In the SRM to Chairman tasking memorandum COMGBJ-11-0002, "NRC Actions Following the Events in Japan," dated March 23, 2011 (ADAMS Accession No. ML110820875), the Commission directed the staff to consider the applicability of lessons learned from the event to "non-operating reactor and non-reactor facilities." The staff has completed inspections at fuel cycle facilities per Temporary Instruction 2600/015, "Evaluation of Licensee Strategies for the Prevention and/or Mitigation of Emergencies at Fuel Facilities" (ADAMS Accession

No. ML111030453). Followup actions are ongoing to ensure that the scope of the Fukushima lessons learned have been considered in the context of the fuel cycle facilities.

The Steering Committee has been briefed on staff plans to review other licensed facilities and other license classifications. A review plan has been prepared to determine the potential applicability of the NTF recommendations to nonreactor facilities and to determine if the design and licensing basis of each facility covers postulated beyond-design-basis events. The staff expects to begin a review of other regulated facilities in FY 2013.

Plans To Sunset the Longer Term Review Organization

In SRM-SECY-11-0117, the Commission specified that the longer-term review will conclude when all longer-term evaluations are completed and associated regulatory actions have been identified and referred to the NRC line organizations for action using existing processes (e.g., the rulemaking process). As described in the previous update, the staff has completed evaluations of schedules and milestones, resources and critical skill sets, and implementation challenges for all Tier 1, 2, and 3 regulatory actions; however, not all lessons learned regulatory actions stemming from the events in Japan have been referred to the NRC line organizations for action using existing processes.

The JLD will need to maintain a coordinating role as requirements are carried out. The staff anticipates that the JLD will play a central role in coordinating the NRC responses to the March 12, 2012 RFI, issuing any additional RFIs (e.g., Tier 2 regulatory action on other external hazards) and in addressing inspections of facility and program modifications required in response to the Tier 1 orders. The JLD also will serve a coordinating role should additional regulatory action be required following the staff's evaluation of responses to the March 12, 2012, RFI.

As a result, the Office of Nuclear Reactor Regulation plans to continue JLD functions through FY 2014. The staff will continue to evaluate and report on its plans to sunset the longer-term review organization in future 6-month status updates.

SUMMARY:

The staff continues to work on the Tier 1, Tier 2, and Tier 3 activities related to lessons learned from Fukushima consistent with the schedules established in SECY-11-0137, SRM-SECY-11-0124, SRM-SECY-12-0025, and SECY-12-0095. Much of the staff's effort since the last 6-month status update continues to focus on the high-priority Tier 1 actions, but work on the Tier 2 and Tier 3 activities continues to progress in accordance with established schedules. Safety enhancements at nuclear power plants are being realized. The staff has also continued a high level of stakeholder engagement. The staff continues to balance the importance of lessons learned implementation with the need to ensure that its efforts do not displace ongoing work of greater safety benefit, work that is necessary to maintain safety, or other high priority work.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection. This paper does not impact currently estimated resources for FY 2013 or FY 2014, and therefore the Office of the Chief Financial Officer does not need to concur.

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for Operations

Enclosures:

1. [Update on Tier 3 Activities](#)
2. [Update on Activities Not Within a Tier](#)
3. [Status Summary Table of Japan Lessons Learned Activities](#)

Update on Tier 3 Activities

Periodic Confirmation of Seismic and Flooding Hazards

This activity originated from NTTF Recommendation 2.2. It is intended to consider a rulemaking that would require licensees to confirm their seismic and flooding hazards periodically, including consideration of any new and significant information that has become available since the previous hazard evaluation. There are no updates to report with this activity, but the approach remains consistent with the program plan and schedule described in SECY-12-0095.

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

This activity originated from NTTF Recommendation 3. It is intended to evaluate potential enhancements to the capability to prevent or mitigate seismically induced fires and floods. As described earlier in this paper, the Commission directed that a PRA methodology be initiated to evaluate potential enhancements in this area and that this aspect should be addressed as a Tier 1 activity. The PRA methodology development is currently underway and there are no updates to report with the Tier 3 aspects of this activity, but the overall approach remains consistent with the program plan and schedule described in SECY-12-0095.

Reliable Hardened Vents for Other Containment Designs

This activity originated from NTTF Recommendation 5.2. It exists for the staff to evaluate the need for hardened vents in containment designs other than boiling-water reactor (BWR) Mark I and Mark II containments. There are no updates to report with this activity, but the approach remains consistent with the program plan and schedule described in SECY-12-0095.

Hydrogen Control and Mitigation inside Containment or Other Buildings

This activity originated from NTTF Recommendation 6 to evaluate the current state of knowledge about the generation, transport, distribution, and combustion of hydrogen given the accident at Fukushima, and to determine if any new safety issues have emerged that warrant regulatory action. There are no updates to report with this activity, but the approach remains consistent with the program plan and schedule described in SECY-12-0095.

Items Related to Emergency Preparedness

In SECY-12-0095, the following four Tier 3 items were included within one program plan:

- EP enhancements for prolonged SBO and multiunit events
- ERDS Capability
- Additional EP topics for prolonged SBO and multiunit events
- 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. There are no updates to report with this activity, but the approach (to issue an ANPR to engage stakeholders on these issues) remains consistent with the program plan and schedule described in SECY-12-0095.

Reactor Oversight Process (ROP) Modifications To Reflect Recommended Defense-in-Depth Framework

This activity originated from NTTF Recommendation 12.1 to expand the scope of the annual ROP self-assessment and biennial ROP realignment to include more fully any defense-in-depth considerations that may result from resolution of NTTF Recommendation 1. There are no updates to report with this activity, but the approach remains consistent with the program plan and schedule described in SECY-12-0095.

NRC Staff Training on Severe Accidents and Severe Accident Management Guidelines

This activity originated from NTTF Recommendation 12.2 to enhance the NRC staff training on severe accidents, including resident inspector training on severe accident management guidelines. There are no specific updates to report with this activity, but the approach remains consistent with the program plan and schedule described in SECY-12-0095.

Basis of Emergency Planning Zone (EPZ) Size

This activity originated as an Additional Issue in SECY-11-0137 and involves the staff evaluating the basis of the plume exposure pathway EPZ size. There are no updates to report with this activity, but the approach remains consistent with the program plan and schedule described in SECY-12-0095.

Pre-Staging Potassium Iodide beyond 10 Miles

This activity originated as an Additional Issue in SECY-11-0137 and involves the staff evaluating whether potassium iodide should be pre-staged beyond the current 10-mile zone. There are no updates to report with this activity, but the approach remains consistent with the program plan and schedule described in SECY-12-0095.

Transfer of Spent Fuel to Dry Cask Storage

This activity originated as an Additional Issue in SECY-11-0137 and involves the staff evaluating the need for regulatory action to require expedited transfer of spent fuel from spent fuel pools to dry cask storage. The staff is currently conducting the research activities described in the program plan in SECY-12-0095. The staff is aware of parallel Commission direction on the research activities (as stated in SRM-M120607C, "Staff Requirements—Meeting with the Advisory Committee on Reactor Safeguards," dated July 16, 2012, ADAMS Accession No. ML121980043), which is closely tied to the overarching Tier 3 program plan. The staff is also aware of the nexus between the research activities, the Tier 3 program plan and the ongoing staff efforts to revise the Commission's Waste Confidence Decision and rule. The staff is working to effectively coordinate and integrate these efforts and expects to request Commission approval (in a separate paper) to revise the direction given in the SRM to integrate the ongoing research activities more efficiently into the program plan and to align associated milestones of the Tier 3 program plan with the Waste Confidence efforts.

Reactor and Containment Instrumentation Withstanding Beyond-Design-Basis Conditions

This activity originated from a recommendation by the Advisory Committee on Reactor Safeguards (ACRS) and involves identifying and evaluating the need for enhanced reactor and containment instrumentation that can withstand beyond-design-basis accident conditions.

Consistent with the program plan in SECY-12-0095, the staff has conducted the following activities:

- Reviewed the Tier 1 activities that would affect the identification and selection of severe accident instrumentation (ongoing).
- Reviewed U.S. Department of Energy (DOE) activities in the area of severe accident modeling and DOE interfaces with the Japan Severe Accident industry team to identify instrumentation needs for monitoring severe accidents.
- Met with DOE and the Electric Power Research Institute to discuss potential research collaborations in severe accident instrumentation needs and qualification (ongoing).
- The NRC staff is participating in an effort sponsored by the International Atomic Energy Agency (IAEA) to develop an IAEA technical document on severe accident instrumentation that will serve as a technical basis for further standards development (ongoing).
- Met with representatives of the ANS Nuclear Standards Board on November 30, 2012 (ADAMS Accession No. ML12356A086), to encourage interest in developing a standard set of criteria to identify design criteria for severe accident monitoring instrumentation.
- Attended the Embedded Topical Meeting on Severe Accident Modeling at the ANS 2012 Winter Meeting (November 12–15, 2012) to identify the degree of fidelity in severe accident modeling and the comparative results of various thermo-hydraulic models of the Fukushima Dai-ichi event using these models (MELCOR, SAMPSON, MAAP, ATHENA, ASTEC). Such modeling is believed to be sufficiently accurate to predict the design and range for severe accident monitoring instrumentation. The staff plans to continue efforts in this area.
- Interfaced with members of the Institute of Electrical and Electronics Engineers (IEEE) Working Group 6.1 on their efforts to update IEEE 497 on Standard Criteria for Accident Monitoring Instrumentation for Nuclear Power Generating Stations (ongoing).

Update on Activities Not Within a Tier

Recommendation 1—Regulatory Framework

In SRM-SECY-11-0093, "Near-Term Report and Recommendations for Agency Actions Following the Events in Japan," dated August 19, 2011, the Commission directed that NTTF Recommendation 1 should be pursued independently of any activities associated with the review of the other Task Force recommendations. To carry out this direction, the staff established a working group (WG) to develop a comprehensive set of options for the Commission, including resource estimates, schedules, and the staff's recommended approach.

Initially, work on Recommendation 1 was limited to allow key staff and managers to focus on the Tier 1 orders and RFI. Active efforts resumed in February 2012; in March 2012, the WG briefed the Steering Committee on its proposed approach to evaluating regulatory framework alternatives. In early May 2012, the WG briefed the Steering Committee to ensure alignment with plans to limit the scope of the initial Recommendation 1 effort to power reactor safety (operating plants and new designs recently or currently being certified, such as the AP1000 and economic simplified boiling-water reactor (ESBWR)). The first public meeting was held on June 20, 2012. The staff met with the ACRS subcommittee in August and December 2012. On November 2, 2012, the staff publicly released an option summary document with detailed information on the framework improvement options under evaluation. These options were discussed in a public meeting held on November 8, 2012. A public comment period was opened in early November and closed on December 14, 2012.

The staff is preparing a Commission paper with recommendations (including preliminary cost and schedule estimates) for activities that could be undertaken to address the issues raised by Recommendation 1. The Japan Lessons Learned Project Directorate (JLD) Steering Committee is evaluating these draft recommendations. Following this evaluation, the recommendations will be presented to the ACRS for additional review before they are given to the Commission. The staff plans to submit an extension request to extend the current due date (February 19, 2013) for providing this Commission paper. Because the staff is now reevaluating the schedule for this activity, the dates for the final ACRS subcommittee and full committee meetings are being rescheduled.

Consideration of Economic Consequences

On August 14, 2012, the staff issued SECY-12-0110, "Consideration of Economic Consequences within the U.S. Nuclear Regulatory Commission's Regulatory Framework" (ADAMS Package Accession No. ML12173A478), for the Commission's consideration. The staff recommended an option to enhance the consistency of regulatory analysis guidance, which is used when considering economic consequences from offsite property damage within regulatory, backfit, and environmental analyses. In addition, the staff held a Commission briefing on economic consequences on September 11, 2012. In response to the SRM from this briefing (ADAMS Accession No. ML12278A395), the staff is engaging international and Federal counterparts to gain more information on their practices regarding economic consequences and is awaiting an SRM on SECY-12-0110.

National Academy of Sciences (NAS) Study

As directed by the U.S. Congress, the NRC transferred \$2 million to the National Academy of Sciences (NAS) to fund an NAS study of the lessons learned from the events at the Fukushima nuclear plant. Since the previous 6-month update, NAS has established the study committee and held three information-gathering meetings on lessons learned from the Fukushima Dai-ichi accident. One of the information-gathering meetings was recently held in Tokyo, Japan, which included a meeting with Japanese experts and an in-depth tour of the Fukushima Dai-ichi facility. Future NAS meetings will address NRC actions taken on recommendations in the NAS report published in 2006, "Safety and Security of Commercial Spent Nuclear Fuel Storage." NAS has stated that the final report will be released in April 2014.

Convention on Nuclear Safety (CNS) Activities

The CNS is an international treaty that commits contracting parties (participating Member States) to a high level of safety in nuclear power plants by setting international benchmarks. At the CNS Fifth Review Meeting, held on April 4–15, 2011, in Vienna, Austria, the contracting parties agreed to hold an Extraordinary Meeting in August 2012 to focus on the potential nuclear safety issues raised by the Fukushima accident. Consistent with this commitment, NRC staff prepared the U.S. national report for the 2012 CNS Extraordinary Meeting with the U.S. Department of State, DOE, and the Institute for Nuclear Power Operations as a representative of the U.S. nuclear industry. The U.S. national report ([NUREG-1650, Revision 4, ADAMS Accession No. ML12221A013](#)) is a standalone document that describes U.S. actions being taken or planned in response to the Fukushima event.

The CNS Extraordinary Meeting took place in Vienna, Austria, from August 27–31, 2012, in which NRC staff attended and actively participated. It was concluded that most contracting parties that have nuclear power plants have conducted targeted safety reviews and are taking additional actions to enhance the protection of the plants from extreme natural hazards. The contracting parties identified a range of topics, such as external events and accident management, which require followup discussions. Therefore, in addition to the regular CNS reporting items, the contracting parties are required to address these Fukushima-related topics in their 2013 CNS national reports. The U.S. national report currently is being updated. The 2013 national report is scheduled to be sent to the Commission in early June to support the IAEA established submittal deadline of August 16, 2013.

Details on the outcome and conclusion of the CNS Extraordinary Meeting can be found in the [Summary Report](#) that the President of the Convention, Mr. Li Ganjie, issued. The report can be found on the Convention on Nuclear Safety webpage on the IAEA website at <http://www-ns.iaea.org/conventions/nuclear-safety.asp>.

Potential Consensus Standards Development

In a letter dated July 2, 2012, ANS expressed to the staff an interest in developing consensus standards related to guidance on carrying out lessons learned from Fukushima (ADAMS Accession No. ML12227A399). The staff responded on September 28, 2012 (ADAMS Accession No. ML12229A354) and committed to hold a public meeting with ANS, other standards development organizations, and the industry to discuss which of the lessons learned might be most appropriate, if any, to pursue standards development. The staff indicated that Tier 3 activities might provide the best opportunity for standards development, given the longer timeframe associated with those activities. The public meeting was held on

November 30, 2012, with presentations from ANS, ASME, NEI, and NRC staff. The Tier 3 item related to reactor and containment instrumentation was identified as a potential candidate for consensus standard development. The staff expects to continue conversing with stakeholders on this issue, as well as other lessons learned, as implementation continues over the next several years. A summary of the public meeting is available at ADAMS Accession No. ML12356A086.

Communication with Stakeholders

In FY 2012, the staff held 82 public meetings related to Japan lessons learned. Most of these meetings included use of webinar, webcasting, and teleconferencing to allow greater participation by individuals from remote locations. Many of these meetings centered on guidance development for carrying out Tier 1 actions. Additionally, the NRC Steering Committee continues to meet publicly with the industry's steering committee approximately quarterly to discuss and resolve issues related to lessons learned. The staff and industry continue to find these joint steering committee meetings useful exchanges that highlight the importance of senior executive engagement and cooperation in moving forward with carrying out the lessons learned from Fukushima.

On January 23, 2013, a public meeting was held to discuss potential improvements in the NRC's communication of significant regulatory issues. One topic discussed was "reflections on NRC's communications since the Fukushima event, including actions the NRC has taken in response to the event." The staff received feedback on how well the agency has communicated information about lessons-learned activities in the time since the initial interest in the Fukushima event, and it is using that feedback to inform future communications activities. A summary of the meeting discussions will be given to the Commission and senior NRC management.

In late 2012, the staff established a team to examine and establish tools and methods to strategically communicate Japan lessons learned activities to the NRC's array of internal and external stakeholders. This Strategic Communications Team is comprised of staff not only from the JLD, but also staff from the variety of offices often tangentially affected by communication needs related to Fukushima lessons learned. Furthermore, the Team has partnered with staff in the Web services and graphics departments to enhance the quality and efficiency of communications tools. The Team expects to evaluate communication needs on a continuing basis, including a focus on events and milestones that are achieved as lessons-learned implementation progresses.

Status Summary of Japan Lessons Learned Activities (February 2013)

Identifier or Background Source	Regulatory Approach	Description	Status / Schedule
<i>Tier 1</i>			
NTTF 2.1	Request for information (RFI)	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.	<ul style="list-style-type: none"> ✓ RFI (03/12/2012) ✓ JLD-ISG-2012-04 (11/16/2012) ✓ JLD-ISG-2012-05 (11/30/2012) ✓ JLD-ISG-2012-06 (01/04/2013)
NTTF 2.3	RFI	Perform seismic and flood protection walkdowns and address plant-specific vulnerabilities. Take appropriate regulatory action to resolve issues associated with updated site-specific hazards.	<ul style="list-style-type: none"> ✓ RFI (03/12/2012) ✓ TI 2515/187 (06/27/2012) ✓ TI 2515/188 (07/06/2012) ✓ Walkdown reports (11/30/2012)
NTTF 3 (partial)	Plan	Develop a plan to prepare a probabilistic risk assessment (PRA) methodology for seismic-induced fires and floods.	<ul style="list-style-type: none"> ✓ PRA plan (06/07/2012)
NTTF 4.1	Rulemaking	Enhance the capability to maintain plant safety throughout a prolonged station blackout (SBO).	<ul style="list-style-type: none"> ✓ ANPR (03/20/2012) ✓ COMSECY-13-0002 (01/25/2013)
NTTF 4.2	Order	Provide a three-phase approach for mitigating beyond-design-basis external hazards.	<ul style="list-style-type: none"> ✓ Order (03/12/2012) ✓ JLD-ISG-2012-01 (08/29/2012) • Integrated plans (02/28/2013)
NTTF 5.1	Order	Provide a reliable hardened containment vent system for boiling-water reactor (BWR) Mark I and II containments.	<ul style="list-style-type: none"> ✓ Order (03/12/2012) ✓ JLD-ISG-2012-02 (08/29/2012) • Integrated plans (02/28/2013)
NTTF 7.1	Order	Provide a reliable indication of water level in spent fuel storage pools.	<ul style="list-style-type: none"> ✓ Order (03/12/2012) ✓ JLD-ISG-2012-03 (08/29/2012) • Integrated plans (02/28/2013)
NTTF 8	Rulemaking	Require integration of onsite emergency response processes, procedures, training, and exercises.	<ul style="list-style-type: none"> ✓ ANPR (04/18/2012) ✓ Draft Regulatory Basis (01/08/2013)

Identifier or Background Source	Regulatory Approach	Description	Status / Schedule
NTTF 9.3 (partial)	RFI	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.	<ul style="list-style-type: none"> ✓ RFI (03/12/2012) ✓ Phase 1 Communications response (10/31/2012) • Phase 1 Staffing response (04/30/2013) • Phase 2 Communications and Staffing response (4 months before 2nd refueling outage)
NTTF 9.4	Voluntary initiative	Complete the Emergency Response Data System (ERDS) modernization initiative by June 2012 to ensure multiunit site monitoring capability.	✓ (June 2012)
SECY-12-0025, Enclosure 2	Under Commission consideration	Related to Near-Team Task Force (NTTF) 5.1. Assess filtration and additional performance requirements for reliable hardened containment vent systems for BWR Mark I and II.	✓ SECY-12-0157 (11/26/2012)
SECY-12-0025, Enclosure 2	Orders and RFI	Related to NTTF 2.1, 2.3, 4.1, and 4.2. Include ultimate heat sink (UHS) systems in hazard reevaluations and walkdowns, loss of UHS as a design assumption in conjunction with strategies for dealing with prolonged SBO, and address loss of access to normal UHS in conjunction with measures taken to deal with beyond-design-basis external hazards.	✓ Subsumed within Orders and RFI (03/12/2012)
<i>Tier 2</i>			
NTTF 7.2-7.5	Rulemaking	Require licensees to provide reliable spent fuel pool makeup capabilities.	✓ COMSECY-13-0002 (01/25/2013)
NTTF 9.3 (partial)	Approach under evaluation	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, and ensuring sufficient emergency preparedness (EP) resources for multiunit and prolonged SBO scenarios.	<ul style="list-style-type: none"> • Under staff evaluation for path forward
SECY-12-0025, Enclosure 3	RFI	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.	<ul style="list-style-type: none"> • Initiate as resources are available

Identifier or Background Source	Regulatory Approach	Description	Status / Schedule
<i>Tier 3</i>			
NTTF 2.2	Rulemaking	Periodic confirmation of seismic and flooding hazards.	<ul style="list-style-type: none"> • SECY-12-0095 Program Plan
NTTF 3 (partial)	<i>Long-term evaluation</i>	Potential enhancements to the capability to prevent or mitigate seismically-induced fires and floods.	<ul style="list-style-type: none"> • SECY-12-0095 Program Plan
NTTF 5.2	<i>Long-term evaluation</i>	Reliable hardened vents for other containment designs.	<ul style="list-style-type: none"> • SECY-12-0095 Program Plan
NTTF 6	<i>Long-term evaluation</i>	Hydrogen control and mitigation inside containment or in other buildings.	<ul style="list-style-type: none"> • SECY-12-0095 Program Plan
NTTF 9.1, 9.2	<i>Critical skills availability</i>	EP enhancements for prolonged SBO and multiunit events.	<ul style="list-style-type: none"> • SECY-12-0095 Program Plan
NTTF 9.3 (partial)	<i>Dependent on NTTF 10</i>	ERDS capability.	
NTTF 10	<i>Long-term evaluation</i>	Additional EP topics for prolonged SBO and multiunit events.	
NTTF 11	<i>Long-term evaluation</i>	EP topics for decisionmaking, radiation monitoring, and public education.	
NTTF 12.1	<i>Dependent on NTTF 1</i>	Reactor Oversight Process (ROP) modifications to reflect the recommended defense-in-depth framework.	<ul style="list-style-type: none"> • SECY-12-0095 Program Plan
NTTF 12.2	<i>Dependent on NTTF 8</i>	Staff training on severe accidents and resident inspector training on severe accident management guidelines.	<ul style="list-style-type: none"> • SECY-12-0095 Program Plan
SECY-12-0025, Enclosure 2	<i>Long-term evaluation</i>	Basis of emergency planning zone size.	<ul style="list-style-type: none"> • SECY-12-0095 Program Plan
SECY-12-0025, Enclosure 2	<i>Long-term evaluation</i>	Pre-staging of potassium iodide beyond 10 miles.	<ul style="list-style-type: none"> • SECY-12-0095 Program Plan
SECY-12-0025, Enclosure 2	<i>Long-term evaluation</i>	Transfer of spent fuel to dry cask storage.	<ul style="list-style-type: none"> • SECY-12-0095 Program Plan

Identifier or Background Source	Regulatory Approach	Description	Status / Schedule
SECY-12-0025, Enclosure 2	<i>Long-term evaluation</i>	Reactor and containment instrumentation withstanding beyond-design-basis conditions.	<ul style="list-style-type: none">• SECY-12-0095 Program Plan