

POLICY ISSUE
(Information)

October 14, 2015

SECY-15-0128

FOR: The Commissioners

FROM: Victor M. McCree
Executive Director for Operations

SUBJECT: EIGHTH 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.

SUMMARY:

This SECY paper provides the NRC staff's eighth 6-month status update on the activities conducted under the charter for the NRC's review of lessons learned from the March 2011 accident at Japan's Fukushima Dai-ichi nuclear power plant. The NRC and the industry have made substantial progress in addressing the lessons learned from the accident, and all of the lessons learned activities are on or ahead of established schedules. Highlights of the work accomplished in the previous 6 months are provided, as well as a summary of significant activities anticipated to be completed before the staff's next 6-month update. A detailed status update on each of the Tier 1 activities is provided in the enclosure. The NRC staff is developing plans to resolve the open Tier 2 and Tier 3 recommendations in light of the substantial safety

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benefit that will be achieved through the Tier 1 recommendations and insights gained from related Commission decisions. The NRC staff plans to provide a paper to the Commission in October 2015 with the latest status and the updated closure plans for these recommendations.

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 carried out under the charter.

In the SRM to 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 update the Commission in 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 most recent update was provided in SECY-15-0059, "Seventh 6-Month Status Update on Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Subsequent Tsunami" (ADAMS Accession No. ML15069A444). This is the eighth 6-month status update on the NRC staff's activities related to lessons learned from the March 2011 accident at Japan's Fukushima Dai-ichi facility.

In SECY-11-0137, "Prioritization of Recommended Actions to be Taken in Response to Fukushima Lessons Learned," dated October 3, 2011 (ADAMS Accession No. ML11272A203), the NRC staff prioritized the Near-Term Task Force (NTTF) recommendations from 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, "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," dated July 13, 2012 (ADAMS Accession No. ML12208A208), supplied assessments and program plans for the Tier 3 recommendations, along with six other recommendations listed 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" (ADAMS Accession Nos. ML12054A735, ML12054A694, and ML12054A679, respectively). On the same date, the NRC also issued a request for information under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Section 50.54(f) (hereafter referred to as the 50.54(f) letter) to licensees (ADAMS Accession

No. ML12053A340). 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), which modified and superseded Order EA-12-050. These regulatory actions addressed most of the Tier 1 recommendations. Implementing these regulatory actions, along with the related rulemaking activities, has continued to be the primary focus of the staff's effort since the last 6-month update.

DISCUSSION:

This update provides the latest 6-month status update on the NRC staff's activities related to lessons learned from the March 2011 accident at Japan's Fukushima Dai-ichi facility. A detailed status update on each Tier 1 recommendation is contained in an enclosure to this memorandum. Status updates for the Tier 2 and 3 recommendations will be provided in a separate SECY paper, as discussed below.

The NRC and the industry have made substantial progress in addressing the lessons learned from the accident, and all of the lessons learned activities are on or ahead of established schedules. Highlights of the progress made to date include:

- For the Mitigation Strategies and Spent Fuel Pool Instrumentation Orders, audits are ongoing of plant documentation and onsite activities to review the closeout of items identified in the interim staff evaluations. As of the end of this reporting period, the NRC staff has completed audits of 49 sites out of a total of 61.
- Twenty-three of 100 units are in compliance with the Mitigation Strategies Order. An additional 28 units are expected to come into compliance at the conclusion of refueling outages in fall 2015.
- Fifty out of 100 units are in compliance with the Spent Fuel Pool Instrumentation Order. An additional 29 units are expected to come into compliance by the end of 2015.
- The NRC staff has issued 39 of 61 Phase 2 emergency preparedness staffing assessment letters. The NRC staff expects to issue 12 more assessments by the end of 2015.
- All sites have implemented automated multisource, multiunit dose assessment capabilities.
- NRC inspectors have completed a pilot post-compliance inspection of the Mitigation Strategies and Spent Fuel Pool Instrumentation Orders, along with emergency preparedness staffing and communication enhancements, at the Watts Bar site. The NRC inspectors did not identify any issues of a more than minor significance.
- The three Western U.S. (WUS) sites submitted their seismic hazard reevaluations on schedule. The NRC staff completed the screening and prioritization review for the three WUS sites on May 13, 2015.

- All 33 Central and Eastern U.S. sites have submitted interim seismic evaluation (expedited seismic evaluation process) reports. The NRC staff review of the reports is in progress, with 28 reviews completed and the rest expected to be completed by the end of 2015.
- The NRC staff supplied a closure plan to the Commission for the reevaluation of flooding hazards, COMSECY-15-0019, on June 30, 2015. The Commission approved the plan in the SRM to COMSECY-15-0019 on July 28, 2015. As of October 2, 2015, the NRC staff has issued 18 mitigating strategies flooding hazard information letters and 12 flood hazard staff assessments.
- The proposed Mitigation of Beyond-Design-Basis Event (MBDBE) rule was delivered to the Commission on April 30, 2015, in SECY-15-0065. The NRC staff is addressing Commission direction on the MBDBE proposed rulemaking provided in the SRM to SECY-15-0065. The staff anticipates publishing the proposed rule for public comment in the *Federal Register* in November 2015.
- The NRC staff has issued 18 (of 19) interim staff evaluations of the overall integration plans for Phase 1 of Order EA-13-109. The staff is currently evaluating an extension request for compliance with the Order for the remaining site.
- The NRC staff issued interim staff guidance JLD [Japan Lessons Learned Division]-ISG-2015-01, "Compliance with Phase 2 of Order EA-13-109," to endorse, with exceptions and clarifications, Nuclear Energy Institute (NEI) 13-02, Revision 1, "Industry Guidance for Compliance With Order EA-13-109."
- The NRC staff provided an information paper (converted to a notation vote paper by the Commission) and the draft Containment Protection and Release Reduction rulemaking regulatory basis to the Commission on June 19, 2015, in SECY-15-0085. In the SRM to SECY-15-0085, dated August 19, 2015, the Commission approved Alternative 1, discontinuing rulemaking activities, leaving Order EA-13-109 in place without additional regulatory actions; and disapproved issuing a *Federal Register* notice requesting public comment on the draft regulatory basis.
- The NRC staff completed the evaluation of the need to apply lessons learned from the accident to facilities other than operating power reactors, with only some limited scope work remaining. The results of that evaluation were provided to the Commission in SECY-15-0081, "Staff Evaluation of Applicability of Lessons Learned from the Fukushima Dai-ichi Accident to Facilities Other Than Operating Power Reactors," dated June 9, 2015 (ADAMS Accession No. ML15050A066).

The NRC staff anticipates the following activities to occur during, or be ongoing over, the next several months:

- The NRC staff expects to complete the remaining 12 audits to review the closeout of open and confirmatory items identified in the interim staff evaluations (ISEs) of licensee's implementation of the Mitigation Strategies and Spent Fuel Pool Instrumentation Orders by August 2016.
- The NRC staff will be completing safety evaluations (SEs) within 6 months of licensees notifying the NRC that they are in compliance with the Mitigation Strategies and Spent Fuel Pool Instrumentation Orders. The staff is expecting to complete approximately 8 SEs by the end of the first quarter of 2016.
- The NRC staff is scheduling compliance inspections per temporary instruction 2515/191. The inspections will be completed within 1-year of licensees notifying the NRC that they are in compliance with the Mitigation Strategies and Spent Fuel Pool Instrumentation Orders.
- The NRC staff is developing guidance to support the proposed MBDBE rule as it relates to the reevaluated seismic and flooding hazards (Draft Regulatory Guide DG-1301). Staff expects to issue the guidance for public comments with the proposed rule in the fourth quarter of calendar year 2015.
- The NRC staff expects to issue a letter in early 2016 to WUS licensees that screened-in for a seismic risk evaluation regarding the suitability of the licensees' seismic ground motion response spectra for use in the risk evaluations.
- The NRC staff expects to issue a final screening determination letter to licensees in October 2015 to identify licensees that are required to submit seismic risk evaluations and establish submittal schedules.
- The NRC staff expects to endorse the NEI guidance, NEI 12-06, Revision 1, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," with exceptions and clarifications, in a revision to interim staff guidance 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," to be issued in late 2015.
- The NRC staff expects to issue letters to licensees on the acceptability of the reevaluated flood hazard for the evaluation of the mitigation strategies by December 2015. Six sites needing assistance from the U.S. Army Corps of Engineers for dam failure assessments will receive their letters in 2016.
- Licensees are modifying or upgrading their mitigating strategies to ensure they can be implemented under the reevaluated flood hazard condition. The NRC staff expects that most licensees will complete their mitigating strategies assessment and pursue related actions, if needed, by December 2016.

- The NRC staff expects to receive the remaining emergency preparedness Phase 2 staffing assessments by December 31, 2015. The staff will issue response letters within 4 months of receiving the staffing assessments.
- The NRC staff will inspect activities related to emergency preparedness staffing and communications in conjunction with the inspections for the Mitigation Strategies and Spent Fuel Pool Instrumentation Orders, the majority of which will be completed in 2016 and 2017.
- The NRC staff anticipates providing the revised proposed MBDBE rulemaking package to the Commission (at least 10 days prior to publication in the *Federal Register*) in the fourth quarter of 2015.
- The NRC staff expects to receive all Phase 2 Overall Integrated Plans (OIPs) related to Order EA-13-109 by December 31, 2015.
- The NRC staff will review the Phase 2 OIPs related to Order EA-13-109, conduct audits (if necessary) of licensee progress toward compliance with Phase 2, and then issue an ISE.

Activities Associated with Flood Hazard Reevaluations

In the SRM to COMSECY-14-0037, "Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluation of Flooding Hazards," dated March 30, 2015 (ADAMS Accession No. ML15089A236), the Commission directed the staff to provide them with more detailed information on the status of flood hazard reevaluations, integrated assessments, and related guidance development in its periodic updates.

The NRC staff has taken a number of actions to address the challenges to completing the flooding hazard reevaluations and integrated assessments on the established schedules. The Commission directed the NRC staff to develop a plan for achieving closure of NTTF Recommendation 2.1 for flooding to the Commission for review and approval. On June 30, 2015, the NRC staff supplied a plan to the Commission in COMSECY-15-0019, "Closure Plan for the Reevaluation of Flooding Hazards for Operating Nuclear Power Plants" (ADAMS Accession No. ML15153A104). On July 28, 2015, the Commission approved the plan in the SRM to COMSECY-15-0019 (ADAMS Accession No. ML15209A682).

The action plan identifies two primary activities that define the response to flooding issues. These are:

- 1) Ensure licensees develop and put into effect mitigating strategies to address reevaluated flooding hazards, and
- 2) Develop a graded approach to identify the need for, and prioritization and scope of, plant-specific integrated assessments and evaluate plant-specific regulatory actions.

The NRC staff and licensees are taking action to ensure mitigating strategies will be able to address the reevaluated flooding hazards. Revision 1 to NEI 12-06 is being developed to

incorporate guidance for performance of flooding mitigating strategies assessments (Appendix G) and guidance for FLEX validation (Appendix E). The NRC staff expects to endorse the industry guidance, with exceptions and clarifications, in the guidance being prepared for the proposed MBDBE rule and in a revision to NRC interim staff guidance, JLD-ISG-2012-01, in the fourth quarter of 2015. The NRC staff expects that most licensees will complete their mitigating strategies assessment and pursue related upgrades to those strategies by December 2016.

The NRC staff is managing the flooding hazard reevaluation review efforts (Phase 1) and related decision making (Phase 2) of NTTF Recommendation 2.1 by using a graded approach to reduce the number of plants needing to do an integrated assessment to those plants where there is the greatest opportunity for additional safety enhancements.

- A revision to interim staff guidance JLD-ISG-2012-05, "Guidance for Performing the Integrated Assessment for External Flooding," will be issued by June 2016.
- NRC staff expects licensees that screen out from having to do the full integrated assessments will submit the required focused evaluations by December 2016.
- For the limited number of plants expected to be required to submit more detailed evaluations, the NRC staff expects that the revised flooding reevaluations will be submitted by late 2016 and the associated integrated assessments by late 2017.
- The NRC staff will then evaluate the integrated assessments and determine the need for further regulatory action (final plan is to be determined).

Initiatives Associated with Tier 2 and 3 Recommendations

As discussed above, the NRC staff developed initial project plans for the Tier 3 recommendations and provided them to the Commission in SECY-12-0095. Since the issuance of that paper, the staff has been taking actions consistent with those plans and providing updates on the status of both Tier 2 and 3 recommendations in its 6-month status updates. Since the last 6-month status update, provided in SECY-15-0059, the staff began an initiative to more fully develop plans to resolve each of these recommendations in light of the substantial safety benefit that will be achieved through the Tier 1 recommendations and insights gained from related Commission decisions. The NRC staff plans to provide a paper to the Commission in October 2015 with updated plans, with the goal of resolving most of the open recommendations by the end of calendar year 2016.

Activities Not Within a Tier

Enclosure 4 to SECY-15-0059 provided a status update on activities that were not assigned to a specific tier. Because of the significant progress made on many of these activities, a separate enclosure to this SECY paper is no longer necessary; rather, these activities are described below:

- In NTTF Recommendation 1 Regulatory Framework – the SRM to SECY-13-0132 (ADAMS Accession No. ML112310021) concluded that NTTF Recommendation 1 is

closed. As directed by the Commission, the staff is working on a paper to address this issue under the Risk Management Regulatory Framework, outside the scope of Fukushima related activities.

- In the SRM to COMGBJ-11-0002 (ADAMS Accession No. ML110820875), the Commission directed the NRC staff to consider the applicability of lessons learned from the Fukushima event to facilities other than operating power reactors. The staff's evaluation of this issue was provided to the Commission in SECY-15-0081 (ADAMS Accession No. ML15050A066). The staff determined that only limited-scope work remains and is being done under existing regulatory processes.
- Phase 2 of the National Academy of Sciences (NAS) study on Fukushima, which reevaluates previous NAS findings related to the safety and security of spent nuclear fuel in light of the accident, will be completed in late 2015. The NRC staff will continue to support NAS as it completes its study and will provide the Commission with an analysis of any recommendations in a future update.
- 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. For example, the NRC staff is participating in several working groups within the International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency on efforts to better understand the accident and develop strategies to ensure nuclear power plants can more effectively cope with severe natural events. Bilateral exchanges have continued to include Fukushima lessons learned as a topic of discussion. The NRC staff also participated in the drafting of two international reports.
- One of those reports, the IAEA Director General's comprehensive "Report on the Fukushima Dai-ichi Accident," was publically released on August 31, 2015 (with a summary report issued in May 2015 to support an IAEA Board of Governor's meeting). The NRC staff reviewed the 45 observations and lessons identified in the Director General's summary report and concluded that they do not introduce concepts that have not been considered by the NRC and the U.S. nuclear industry. The staff is now reviewing the comprehensive report to ensure all lessons learned are being addressed appropriately.
- The second international report entitled "Five Years after the Fukushima Daiichi Accident" was collaborated on by members of the NRC staff and the Nuclear Energy Agency (NEA). The NEA expects that this report will be published early in 2016.
- The Japan lessons learned strategic communication team has evaluated and put tools in place for enhancing stakeholder understanding of lessons learned activities. The communications team will continue to examine communication needs and develop relevant tools with a focus on upcoming events and milestones.

As appropriate, the NRC staff will engage the Commission if any significant new information is developed in any of the above topic areas.

Decommissioning Reactors

Five reactor units at four sites have ceased operations permanently and begun the decommissioning process since the Fukushima lessons learned Orders and 50.54(f) letter were issued in March 2012. They are:

- Crystal River, Unit 3, Nuclear Generating Plant;
- Kewaunee Power Station;
- San Onofre Nuclear Generating Station, Units 2 and 3; and
- Vermont Yankee Nuclear Power Station.

The licensees have submitted the certifications required by 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. The NRC staff has rescinded the applicable Orders and relieved these licensees of their obligations created by the 50.54(f) letter. In addition, Oyster Creek Nuclear Generating Station (Oyster Creek) has also announced plans publicly to shut down permanently in 2019. The NRC staff is currently considering a request from Oyster Creek to relax the requirements of Order EA-13-109.

Office of Nuclear Reactor Regulation's Japan Lessons-Learned Division

On June 15, 2014, the Office of Nuclear Reactor Regulation (NRR) centralized the day-to-day Fukushima Dai-ichi lessons learned activities. The functions of the Japan Lessons-Learned Directorate and the Mitigating Strategies Directorate have been incorporated into the JLD.

The JLD is tasked with executing the NTF recommendations, as approved by the Commission, by providing management oversight to support these high-priority activities and promoting the flexible use of agency resources to most efficiently accomplish specific key milestones. The JLD provides a baseline capability on Tier 1 activities and other Fukushima support activities to accomplish its day-to-day mission and reaches out to other divisions as additional resources are needed to handle workload peaks.

At this time, a decision on when to sunset the JLD has not been made. The NRC staff anticipates being in a better position to determine the timing for this organizational change in early 2016. As work on specific technical issues associated with Japan lessons learned activities are completed, JLD staff are being reassigned to other divisions in NRR to support work in other areas. As a result, JLD will be reduced from five to four branches at the beginning of calendar year 2016. Additional changes will be made based on the JLD workload.

The Commissioners

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COORDINATION:

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

/RA/

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Enclosure:
Update on Tier 1 Activities

The Commissioners

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COORDINATION:

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

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Enclosure:
Update on Tier 1 Activities

201100250

ADAMS Accession Nos.: Package ML15245A473; SECY ML15245A751; Enclosure ML15245A780

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OFFICIAL AGENCY RECORD