

POLICY ISSUE
Notation Vote

January 30, 2017

SECY-17-0016

FOR: The Commissioners
FROM: Victor M. McCree
Executive Director for Operations
SUBJECT: STATUS OF IMPLEMENTATION OF LESSONS LEARNED FROM
JAPAN'S MARCH 11, 2011, GREAT TŌHOKU EARTHQUAKE AND
SUBSEQUENT TSUNAMI

PURPOSE:

The purpose of this paper is to provide an 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 nuclear power plant. This paper also notifies the Commission of the planned dissolution of the NRC's Japan Lessons-Learned Steering Committee and requests Commission approval to modify the periodicity of the staff's Fukushima status memos from monthly to semi-annually. This paper does not address any new commitments or resource implications.

SUMMARY:

Since the March 2011 accident at Fukushima Dai-ichi, the NRC has made substantial progress in addressing the lessons learned from the accident and have implemented the most significant safety enhancements on or ahead of established schedules. In 2011, the staff evaluated the lessons learned from the accident and prioritized its recommendations into tiers that related to the urgency of the action and the need for additional information to develop an approach.

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

The most significant activities, referred to as Tier 1, are either complete or progressing under clearly defined processes. The NRC issued orders associated with several Tier 1 actions in 2012—specifically mitigation strategies for beyond-design-basis events, reliable hardened containment vents (later updated to address venting during a severe accident), and reliable spent fuel pool instrumentation. Nearly all sites are in compliance with mitigation strategies and spent fuel pool instrumentation orders, and applicable sites are on schedule with the timelines established in the containment vent order. The NRC also issued a request for information on several topics including seismic and flooding hazards and emergency preparedness. Activities to address the request for information are progressing on schedule, with many sites complete. The draft final rule on mitigation of beyond-design-basis-events (MBDBE), which consolidates two rulemaking activities related to station blackout and emergency preparedness initiated in 2012, is currently with the Commission for consideration.

In addition, Tier 2 and 3 activities are considered complete, pending a Commission decision on the closure of the “Group 3” items related to natural hazards other than seismic and flooding, real-time radiation monitoring, and ongoing evaluation of natural hazards. With respect to the other Tier 2 and 3 recommendations, the staff completed assessments of the need for regulatory action on topics such as such as expedited transfer of spent fuel to dry storage, containment venting and hydrogen control, and enhanced instrumentation. The staff concluded, in general, that additional regulatory action beyond those taken for the Tier 1 activities is not warranted, with the exception of the staff’s proposed approach for ongoing assessment of natural external hazard information.

Enclosure 1 to this paper contains the status of each of the Tier 1 activities, as well as those Tier 2 and Tier 3 issues that are being addressed through the consolidated MBDBE rulemaking. Enclosure 2 contains a synopsis of other lessons-learned activities.

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 review of the accident at the Fukushima Dai-ichi nuclear power plant in Japan. The charter required, among other things, status updates every 6 months over a period of 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 staff to continue to update the Commission in a status report every 6 months until completion of the implementation of Tier 1 actions.

On April 5, 2016, the staff provided the ninth 6-month status update in SECY-16-0043, “Ninth 6-Month Status Update on Response to Lessons Learned from Japan’s March 11, 2011, Great Tōhoku Earthquake and Subsequent Tsunami” (ADAMS Accession No. ML16054A255). In SECY-16-0009, “Recommendations Resulting from the Integrated Prioritization and Re-Baselining of Agency Activities,” dated January 31, 2016 (ADAMS Accession No. ML16028A189), the staff recommended discontinuing the 6-month status updates. The

Commission agreed in the SRM to SECY-16-0009, dated April 13, 2016 (ADAMS Accession No. ML16104A158). Thus, the update of April 5, 2016, was the last 6-month update provided to the Commission. In response to Commission direction in this SRM, the staff has continued to transmit status updates to the Commission via memorandum on a monthly basis; this paper provides the status update for January 2017.

Initial Prioritization and Staff Recommendations

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 into three tiers 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). The staff also identified for consideration six additional issues beyond those provided in the NTTF report. In the SRM to SECY-11-0137, dated December 15, 2011 (ADAMS Accession No. ML113490055), the Commission directed the staff to review and prioritize five of the six additional issues identified in SECY-11-0137. The sixth issue, "Instrumentation for Seismic Monitoring," was referred for further consideration under an ongoing action plan in response to the earthquake that took place in central Virginia in August 2011.

The Advisory Committee on Reactor Safeguards (ACRS) reviewed the NTTF report and provided its recommendations in two letters dated October 13, 2011 (ADAMS Accession No. ML11284A136), and November 8, 2011 (ADAMS Accession No. ML11311A264). The staff documented its review of the additional ACRS recommendations in Enclosure 3 to SECY-12-0025, "Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Tsunami," dated February 17, 2012 (ADAMS Accession No. ML12039A103). The staff's review of the ACRS recommendations identified two issues that would be addressed as part of Fukushima lessons-learned activities.

The staff prioritized the five staff-identified issues and the two ACRS-identified issues in Enclosures 2 and 3 to 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 following three additional issues were identified but were not prioritized into a tier:

- (1) In the SRM to 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 Fukushima lessons learned to facilities other than operating power reactors.
- (2) In the SRM to SECY-12-0110, "Consideration of Economic Consequences within the U.S. Nuclear Regulatory Commission's Regulatory Framework," dated March 20, 2013 (ADAMS Accession No. ML13079A055), the Commission directed the staff to compare U.S. and Japanese regulatory requirements in effect at the time of the accident.

- (3) In the Energy and Water Development Appropriations Act of 2012, Congress mandated that the NRC fund a National Academy of Sciences study of the lessons learned from the accident at the Fukushima Dai-ichi nuclear plant.

Collectively, these activities constitute the post-Fukushima initiatives being completed under the charter.

Actions to Address Tier 1 Recommendations

On March 12, 2012, the NRC issued the following orders:

- 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);
- EA-12-050, "Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents" (ADAMS Accession No. ML12054A694); and
- EA-12-051, "Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation" (ADAMS Accession No. ML12054A679).

On the same date, the NRC issued a request for information to licensees under Title 10 of the *Code of Federal Regulations*, Section 50.54(f) (ADAMS Accession No. ML12053A340) to obtain information related to several NTTF recommendations, including seismic and flooding hazards and emergency preparedness.

On March 20, 2012, the staff published an advanced notice of proposed rulemaking in Volume 77, page 16,175, of the *Federal Register* (77 FR 16175), which began the process of considering amendments to the NRC's regulations that address station blackout.

On April 18, 2012, the staff published an advanced notice of proposed rulemaking (77 FR 23161) to begin the process of considering amendments to the NRC's regulations that address onsite emergency response capabilities.

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.

On July 9, 2014, in the SRM to SECY-14-0046, "Fifth 6-Month Status Update on Response to Lessons Learned from Japan's March 11, 2011, Great Tōhoku Earthquake and Subsequent Tsunami" (ADAMS Accession No. ML14218A703), the Commission approved the staff's proposal to consolidate the Station Blackout Mitigation Strategies rulemaking with the Onsite Emergency Response Capabilities rulemaking, as well as rulemaking for numerous emergency preparedness actions. The consolidated rulemaking activity is known as the MBDBE rulemaking. The staff provided the draft final MBDBE rule to the Commission on December 15, 2016, in SECY-16-0142, "Draft Final Rule—Mitigation of Beyond-Design-Basis Events (RIN 3150-AJ49)" (ADAMS Accession No. ML16301A005). SECY-16-0142 requests

Commission approval to publish a final rule that establishes requirements for the mitigation of beyond-design-basis events for nuclear power reactor licensees and applicants.

These regulatory actions addressed most of the Tier 1 recommendations. Since the staff's last 6-month status update paper dated April 5, 2016, the staff has continued to focus its effort on implementing these regulatory actions, along with the related rulemaking activities.

Actions to Address Tier 2 and Tier 3 Recommendations

In 2015 the staff refined its resolution plans for the open Tier 2 and 3 recommendations, considering the safety benefit achieved through implementation of the Tier 1 recommendations and insights from related Commission decisions. On October 29, 2015, the staff provided updated resolution plans for these items in SECY-15-0137, "Proposed Plans for Resolving Open Fukushima Tier 2 and 3 Recommendations" (ADAMS Accession No. ML15254A008). The Commission approved these plans, as well as the closure of several recommendations, in the SRM to SECY-15-0137, dated February 8, 2016 (ADAMS Accession No. ML16039A175). The staff has implemented the resolution plans for the open Tier 2 and 3 recommendations and provided the Commission with four papers documenting its work in this area:

- On March 31, 2016, the staff issued SECY-16-0041, "Closure of Fukushima Tier 3 Recommendations Related to Containment Vents, Hydrogen Control, and Enhanced Instrumentation" (ADAMS Accession No. ML16049A079).
- On June 2, 2016, the staff issued SECY-16-0074, "Assessment of Fukushima Tier 2 Recommendation Related to Evaluation of Natural Hazards Other Than Seismic and Flooding" (ADAMS Accession No. ML16102A301), as an interim report directed by the SRM to SECY-15-0137.
- On December 29, 2016, the staff issued SECY-16-0144, "Proposed Resolution of Remaining Tier 2 and 3 Recommendations Resulting from the Fukushima Dai-Ichi Accident" (ADAMS Accession No. ML16286A586), which contains the staff's proposals for closure of two of the three remaining recommendations. To address the final recommendation, SECY-16-0144 contains the staff's proposed framework for a graded approach that will allow NRC to proactively, routinely, and systematically seek, evaluate, and respond to new information on natural hazards.
- The draft final MBDBE rule provided to the Commission in SECY-16-0142 addresses resolution of certain Tier 2 and 3 recommendations related to spent fuel pools, station blackout, multiunit events, and emergency preparedness.

Based on the staff's proposals in SECY-16-0142 and SECY-16-0144, all Tier 2 and 3 items are considered complete or transitioned to the line organization, with any further actions being accomplished using normal NRC processes (e.g., the rulemaking process).

DISCUSSION:

Enclosure 1 discusses the status of each of the Tier 1 activities. For the majority of operating reactor sites, the licensees have completed the actions necessary to implement Orders

EA-12-049 and EA-12-051. Licensees have also made significant progress on implementing Order EA-13-109, and the required industry actions are on schedule to be completed within the timeframe specified in the order. The staff delivered the final MBDBE rulemaking package to the Commission on December 15, 2016. Flooding and seismic hazard reevaluations have been completed, and a firm schedule for the completion of licensee assessments of the new hazard's impact on the sites has been developed. The staff has completed the guidance for its regulatory decisionmaking based on these impact assessments. Emergency preparedness staffing and communications assessments have also been completed.

Enclosure 2 discusses the Tier 2 and Tier 3 activities. With the exception of those Tier 2 and Tier 3 activities that are included in the MBDBE rulemaking, and pending Commission direction on the staff's proposals in SECY-16-0144, all Tier 2 and 3 items are complete or have been transitioned to the line organization. Enclosure 2 also discusses four items that were not included within a tier but are now complete.

Dissolution of the NRC's Japan Lessons-Learned Steering Committee

In SECY-13-0095, dated September 6, 2013 (ADAMS Accession No. ML13213A304), the staff sent to the Commission its proposal to transition activities to the line organization, maintain limited Steering Committee oversight of ongoing Fukushima activities, and dissolve the Steering Committee. In the SRM to SECY-13-0095, dated November 13, 2013 (ADAMS Accession No. ML13317A271), the Commission disapproved the staff's recommendation to dissolve the Steering Committee, directing the staff instead to modify the charter to reflect the reduced Steering Committee oversight and submit it for approval. The revised charter, dated March 2014, was provided to the Commission as Enclosure 5 to SECY-14-0046 (ADAMS Accession No. ML14064A539), which the Commission approved in the SRM to that paper (ADAMS Accession No. ML14190A347), with comments. The staff subsequently revised the charter as specified in the SRM (ADAMS Accession No. ML14218A462).

The revised charter provides the Chairman of the Steering Committee with the authority to dissolve the Steering Committee when (1) the remaining four lessons-learned activities under the Steering Committee's oversight have been transitioned to the line organizations and (2) major implementation issues are resolved or can be adequately managed within the line organizations. The revised charter also directs the Steering Committee's Chairman to notify the Commission when a determination to dissolve the Steering Committee has been made, and such notification would constitute closure of the charter.

With the substantial completion of the major Tier 1 activities, completion of the Tier 2 and 3 items, and submission of the final MBDBE rule to the Commission, the criteria noted above for closing the charter and dissolving the Steering Committee have been met. In accordance with the charter, the Deputy Executive Director for Reactor and Preparedness Programs, as Chairman of the Steering Committee, will dissolve the Steering Committee in February 2017, following a final joint meeting with the industry steering committee on February 3, 2017. Through this paper, the staff is informing the Commission of that decision. Notwithstanding the dissolution of the Steering Committee and in accordance with normal agency practice, the staff will continue to bring to the Commission's attention any proposed regulatory actions or policy matters related to Fukushima lessons-learned activities.

Transition to Long-Term Oversight/Knowledge Management

On June 15, 2014, the Office of Nuclear Reactor Regulation (NRR) centralized the day-to-day Fukushima Dai-ichi lessons-learned activities by merging the functions of the Japan Lessons-Learned Project Directorate and the Mitigating Strategies Directorate into the Japan Lessons-Learned Division (JLD). JLD executes the NTTF recommendations, as approved by the Commission, by providing oversight to support completion of these high-priority activities in an efficient and effective manner. JLD staff maintains a baseline capacity to implement Tier 1 activities and other Fukushima support activities, and reaches out to other divisions as additional resources are needed to handle workload peaks.

As lessons-learned activities transition from implementation to long-term oversight, the JLD organization is being reduced accordingly. For example, as work on specific technical issues associated with Fukushima lessons-learned activities are completed, NRR is reassigning JLD staff members to support work in other areas. This JLD resource management includes maintaining JLD functions in two branches beginning in fiscal year 2018. Along with the resource adjustment, the staff has developed a plan to ensure consistent implementation of lessons-learned initiatives with predictable outcomes; examples include development of a cross-regional panel to review inspection findings, increasing knowledge transfer opportunities, and developing new knowledge management tools. This plan will support future Fukushima-related inspection and oversight activities.

Commission Memos on Japan Lessons-Learned Status

As discussed above, in the SRM to SECY-16-0009, “Recommendations Resulting from the Integrated Prioritization and Re-Baselining of Agency Activities,” the Commission approved a staff recommendation to discontinue the staff’s 6-month Fukushima status updates. In that SRM, the Commission disapproved a staff recommendation to discontinue providing the Commission with bi-weekly Fukushima status memos; however, the Commission changed the periodicity of the memo from bi-weekly to monthly. In light of the substantial progress achieved in implementing Fukushima lessons-learned initiatives, the staff requests Commission approval to modify the periodicity of those memos (tracked as SRM-S16-0009-2), such that they are provided on a semi-annual basis rather than monthly. The staff would continue to provide timely updates to the Commission on topics of interest through routine agency communication mechanisms, such as daily notes or Notes to Commissioners’ Assistants.

RECOMMENDATION

The staff recommends that the Commission approve modification of the periodicity of the staff’s Fukushima status memos from monthly to semi-annually.

The Commissioners

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COORDINATION:

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

/RA/

Victor M. McCree
Executive Director
for Operations

Enclosures:

1. Status Update on Tier 1 Activities
2. Status Update on Other than
Tier 1 Activities

SUBJECT: FINAL STAFF REPORT ON RESPONSE TO LESSONS LEARNED FROM
 JAPAN'S MARCH 11, 2011, GREAT TŌHOKU EARTHQUAKE AND
 SUBSEQUENT TSUNAMI, JANUARY 30, 2017

SRM-S16-0009-2

**ADAMS Accession Nos.: Package: ML16356A084; Paper: ML16356A045;
 Enclosure 1: ML16356A046; Enclosure 2: ML16356A047**

*via e-mail

OFFICE	NRR/JLD/LA*	QTE*	NRR/JLD/JHMB/PM	NRR/JLD/JHMB/BC
NAME	SLent	CHsu	RBernardo	GBowman
DATE	12/12/2016	12/19/2016	12/20/16	12/22/16
OFFICE	NMSS/FCSE/DD*	RES/DRA/DD(A)*	RES/DSA/D*	NRO/DSEA/DD(A)*
NAME	SMoore (MKotzalas for)	KCoyne	MCase	SHelton
DATE	12/13/2016	12/29/2016	12/29/2016	1/4/2017
OFFICE	NRR/DPR/D*	NSIR/DPR/DD*	NRR/JLD/DD*	OGC (NLO)*
NAME	LLund	SCoffin	MShams	SClark
DATE	12/27/2016	1/3/2017	1/6/2017	1/6/2017
OFFICE	NRR/D	EDO		
NAME	WDean	VMcCree		
DATE	01/18/17	01/30/2017		

OFFICIAL AGENCY RECORD