

Resolution of Post-Fukushima Tier 2, Tier 3, and Non-Tiered Activities¹

- **Identification and prioritization of post-Fukushima activities:**
 - In SECY-11-0137, the NRC staff prioritized the Near-Term Task Force (NTTF) recommendations (SECY-11-0093) into three tiers.
 - Tier 2 and Tier 3 items consisted of those items which could not be initiated in the near term because of resource constraints, the need for further technical assessment, or were dependent on activities related to the higher priority Tier 1 issues.
 - In addition to the prioritization in SECY-11-0137, the staff identified additional issues (beyond the recommendations of the NTTF report) with a direct nexus to the Fukushima event. Three of these issues were subsequently prioritized as Tier 3 in Enclosure 2 to SECY-12-0025.
 - In Enclosure 3 to SECY-12-0025, the staff reviewed additional recommendations made by the Advisory Committee on Reactor Safeguards (ACRS) after their review of the NTTF report. Two of the ACRS recommendations were prioritized as Tier 3.
 - Three additional actions were addressed by the staff. Two of these actions were as a result of Commission direction (staff requirements memorandum (SRM) SRM-COMGBJ-11-0002 and SRM-SECY-12-0012). The third was direction from Congress in the Energy and Water Development Appropriations Act of 2012 for the NRC to fund a study of the accident by the National Academy of Sciences (NAS).
 - In SRM-SECY-11-0093, the Commission directed that NTTF recommendation 1 be pursued independently of post-Fukushima activities. As a result, this recommendation was not included in a tier.
- **Completion of the non-Tier 1 post-Fukushima activities:**
 - Several of the Tier 2 and Tier 3 NTTF recommendations involved proposed rulemaking activities:
 - In SRM-COMSECY-13-0002, SRM-COMSECY-13-0010, and SRM-SECY-14-0046, the Commission approved the staff's proposed consolidation of various rulemaking activities. This resulted in the rulemaking activities for all tiers being consolidated into a single mitigation of beyond-design-basis events (MBDBE) rulemaking. The staff submitted the draft final rule in SECY-16-0142.

¹ Commission Papers (SECY), Staff Requirements Memoranda (SRM) and Commission Action Memoranda (COMSECY) are found in the NRC Library (<https://www.nrc.gov/reading-rm/doc-collections/#comm>) on the NRC web site (www.nrc.gov).

- The NRC staff completed an evaluation of the need to expedite transfer of spent fuel to dry storage in May 2014. This was reported in COMSECY-13-0030. NRC staff concluded that, because of the minimal risk, no further generic evaluations should be pursued. The Commission agreed with the staff's recommendation in SRM-COMSECY-13-0030, but directed several follow up items for staff. The NRC staff has completed the follow up actions, including:
 - issued Information Notice 2014-14 discussing the benefits of adopting a "1 x 8" spent fuel pool (SFP) loading configuration,
 - modified the regulatory analysis (addendum to Enclosure 1 of COMSECY-13-0030) to more fully explain why additional regulatory actions to impose a requirement to establish a "1 x 8" SFP loading pattern were not justified,
 - evaluated the existing process for seismic hazard reevaluations to determine if the SFP analysis can be eliminated (the staff concluded an appropriate SFP evaluation should be conducted),
 - completed a technical overview of spent fuel rack designs used in other countries,
 - provided an information paper (SECY-14-0136) detailing the staff's views about the treatment of limited-term operational vulnerabilities, and
 - provided two reports to the Commission on the National Academy of Science's (NAS) study on this topic (SECY-15-0059, Enclosure 6 and SECY-16-0100).
- The NRC staff completed an evaluation of the applicability of lesson-learned to other regulated facilities in June 2015. The evaluation was provided to the Commission in SECY-15-0081. NRC staff determined that no regulatory action is needed for most other facilities, with two exceptions:
 - For the three high-power research and test reactors (RTRs), the staff used an audit process per NRR Office Instruction LIC-111 to determine whether additional actions were necessary. Based on the information from the audits, documented in audit reports, the staff has concluded that no further actions are necessary.
 - The staff issued Generic Letter (GL) 2015-01² to fuel cycle facilities to gather information to determine if additional regulatory activities are needed. In December 2017, the NRC staff completed all activities associated with GL 2015-01 with no further regulatory activities required.

This completed the action to determine the applicability of the Fukushima lessons-learned to other NRC regulated facilities as directed by SRM-COMGBJ-11-0002.

- The NRC staff completed "A Comparison of U.S. and Japanese Regulatory Requirements in Effect at the Time of the Fukushima Accident"³ in November 2013. This completed the action to perform a comparison study of U.S. and Japanese regulations as directed by SRM-SECY-12-0012.

² Agencywide Documents Access and Management System (ADAMS) Accession No. ML14328A029

³ ADAMS Accession No. ML13326A991

- The NRC funded a study by the National Academy of Sciences (NAS) on the lessons-learned from the Fukushima accident. NAS completed the study in two phases:
 - Phase 1⁴ of the study was published in July 2014. The NRC staff review, provided to the Commission in SECY-15-0059, Enclosure 6, found that ongoing planned NRC and industry activities adequately address the NAS recommendations from Phase 1.
 - Phase 2⁵ of the study was published in May 2016. The NRC staff review, provided to the Commission in SECY-16-0100, did not identify the need to initiate any new activities to address the Phase 2 recommendations.

This completed the action to fund and evaluate a study on the Fukushima lessons-learned by the NAS as mandated by Congress in the Energy and Water Development Appropriations Act of 2012.

- To address the remaining Tier 2 and Tier 3 items, the NRC staff developed resolution plans in October 2015 and provided them to the Commission in SECY-15-0137. The staff's evaluation considered existing requirements and voluntary measures, the overall risk posed by the issue, and insights gained during work on the Tier 1 activities, to determine if a recommendation would provide a substantial safety improvement if implemented. The remaining Tier 2 and 3 activities were binned into three groups:
 - Group 1 - Items that could be closed immediately because enough progress had been made and/or existing processes are in place to address future work. Additional ACRS and/or public interaction was not needed to resolve the recommendation.
 - The Commission agreed with closing the Group 1 issues in SRM-SECY-15-0137.
 - Group 2 - Items that the staff's initial assessment has concluded should be closed, but for which interaction with ACRS or external stakeholders is warranted prior to finalizing the assessment. Sufficient information was available and the staff's initial technical assessment was complete, but additional interaction with ACRS and/or external stakeholders would be beneficial.
 - The staff informed the Commission of the final results of its evaluation in SECY-16-0041 on March 31, 2016.
 - Group 3 - Items for which the staff had not yet completed its assessment and/or documentation, along with ACRS or external stakeholder interaction. More detailed documentation of analyses and justification for closure was needed. Interaction with ACRS and/or external stakeholders would be needed after the additional analyses were complete.
 - The staff's additional analyses were provided to the Commission on June 2, 2016, in SECY-16-0074, and on December 29, 2016, in SECY-16-0144. The Commission agreed, with comment, to close the Group 3 items in SRM-SECY-16-0144.

⁴ <https://www.nap.edu/catalog/18294/lessons-learned-from-the-fukushima-nuclear-accident-for-improving-safety-of-us-nuclear-plants>

⁵ <https://www.nap.edu/catalog/21874/lessons-learned-from-the-fukushima-nuclear-accident-for-improving-safety-and-security-of-us-nuclear-plants>

Disposition of Tier 2, Tier 3, and Non-Tiered Fukushima Lessons-Learned Activities

All non-Tier 1 recommendations have been resolved. A summary list of all the non-Tier 1 activities, the SECY-15-0137 group (if applicable), and the associated completion documentation, is provided in the following table.

NTTF Rec # or Source ⁶	Recommendation	Group	Action to Complete	Completion Documented ⁷
1	Establish a logical, systematic, and coherent regulatory framework for adequate protection that appropriately balances defense-in-depth and risk considerations.	NA	Evaluate in the context of the long term RMRF, which is outside the scope of the NRC's post-Fukushima actions, thus NTTF Recommendation 1 is considered closed.	SECY-13-0132 and SRM SECY-14-0114 Enclosure 4
ACRS	The Advisory Committee on Reactor Safeguards (ACRS) recommended expanding recommendation 2.1 to include natural hazards other than flooding and seismic. Also mandated by Congress.	3	An interim assessment, directed by SRM-SECY-15-0137, was provided in SECY-16-0074. The final staff assessment in SECY-16-0144 concluded that no additional regulatory actions were necessary. This recommendation is closed.	SECY-16-0144 Enclosure 1 and SRM
2.2	Initiate rulemaking to required licensees to confirm seismic and flooding (expanded to include all natural hazards) hazards every 10 years	3	Staff proposed to enhance existing processes to routinely aggregate and assess new hazard information vice rulemaking. The External Hazards Center of Expertise (EHCOE) will report to the Commission every six months on the implementation of the process. This recommendation is closed.	SECY-16-0144 Enclosure 2 and SRM
3	Enhancements to the capability to prevent or mitigate seismically-induced fires and floods (SIFF)	1	Given the broad regulatory activities pertaining to seismic, fire, and flooding events, operating experience involving SIFFs, and actions taken in response to the Fukushima accident, the staff concluded that additional requirements or enhancements are not needed.	SECY-15-0137 Enclosure 3 and SRM

⁶ Near-Term Task Force (NTTF) recommendations can be found in the NTTF report (ADAMS Accession No. ML11186A950)

⁷ Commission Papers (SECY), Staff Requirements Memoranda (SRM) and Commission Action Memoranda (COMSECY) are found in the NRC Library (<https://www.nrc.gov/reading-rm/doc-collections/#comm>) on the NRC web site (www.nrc.gov).

Disposition of Tier 2, Tier 3, and Non-Tiered Fukushima Lessons-Learned Activities (Continued)

NTTF Rec # or Source	Recommendation	Group	Action to Complete	Completion Documented
5.2	Evaluate the need for hardened containment vents for other containment designs	2	Staff concluded that regulatory actions to impose further improvements to containment venting and hydrogen control are not warranted. This recommendation is closed.	SECY-16-0041 Enclosure 1
6	Hydrogen and combustible gas control within containment	2	Staff concluded that regulatory actions to impose further improvements to containment venting and hydrogen control are not warranted. This recommendation is closed.	SECY-16-0041 Enclosure 1
ACRS	The ACRS recommended that the NRC consider the need for enhanced instrumentation for beyond-design-basis events	2	Staff concluded that enhanced instrumentation does not represent a substantial safety improvement. This recommendation is closed.	SECY-16-0041 Enclosure 2
7.2-7.5	Spent fuel pool makeup capability	NA	Consolidated within the Mitigation of Beyond-Design-Basis Events (MBDBE) rulemaking	COMSECY-13-0002 and SRM SECY-14-0046 Enclosure 6 and SRM
Staff	Evaluate the need to expedite transfer of spent fuel to dry storage	NA	NRC staff concluded that, because of the minimal risk, no further generic evaluations should be pursued. The Commission agreed with the staff's recommendation. This item is complete.	COMSECY-13-0030 and SRM
			In SRM-COMSECY-13-0030, the Commission directed followup actions for the staff. The followup actions are complete.	SECY-15-0059 Enclosure 3
Staff	Consider the need to expand the emergency planning zone (EPZ) beyond 10 miles	1	The staff concluded that no further regulatory action is needed. This item is closed.	SECY-15-0137 Enclosure 6 and SRM
Staff	Consider the need to pre-stage potassium iodide (KI) beyond 10 miles	1	The staff concluded that no further regulatory action is needed. This item is closed.	SECY-15-0137 Enclosure 6 and SRM

Disposition of Tier 2, Tier 3, and Non-Tiered Fukushima Lessons-Learned Activities (Continued)

NTTF Rec # or Source	Recommendation	Group	Action to Complete	Completion Documented
9.1 9.2	Emergency planning enhancements for multiunit and/or prolonged station blackout (SBO) events	NA	Consolidated within the MBDBE rulemaking	SECY-14-0046 Enclosure 6 and SRM
9.3 (P)	(Partial): Additional emergency preparedness (EP) regulatory actions	NA	Consolidated within the MBDBE rulemaking	COMSECY-13-0002 and SRM SECY-14-0046 Enclosure 6 and SRM
9.3 (P)	(Partial): Maintain emergency response data system (ERDS) capability for prolonged SBO event	1	The staff concluded that this would not result in a substantial safety improvement. This recommendation is closed.	SECY-15-0137 Enclosure 7 and SRM
10.1 10.2	Emergency response guidance, command and control, for prolonged SBO	NA	Consolidated within the MBDBE rulemaking	SECY-14-0046 Enclosure 6 and SRM
10.3	Reliability of ERDS data	1	The staff concluded that this would not result in a substantial safety improvement. This recommendation is closed.	SECY-15-0137 Enclosure 7 and SRM
11.1	Evaluate enhanced emergency response resources	NA	Consolidated within the MBDBE rulemaking	SECY-14-0046 Enclosure 6 and SRM

Disposition of Tier 2, Tier 3, and Non-Tiered Fukushima Lessons-Learned Activities (Continued)

NTTF Rec # or Source	Recommendation	Group	Action to Complete	Completion Documented
11.2	Recovery and reentry insights	1	Specific guidance for response to a nuclear or radiological event is contained in the current version of the Nuclear/Radiological Incident Annex ⁸ (NRIA) to the National Response Framework. The NRIA is being revised to address recovery in addition to response and will include lessons learned from the Fukushima event. The Federal Emergency Management Agency (FEMA) is leading an interagency effort to make those revisions. The NRC works on matters relevant to the NRIA as part of its normal interagency activities. This recommendation is closed.	SECY-15-0137 Enclosure 7 and SRM
11.3	Efficacy of real-time radiation monitoring	3	The staff concluded that no further regulatory actions were necessary. This recommendation is closed.	SECY-16-0144 Enclosure 3 and SRM
11.4	Training on radiation, radiation safety and KI	1	FEMA engages the public around nuclear sites using lessons learned and sharing best practices. This recommendation is closed.	SECY-15-0137 Enclosure 7 and SRM
12.1	Expand the reactor oversight process (ROP) to more fully include defense in depth	1	The staff has identified and implemented improvements to the ROP based on insights from Fukushima-related lessons-learned. Potential future ROP enhancements will be implemented using existing agency processes. This recommendation is closed.	SECY-15-0137 Enclosure 8 and SRM
12.2	NRC staff training on severe accidents	1	Significant progress has been made in addressing this recommendation and additional training enhancements are planned. The staff will use well-established processes to make any necessary future enhancements. This recommendation is closed.	SECY-15-0137 Enclosure 9 and SRM

⁸ <https://www.fema.gov/media-library/assets/documents/25554>

Disposition of Tier 2, Tier 3, and Non-Tiered Fukushima Lessons-Learned Activities (Continued)

NTTF Rec # or Source	Recommendation	Group	Action to Complete	Completion Documented
SRM-COMGBJ-11-0002	Applicability to other regulated facilities	NA	The staff concluded that no regulatory action is needed for most other facilities. This item is closed.	SECY-15-0081
			For the three high-power research and test reactors (RTR), the staff requested additional information from the licensees to determine whether additional actions were necessary. Based on analysis of the licensees' responses, the staff has concluded that no further actions are necessary.	SECY-17-0016 Enclosure 2
			The staff has closed GL 2015-01 ⁹ for all fuel cycle facilities with no further regulatory activities required.	SECY-17-0016 Enclosure 2
SRM-SECY-12-0110	Comparison of US and Japanese regulations	NA	Comparison study ¹⁰ was completed in November 2013. This item is complete.	SECY-14-0046 Enclosure 4
Congress	Congress directed the NRC to fund a study by the National Academy of Sciences (NAS) on the lessons learned from Fukushima. In SRM-COMSECY-13-0030, the Commission directed the staff to provide an assessment of the NAS report.	NA	Phase 1 ¹¹ complete July 2014. Staff review found that ongoing planned NRC and industry activities adequately address the NAS recommendations from Phase 1. Phase 2 ¹² complete May 2016. The staff review did not identify the need to initiate any new activities to address the Phase 2 recommendations.	SECY-15-0059 Enclosure 6 SECY-16-0100

⁹ ADAMS Accession No. ML14328A029

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