

## WHITE PAPER

### NRC STAFF PRELIMINARY ASSESSMENT OF FUKUSHIMA RECOMMENDATIONS RELATED TO: 1) EVALUATION OF NATURAL HAZARDS OTHER THAN SEISMIC AND FLOODING, 2) PERIODIC CONFIRMATION OF NATURAL HAZARDS, AND 3) REAL-TIME RADIATION MONITORING

This "white paper" has been prepared and is being released to support ongoing public discussions on NRC staff assessments of Fukushima lessons learned recommendations related to: 1) the evaluation of natural hazards other than seismic and flooding, 2) periodic confirmation of natural hazards, and 3) real-time radiation monitoring. This white paper is an intermediate work product and does not necessarily represent the final NRC staff or agency position. Following the public discussions – including with the Advisory Committee on Reactor Safeguards – the NRC staff plans to provide a paper to the Commission in December 2016 with its final assessment of these recommendations.

This paper provides the staff's preliminary assessment of whether Fukushima lessons-learned recommendations associated with natural hazards other than seismic or flooding, periodic confirmation of natural hazards, or real-time radiation monitoring, warrant additional regulatory action as part of the NRC's response to the Fukushima Dai-ichi accident. The staff's assessment of these recommendations can be found in the enclosures to this white paper. On the basis of its assessment, the NRC staff has preliminarily determined that:

- Additional regulatory actions are not needed to address natural hazards other than seismic and flooding.
- Periodic confirmation of natural hazards should be addressed through the enhancement of internal processes to establish a more routine, proactive, and systematic program for identifying and evaluating new information related to external hazards.
- Imposition of new requirements associated with real-time radiation monitoring on-site and within the emergency planning zones (EPZs) is not necessary.

The NRC's Near Term Task Force (NTTF) was established shortly after the Fukushima Dai-ichi accident. The NTTF was directed to conduct a methodical and systematic review of NRC processes and regulations and provide recommendations to the Commission on whether the agency should make changes to its regulatory program in response to the accident. In SECY-11-0093, "Near-Term Report and Recommendations for Agency Actions Following the Events in Japan," dated July 12, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11186A950), the NTTF provided its recommendations to the Commission. The staff requirements memorandum for SECY-11-0093 (ADAMS Accession No. ML112310021), dated August 19, 2011, directed the staff to recommend a prioritization of the NTTF's recommendations.

In SECY-11-0137, "Prioritization of Recommended Actions to be Taken in Response to Fukushima Lessons Learned," dated October 5, 2011 (ADAMS Accession No. ML11272A111), the staff provided the Commission with its proposed prioritization of the NTTF recommendations. In SECY-11-0137 and during subsequent interactions with stakeholders, the staff identified a number of additional issues with a clear connection to the Fukushima Dai-ichi accident that may warrant regulatory action, but that were not included in the NTTF's report. These additional recommendations were prioritized either in SECY-11-0137 or as part of later evaluations.

The staff's prioritization approach grouped the recommendations in three tiers. Tier 1 consisted of those NTTF recommendations that the staff determined would have the greatest potential safety improvement in the near term, which should be started without delay, and for which sufficient resources and critical skill sets were available. Tier 2 consisted of those NTTF recommendations that could not be initiated in the near-term due to factors such as the need for further technical assessment and alignment, dependence on Tier 1 issues, or availability of critical skill sets. Tier 3 consisted of those NTTF recommendations that required further staff study to support a regulatory action, had an associated shorter-term action that needed to be completed to inform the longer-term action, were dependent on the availability of critical skill sets, or were dependent on the resolution of NTTF Recommendation 1. Most of the Tier 3 items involved studies and evaluations.

In SECY-15-0137, "Proposed Plans for Resolving Open Fukushima Tier 2 and Tier 3 Recommendations," dated October 29, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15254A008), the NRC staff provided the Commission with a grouping of the remaining open Tier 2 and Tier 3 recommendations related to the lessons learned from the accident at the Fukushima Daiichi nuclear facility. The three groups described in the paper included: (1) recommendations that could be closed based on the staff's assessment; (2) recommendations that the staff's initial assessment concluded could be closed, but for which stakeholder interaction was warranted prior to finalizing the staff's assessment; and (3) recommendations for which the staff had not completed assessments, stakeholder interactions, and/or documentation. In SECY-15-0137, the staff committed to completing its evaluation of the Group 2 and 3 recommendations by March 31 and December 31, 2016, respectively.

In the staff requirements memorandum (SRM) associated with SECY-15-0137, dated February 8, 2016 (ADAMS Accession No. ML16039A175), the Commission:

- approved the staff's recommendation to close Group 1 recommendations,
- directed the staff to document the final results of the Group 2 evaluations after interactions with external stakeholders and the Advisory Committee on Reactor Safeguards (ACRS), and
- directed the staff to provide an interim status update of the Group 3 activity associated with natural hazards other than seismic and flooding by mid-calendar year 2016.

The staff's final results of the Group 2 recommendations are documented in SECY-16-0041, "Closure of Fukushima Tier 3 Recommendations Related to Containment Vents, Hydrogen Control, and Enhanced Instrumentation," dated March 31, 2016 (ADAMS Accession No.

ML16049A079). SECY-16-0074, "Assessment of Fukushima Tier 2 Recommendation Related to Evaluation of Natural Hazards other than Seismic and Flooding," dated June 2, 2016 (ADAMS Accession No. ML16102A297) provides staff's interim status update on the evaluation of natural hazards other than seismic and flooding.

#### Staff Assessment of Natural Hazards Other than Seismic and Flooding

In SECY-11-0093 the staff sought to identify additional recommendations related to the lessons learned from the Fukushima Dai-ichi event, beyond those identified in the NTTF report. As part of that initiative and in response to comments from the Advisory Committee on Reactor Safeguards (ACRS), as well as specific language included in the Consolidated Appropriations Act, 2012 (Section 402 of Division B of Public Law (Pub. L.) 112-74, signed into law on December 23, 2011), the NRC staff identified an action regarding evaluation of natural external hazards other than seismic and flooding. In 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), this action was prioritized as a Tier 2 activity because of the lack of availability of the critical skill sets for both the NRC staff and external stakeholders, and because the NRC staff considered the seismic and flooding reevaluations to be of higher priority.

In SECY-15-0137, the NRC staff outlined a four step process for reviewing natural hazards other than seismic and flooding:

1. Define natural hazards other than seismic and flooding to determine those hazards that could potentially pose a threat to nuclear power plants and perform a screening to determine which of those should be reviewed generically.
2. Determine and apply screening criteria to appropriately exclude certain natural hazards from further generic evaluations, or exclude some licensees from considering certain hazards.
3. Perform a technical evaluation to assess the need for additional actions if the hazard or licensee was not screened out generically in Task 2.
4. Based on the results of Task 3, determine if additional regulatory actions are needed.

In SECY-16-0074 the staff informed the Commission that it had completed Tasks 1 and 2 of the process described in SECY-15-0137. The staff concluded that other than seismic and flooding, only those natural hazards associated with high winds and snow loads warranted further assessments and stakeholder interactions to address the Tier 2 recommendation. Enclosure 1 of this white paper provides the staff's preliminary assessment of high winds and snow loads in accordance with Task 3 of the process outlined above. Based on the assessment found in Enclosure 1, the staff's preliminary conclusion is that regulatory action to provide additional protection against high winds and snow loads is not warranted.

## Periodic Confirmation of Natural Hazards

NTTF Recommendation 2.2 suggested that the NRC initiate a rulemaking to require licensees to confirm seismic and flooding hazards every 10 years and address any new and significant information including, if necessary, updating the design basis for structures, systems, and components important to safety to protect against the updated hazards. In SECY-12-0095, the staff discussed that other external hazards, such as those caused by meteorological effects, should be included in the periodic updates that would be required once Recommendation 2.2 is implemented.

In SECY-15-0137, "Proposed Plans for Resolving Open Fukushima Tier 2 and 3 Recommendations," the staff stated that the use of rulemaking to address Recommendation 2.2 was not necessary. Rather, the staff proposed to develop a method to leverage and enhance existing NRC processes and programs to ensure that information related to external hazards is proactively and routinely evaluated in a systematic manner. In response to the SRM to SECY-15-0137, NRC staff has developed a proposed framework that expands upon the concepts described in SECY-15-0137. The framework provides a graded approach that will allow NRC to proactively, routinely, and systematically seek, evaluate, and respond to new information on external hazards. The framework is described in Enclosure 2.

## Real-Time Radiation Monitoring

NTTF Recommendation 11.3 recommended that the NRC staff study the efficacy of real-time radiation monitoring on-site and within the EPZs (including consideration of alternating current power independence and real-time availability on the internet). There is extensive regulatory history associated with the evaluation of real-time radiation monitoring on-site and within the EPZs, in which policy decisions have been previously made regarding their efficacy. In its evaluation, the NTTF concluded that "as long as field teams are adequately staffed, equipped, and capable of transit given the nature of the natural disaster, field monitoring remains an effective method to acquire radiation data." In Enclosure 3 of this white paper, the staff provides its preliminary assessment that imposing a new requirement for real-time radiation monitoring is not warranted.

## CONCLUSIONS:

Based on the staff's assessment provided in Enclosure 1 through 3 of this white paper, the staff's preliminary conclusion is that additional regulatory actions are not warranted for Fukushima lessons-learned recommendations associated with natural hazards other than seismic and flooding or real-time radiation monitoring on-site and in EPZs. Regarding Recommendation 2.2, which is associated with periodic confirmation of external hazards, the staff proposes that the recommendation should be addressed through the enhancement of internal processes to establish a more routine, proactive, and systematic program for identifying and evaluating new information related to external hazards.

### Enclosures:

- 1) Evaluation of Natural Hazards Other than Seismic and Flooding
- 2) Evaluation of Periodic Confirmation of Natural Hazards
- 3) Evaluation of Real-Time Radiation Monitoring