Status of U.S.NRC Actions for the Events of Fukushima Dai-ichi NPP

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1. Introduction

Following the events at the Fukushima nuclear power plants (NPPs), various actions of the nuclear related organizations in the world are proceeding. In order to acquire design certification of the U.S. Nuclear Regulatory Committee (U.S.NRC) for the APR1400, status review of U.S.NRC action is needed. In this study, status of U.S.NRC actions for the events of Fukushima is studied by reviewing commission papers, orders, request for information (RFI), Interim Staff Guidance (ISG) issued by NRC, etc.

2. Recommendations

Following the events at the Fukushima Dai-ichi NPPs, the U.S.NRC established a senior-level agency task force (Near-Term Task Force, NTTF) to review the accident, develop lessons learned and initiate a review of NRC regulations to determine if additional measures needed to be taken in the near-term to ensure the safety of NPPs.[1] The NTTF developed a comprehensive set of recommendations including one policy statement, seven rulemaking activities, 12 orders, five staff actions and 10 actions for long-term evaluation.[2] Four NTTF recommendations about regulatory framework are pursued independent of any activities.[3]

To identify additional recommendations related to lessons learned from the Fukushima event beyond those identified in the NTTF report, the NRC received six additional recommendations both from NRC staff and external stakeholders, including the Office of Science and Technology Policy, Congress, international counterparts, other Federal and State agencies, non-governmental organizations, the public, and the nuclear industry.[4] Also, the Advisory Committee on Reactor Safeguards (ACRS) made several recommendations in letters and as a result of evaluation, the NRC determined one additional recommendation.[5] The NRC staff continues work on 38 activities.

3. Response of Recommendations

The NRC staff reviewed the NTTF recommendations within the context of the NRC's existing regulatory framework. They considered the various regulatory vehicles available to implement the recommendations and established the staff's prioritization of the recommendations based upon the potential safety enhancements.[4,6] In SECY-11-0124, the NRC staff identified eight recommendations which should be undertaken without necessary delay.[6] As a result of the NRC staff's prioritization and assessment process, the NTTF recommendations were prioritized into three tiers (Tier 1, Tier 2 and Tier 3).[4] Also in SECY-12-0025, the NRC staff described prioritization of seven additional recommendations.[5]

Tier 1 recommendations should be initiated without delay and consist of 11 NTTF and two additional recommendations. Tier 2 recommendations consist of five NTTF and one additional recommendation, which could not be initiated in the near term due to factors that include the need for further technical assessment and alignment, dependence on Tier 1 issues, or availability of critical skill sets. Tier 3 recommendations consisting of 15 NTTF and four additional recommendations require further staff study to support a regulatory action, have an associated shorter term action that needs to be completed to inform the longer term action, or are dependent on the availability of critical skill sets.

Three orders and one RFI are issued for the Tier 1 recommendations.[7~10] Order EA-12-049 is issued for development of strategies to mitigate beyond design basis natural phenomena which address multiunit events and reasonable protection of equipment identified under such strategies. Order EA-12-050 is regarding with pertaining to reliable containment vents for BWR licensees with Mark I and Mark II containment designs. Order EA-12-051 requires a reliable means of remote monitoring wide-range spent fuel pool levels to support effective prioritization of event mitigation and recovery actions in the beyond-design-bases external event.

The NRC also addressed a request for information about seismic and flooding reevaluations, seismic and flooding hazard walkdowns, and assessment on communication system and equipment under conditions of onsite and offsite damage and prolonged station blackout (SBO) and performance on a staffing study to determine the number and qualifications of the staff required to fill all necessary positions in response to a multiunit event.

The NRC issued six interim staff guidance to describe the acceptable methods to comply with three Orders and the RFI described above.[11~16] Regarding to EA-12-49, JLD-ISG-2012-01 is issued and endorses the methodologies described in the industry guidance document, Nuclear Energy Institute (NEI) 12-06.[17] Also, the NRC staff has determined that with some

exceptions, conformance with the guidance in NEI 12-02 is an acceptable method for use in satisfying the requirements in order EA-12-051.[18] NEI also issued the NEI 12-01 to provide guideline for assessing beyond design basis accident response staffing and communications capabilities.[19]

The NRC initiated a rulemaking in the form of an advanced notice of proposed rulemaking (ANPR) for NTTF recommendation on strengthening SBO mitigation capability.[20] According to SRM-COMSECY-13-0002, the NRC will consolidate regulatory activities associated with NTTF recommendations on SBO mitigation capability and on spent fuel pool instrumentation and makeup capability into a single rulemaking to be henceforth called "Station Blackout Mitigating Strategies." For NTTF recommendation on strengthening and integrating onsite emergency response capabilities, the NRC issued an ANPR and a draft regulatory basis, and held a public meeting. The final regulatory basis is scheduled to be completed by May 2013, the proposed rule is due July 2014, and the final rule is due in February 2016.

The NRC made program plans on Tier 3 recommendations.[21] The plans describe purpose, dependencies on other recommendation, schedule and milestone, etc.

4. Conclusions

In order to acquire design certification of the APR1400, status of U.S.NRC actions for the events of Fukushima Dai-ichi NTT is reviewed. The NRC has determined and conducted the 38 recommendations for action including 31 NTTF recommendations and seven additional recommendations. The recommendations are divided into Tier 1, Tier 2 and Tier 3. Tier 1 and Tier 2 recommendations are implemented by three Orders, one request for information and two rulemakings. To comply with three orders and one request for information, the NRC issued six ISGs and NEI issued three technical reports. The final rule on strengthening and integrating onsite emergency response capabilities will be issued in February 2016. Station blackout mitigating strategies rulemaking on SBO mitigation capability and on spent fuel pool instrumentation and makeup capability will proceed.

REFERENCES

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[5] SECY-12-0025, "Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Subsequent Tsunami," 2012.
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[7] Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," 2012.
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[9] Order EA-12-051, "Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," 2012.
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[16] JLD-ISG-2012-06, "Guidance for Performing a Tsunami, Surge, or Seiche Hazard Assessment," 2012.
[17] NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, 2012.
[18] NEI 12-02, "Industry Guidance for Compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation"," Rev1, 2012.
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[21] 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," 2012.