Summary Status of Active Generic Issues (GIs)

Reactor Generic Issues

The Generic Issues Program is evaluating four open generic issues (GIs) and tracking their resolution. Three GIs are in the regulatory office implementation stage, GI-191, GI-199, and GI-204. One GI is in the GI program assessment stage (GI-193). The status of each open generic issue is described below:

GI-191, "Assessment of Debris Accumulation on Pressurized-Water Reactor (PWR) Sump Performance"

This GI concerns the possibility that, following a loss-of-coolant accident (LOCA) in a PWR, debris accumulating on the emergency core-cooling system (ECCS) sump screen may result in clogging and restrict water flow to the pumps.

As a result of this GI and the related Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors," dated September 13, 2004, all PWR licensees increased the size of their containment sump strainers, significantly reducing the risk of strainer clogging. A related issue, which needs to be resolved to close GI-191, is the potential for debris to bypass the sump strainers and enter the reactor core. In 2008, the staff of the U.S. Nuclear Regulatory Commission (NRC) determined that additional industry-sponsored testing was necessary to resolve this issue. In 2012, the industry performed and completed the additional testing and submitted a topical report to the NRC. In 2013, NRC staff issued a safety evaluation of the topical report, finding it an acceptable model for assessing the effect of sump-strainer-bypassed fibrous, particulate and chemical debris on core cooling in PWRs.

In December 2010, the Commission determined that it was prudent to allow the nuclear industry to complete testing on in-vessel effects and zone of influence and to develop a path forward by mid-2012. The Commission directed NRC staff to evaluate alternative approaches, including risk-informed approaches, for resolving GI-191 and to present them to the Commission by mid-2012. Based on the interactions with stakeholders and the results of the industry testing, NRC staff in 2012 developed three options for licensees to resolve GI-191. These options were documented and proposed to the Commission in SECY-12-0093, "Closure Options for Generic Safety Issue 191, Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance," dated July 9, 2012. All options require licensees to demonstrate compliance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors." The options allow industry alternative approaches for resolving GI-191. The Commission issued a Staff Requirements Memorandum on December 14, 2012, approving the options for closure of GI-191.

Licensees have since notified the NRC of the option that they have selected and are developing proposed technical resolutions based on the option selected. NRC staff is reviewing the proposed technical resolutions as licensees submit them. To date, seven sites have successfully resolved GI-191.

GI-193, "Boiling Water Reactor (BWR) Emergency Core Cooling System (ECCS) Suction Concerns"

GI-193 involves an evaluation of the consequences of LOCA causing a blowdown of containment gas into the suppression pool. The noncondensable gas could enter into the suction piping of the ECCS pumps, causing gas binding, vapor locking, or cavitation, leading to a possible failure or degraded performance. The Office of Regulatory Research (RES) has completed a technical report providing a basic understanding of the overall phenomena. The results of the study provide the "exclusion zone," and a quantification of the time-dependent gas void fraction present at different locations in the suppression pool following a large-break LOCA. The technical report will be issued as a NUREG in 2016.

RES has completed computational fluid dynamics (CFD) models and analyses for several tests performed at two smaller scale test facilities that model the post-LOCA noncondensable gas behavior in a suppression pool. Analyses have been completed to simulate full-scale Mark I suppression pool behavior after a large-break LOCA. These results can be used to determine the location of a time-dependent "exclusion zone," which is the volume below and around the downcomer exhaust that is expected to contain a large concentration of noncondensable gas from the drywell after a LOCA. If an ECCS pump suction strainer is in this "exclusion zone," the ECCS pump may be vulnerable to gas entrainment if it is operated during the time the large noncondensable gas volume is present. The completed RES technical report provides a means to assess the post-LOCA vulnerability of an ECCS pump based upon pump strainer location and an ECCS pump start time.

Using the information in the technical report, the GI review panel is completing an assessment to determine whether the issue should proceed to regulatory office implementation. The panel found the issue does not present a significant safety hazard. The panel anticipates recommending that the issue be closed rather than proceed to regulation office for implementation. The panel will be presenting its final assessment report to the Director of RES in the near future.

GI-199, "Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States for Existing Plants"

This GI addresses the estimated seismic hazard levels at current nuclear sites in the central and eastern United States (CEUS) that might be higher than the values used in designs and previous evaluations.

The NRC evaluated the effects of new seismic hazard data and methods on U.S. nuclear plants and collaborated with the Electric Power Research Institute (EPRI) to ensure a sound technical approach was developed. The Safety/Risk Assessment Panel issued its report on September 2, 2010. The panel recommended that further actions be taken to address GI-199 outside the GI program. The NRC issued Information Notice 2010-18, "Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States on Existing Plants," on September 2, 2010, to inform stakeholders that the GI-199 safety/risk assessment report had been issued. The information notice also stated that the NRC will follow the appropriate regulatory process to request that operating plants and independent spent fuel storage installations provide specific information about their facilities to enable NRC staff to complete the regulatory assessment and identify and evaluate candidate backfits. After the accident at the Fukushima Dai-ichi nuclear power plant resulting from the March 11, 2011, Great Tōhoku Earthquake and subsequent tsunami in Japan, the NRC incorporated GI-199 into the work being performed in response to the accident. The NRC has requested that all nuclear power

plants reevaluate seismic hazards using present-day guidance and methods. Licensees of nuclear plants in CEUS and Western United States (WUS) submitted their reevaluated seismic hazards by March 2015.

NRC staff has finished reviewing the reports and issued a final determination letter for seismic risk evaluations on October 27, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15194A015). The letter includes a staggered schedule for submitting the seismic risk evaluations for those sites that screen in. The final determination letter updates the preliminary screening letters that the NRC issued on May 9, 2014 (for the CEUS plants) and May 13, 2015 (for WUS plants). Overall, 20 operating reactor sites have screened in, requiring licensees to complete seismic risk evaluations. Of the remaining 41 sites, 32 sites are required to perform limited-scope evaluations (i.e., high-frequency evaluation, low-frequency evaluation, or spent fuel pool evaluation). Nine sites have screened out of any further evaluations.

In December 2014, the CEUS sites that screened in for a seismic risk evaluation have submitted interim actions or evaluations as part of the licensee's expedited seismic evaluation process (ESEP). The ESEP served as an engineering review of the interim actions or evaluations, which determined systems and components that can be used to safely shut down a plant under certain accident conditions. The ESEP either (1) confirmed that a plant has sufficient margin to continue operations without any modifications, pending a long-term evaluation, or (2) identified the need to enhance the seismic capacity of the plant in the near term. By the end of the calendar year 2015, NRC staff expects to complete the review of the ESEP submittals for those sites that screened in and issued responses. One WUS screened in to perform an expedited seismic evaluation. The submittal is anticipated by December 31, 2015 and NRC staff expects to complete that evaluation by March 31, 2016.

GI-204, "Flooding of Nuclear Power Plant Sites Following Upstream Dam Failures"

This GI relates to potential flooding effects from upstream dam failure(s) on nuclear power plant sites, spent fuel pools, and sites undergoing decommissioning with spent fuel stored in spent fuel pools. The Office of Nuclear Reactor Regulation proposed this GI in July 2010, and it has been subsumed as part of the implementation of the recommendations from the agency's Japan Near-Term Task Force (NTTF).

In March 2012, the NRC sent letters to licensees requesting the reevaluation of all flood hazards, to include dam failures, using present-day guidance and methodologies. As of the end of November 2015, most sites have completed flood hazard reevaluations in response to the March 2012 request. Some licensees have requested and been granted extensions, where appropriate (e.g., to allow time for the U.S. Army Corps of Engineers to provide input necessary to complete the analyses). The NRC has begun to issue assessments of the flood hazard reevaluation reports. NRC staff expects to complete the technical assessment of licensees' Flood Hazard Reevaluation Reports by the end of 2016. Those sites that had flood-causing mechanisms that exceeded the current design basis are required to perform additional analysis (e.g. focused evaluation (due in mid-2017) or integrated assessment (due by the end of 2018), depending on the hazard) to evaluate the site response to the updated flood hazard.

Status Summary of Active Generic Issues during the First Quarter (Q1) of FY 2016					
GI No.	*Title*	*Current Stage*	*Planned Closure*	*Months Open*	*Regulatory Effects*
191	*Assessment of Debris Accumulation on Pressurized-Water Reactor (PWR) Sump Performance*	*Regulatory Office Implementation*	*12/2018*	*232*	*Regulatory Guide 1.82, "Water Sources for Long-Term Recirculation Cooling Following a Loss-of-Coolant-Accident;"* *Regulatory guide* 1.229, "Risk-Informed Approach for Addressing the Effects of Debris on Post-Accident Long-Term Core Cooling;" *NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition;"* *Bulletin 2003-01; Generic Letter (GL) 2004-02*
193	*Boiling-Water Reactor (BWR) Emergency Core Cooling Systems (ECCS) Suction Concerns*	*Complete Generic Issue Program Assessment*	*1/2016*	*164*	*None Expected*

Status Summary of Active Generic Issues during the First Quarter (Q1) of FY 2016					
GI No.	*Title*	*Current Stage*	*Planned Closure*	*Months Open*	*Regulatory Effects*
199	*Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States for Existing Plants*	*Regulatory Office Implementation* *Activities Covered by 10 CFR 50.54(f) Letters on items 2.1, 2.3 & 9.3 of the Japan NTTF Recommendations*	*December 2019*	*128*	*Information Notice (IN) 2010-018, "Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States on Existing Plants,"* *IN 2010-019, "Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States"* *Request for Information letter dated March 12, 2012, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights From the Fukushima Dai-ichi Accident"*
204	*Flooding of Nuclear Power Plant Sites Following Upstream Dam Failures*	*Regulatory Office Implementation* *Activities Covered by 10 CFR 50.54(f) Letters on Items 2.1, 2.3 & 9.3 of the Japan NTTF Recommendations*	*To Be Determined*	*48*	*Request for Information letter dated March 12, 2012, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights From the Fukushima Dai-ichi Accident"*