

## Summary Status of Active Generic Issues (GIs)

### Reactor Generic Issues

The Generic Issues Program is currently 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 assessment stage (GI-193), and is expected to close in the upcoming quarter. A summary of the status of each open GI 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 were 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. The completed RES technical report provided a means to assess the post-LOCA vulnerability of an ECCS pump based upon pump strainer location and an ECCS pump start time. This report is not currently publicly available; however, it will be published as NUREG-2196 and made publicly available in the middle of 2016.

Using the information in the technical report, the GI review panel has completed an assessment and found the issue does not present a significant safety hazard. Therefore, the issue will not proceed to regulatory office for implementation. The panel is scheduled to present its final assessment report to the Director of RES in April 2016.

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

This GI addresses how current estimates of the seismic hazard level at some nuclear sites in the Central and Eastern United States (CEUS) might be higher than the values used in their original designs and previous evaluations. Following collaboration with the Electric Power Research Institute (EPRI), a Safety/Risk Assessment Report recommending actions to be taken to address GI-199 was communicated to licensees and other stakeholders via Information Notice 2010-18, “Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States on Existing Plants.”

Following the March 2011 nuclear event in Japan, the agency incorporated GI-199 into the work being performed in response to the accident. Consequently, as part of a March 12, 2012, 50.54(f) request for information, the NRC requested all nuclear power plants reevaluate their seismic hazards using present day guidance and methods. The CEUS sites submitted reevaluated seismic hazard reports in March 2014. Based on the reports, the NRC staff determined the need to complete future seismic probabilistic risk assessments (SPRAs) or other seismic evaluations as documented in a letter to the CEUS sites issued on October 27, 2015.

As of March 2016, of the 61 overall sites, staff assessments of the reevaluated seismic hazards reports were completed for all 58 CEUS sites and 2 WUS plants, with 1 WUS plant outstanding. The screening results were refined based on the completed staff assessments. Overall, 20

operating reactor sites, 18 CEUS sites and 2 WUS sites, have screened in for completion of SPRAs. Of the remaining 41 sites (40 CEUS sites and 1 WUS site), 8 have screened out of any further evaluations. The remaining 32 CEUS are requested to perform limited scope evaluations (i.e., high frequency evaluation, low frequency evaluation, or spent fuel pool evaluation). The 1 WUS site is still being evaluated by the staff.

Of the original 61 sites, 48 sites and later reduce to 34 sites were initially selected to perform Expedited Seismic Evaluation Process (ESEP) reports, due in December 2014. The ESEP reports confirmed that adequate seismic margin exists to safely shut down the plant without need for modifications while lengthier seismic evaluations were being conducted. The NRC staff has completed reviews of all ESEP reports for CEUS sites, and currently evaluating 1 WUS site. Required plant modifications will be completed as specific in the NRC final determination letter issued on October 27, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15194A015). Plant upgrades not requiring an outage will be completed by December 2016 for CEUS plants and by June 2018 for WUS plants.

#### **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) and evaluate the site’s response to the updated flood hazard.

Status Summary of Active Generic Issues during the Second Quarter (Q2) 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	233	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	04/2016	165	None Expected

Status Summary of Active Generic Issues during the Second Quarter (Q2) 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	129	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	49	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"