

## **Summary Status of Generic Issues (GIs)**

### **Reactor Generic Issues (Active)**

In accordance with Management Directive 6.4, "Generic Issues Program," the NRC transferred the responsibility for implementation and verification of GI-191, GI-199, and GI-204 to the Office of Nuclear Reactor Regulation (NRR). The GI Program staff will continue to track the status of all GIs and report on them until completion.

### **GI-191, "Assessment of Debris Accumulation on Pressurized-Water Reactor (PWR) Sump Performance" (pages 1–8 of the GIMCS report).**

GI-191 is in the regulatory office implementation stage of the GI Program. This GI concerns the possibility that, following a loss-of-coolant accident (LOCA) in a PWR, debris accumulating on the emergency core cooling system sump screen may result in clogging and restricting water flow to the pumps. Because of this GI and the related generic letter (GL) 2004-02, all PWR licensees increased the size of their containment sump strainers substantially, which significantly reduced the risk of strainer clogging. Some licensees removed fibrous or particulate insulation, changed their sump pH buffers to reduce chemical effects, or installed debris interceptors to reduce the amount of debris that can reach the strainers.

An associated issue that needs to be resolved to close GI-191 involves the potential for debris to bypass the sump strainers and to enter the reactor core. In 2008, the NRC staff determined that additional industry-sponsored testing was necessary to support resolution of this issue. The industry performed and completed its additional testing and submitted its topical report to the NRC. The topical report guidance and acceptable bases were developed through analyses and flow testing using representative fuel assemblies and emergency core cooling systems (ECCS) flow rates. The NRC staff issued a safety evaluation (SE) to 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. The Commission issued a staff requirements memorandum (SRM) in December 2010, SRM-SECY-10-0113, "Closure Options for Generic Safety Issue 191, 'Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance'." The Commission determined that it was prudent to allow the nuclear industry to complete testing on in-vessel effects and zone of influence in 2011 and to develop a path forward by mid-2012. The SRM directed the 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, the NRC staff in 2012 developed three options 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 would require licensees to demonstrate compliance with 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors." The options allowed industry alternative approaches for resolving GI-191. The Commission issued SRM-SECY-12-0093 on December 14, 2012, approving the options for closure of GI-191. The staff currently projects closure for this GI in December 2018.

GI-193, “Boiling Water Reactor (BWR) Emergency Core Cooling System (ECCS) Suction Concerns” (pages 9–12 of the GIMCS report).

GI-193 is in the assessment stage of the GI Program. This GI involves an evaluation of possible failure or degraded performance of the ECCS pumps due to unknown quantities of noncondensable gas in the suction piping that could cause gas binding, vapor locking, or cavitation.

Completed portions of the Task Action Plan resulted in a basic understanding of the overall phenomena. The next phase attempted to quantify the gas void fraction present at different locations in the suppression pool as a function of time following a LOCA. This information will be used to identify the possible need for a post-LOCA suppression pool ECCS pump suction strainer “exclusion zone.” “Exclusion zone” is the volume below or around the downcomer exhaust that is expected to contain a large concentration of noncondensable gas from the drywell. The “exclusion zone” defines boundary zones such that if a suction strainer is located in a boundary zone, the ECCS pump may be vulnerable.

Computational fluid dynamics (CFD) models and analyses have been completed for several tests performed at the two test facilities. CFD analyses have been completed using computational methods used for the two test programs to simulate full-scale Mark I suppression pool behavior following a large-break LOCA. A technical report is being drafted and the results from the full-scale CFD analyses can be used to determine the time dependent “exclusion zone.” Once the technical report is issued, a safety and risk analysis will be performed to determine whether the issue should proceed to regulatory office implementation.

GI-199, “Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States for Existing Plants” (pages 13–16 of the GIMCS report).

GI-199 is in the regulatory office implementation stage of the GI Program. The NRC opened GI-199 to assess the implications of updated seismic data and methods for central and eastern United States (CEUS) operating plants. The staff’s confirmatory analysis concluded that the calculated seismic hazard for some operating plants in the CEUS had increased. NRR developed a draft Generic Letter (GL) to request needed data from power reactor licensees. The NRC originally intended the request to apply only for power reactor licensees in the CEUS, but in light of the March 2011 Japanese earthquake, NRR expanded the scope of the request to include all U.S. power reactor licensees.

The NRC released the draft GL to the public for comment in September 2011 (ML111710783). The preparation of the GL was halted because the agency incorporated this GI into the work it is doing in response to the Fukushima Dai-ichi accident. The NRC has requested that all nuclear power plants reevaluate seismic hazards using present-day guidance and methods.

Plants in the CEUS submitted their seismic hazard reevaluations in March 2014, and plants in the western United States (WUS) submitted their seismic hazard reevaluations in March 2015. Depending on the comparison between the reevaluated seismic hazard and the design basis, the resulting outcome is either no further risk evaluation for the plant (screened out) or performance of a plant risk assessment if the reevaluated hazard exceeds the plant’s design basis (screened in). If the reevaluated hazard only exceeds the design basis above 10Hz, then the licensee needs to perform a high-frequency confirmation. The NRC performed a screening and prioritization of the submittals. The NRC determined which licensees screened in for further analysis and sorted those licensees into different priority groups with different due dates

for submitting the risk evaluations to the NRC. The NRC is now performing a more comprehensive review of the reevaluated hazard submittals and has begun to issue staff assessments of those submittals. The NRC determined the priority for the subsequent completion of the risk assessments by nuclear power plants based on the following factors: (1) the extent to which the reevaluated hazard exceeds the current design basis, (2) the absolute seismic hazard based on an examination of the probabilistic seismic hazard curves for the site, and (3) previous estimates of plant capacity (e.g., Individual Plant Examination of External Events [IPEEE] insights). If required, the risk evaluations are due in 2017, 2019, or 2020 depending on the priority.

While the risk evaluations are ongoing, plants also will perform near-term expedited seismic evaluations of key equipment needed to protect the reactor core following a beyond-design-basis seismic event. The expedited seismic evaluations for CEUS plants were completed by December 2014. The expedited seismic evaluations will be completed by January 2016 for WUS plants. As a result of the expedited seismic evaluations, plant upgrades not requiring an outage will be completed by December 2016 for CEUS plants and by June 2018 for WUS plants. The staff has begun issuing letters documenting the results of its review of licensee's Expedited Seismic Evaluation Process Evaluation.

GI-204, "Flooding of Nuclear Power Plant Sites Following Upstream Dam Failures" (page 17–18 of the GIMCS report).

GI-204 is in the regulatory office implementation stage of the GI Program. This GI pertains to the flooding of U.S. NPP sites following upstream dam failure. This issue is similar to GI-199 in that the NRC was examining both issues prior to the Fukushima Dai-ichi accident in Japan. The NRC is addressing both issues as part of its response to the recommendations of the agency's Near Term Task Force (NTTF) review of insights from the accident, specifically NTTF recommendation 2.1. The NRC issued a request for information letters related to the reevaluation of flood hazards in March 2012.

An NRC letter dated May 11, 2012, (ADAMS Accession number ML12097A510) to all power reactor licensees states that licensees, separated by categories, must submit their flood hazard reevaluations to the NRC in three prioritized response due dates by March 2013, March 2014, and March 2015. The NRC staff used criteria described in the letter to assign plants a schedule (category) for completing the flood hazard reevaluations. The categories correspond to the length of time allotted (prioritization) to complete the hazard reevaluation and report the results to the NRC.

As of March 2015, most sites have completed flood hazard reevaluations in response to the March 2012 request. Some sites have requested and been granted extensions, as appropriate. The staff expects to complete the technical staff assessments documenting the Flood Hazard Reevaluation Report (FHRR) review performed by 2017. Under the current plan, those sites that had flood-causing mechanisms that exceeded the current design basis are required to submit an integrated assessment evaluating the site response to the FHRR results as described in the March 2012 letter. However, the staff is currently developing a plan with a graded approach that will focus on the areas with the most potential safety benefit. The plan (ADAMS Accession No ML15153A104) was submitted to the Commission for approval on June 30, 2015.

*Status Summary of Active Generic Issues during the Third Quarter (Q3) of FY 2015*

<i>GI No.</i>	<i>Title</i>	<i>Current Stage</i>	<i>Planned Closure</i>	<i>Months Open</i>	<i>Regulatory Impacts</i>
191	<i>Assessment of Debris Accumulation on Pressurized-Water Reactor (PWR) Sump Performance</i>	<i>Regulatory Office Implementation</i>	<i>12/2018</i>	<i>226</i>	<i>Regulatory Guide 1.82, "Water Sources for Long-Term Recirculation Cooling Following a Loss-of-Coolant-Accident;" 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</i>
193	<i>Boiling-Water Reactor (BWR) Emergency Core Cooling Systems (ECCS) Suction Concerns</i>	<i>Technical Assessment</i>	<i>To Be Determined</i>	<i>158</i>	<i>To Be Determined</i>
199	<i>Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States for Existing Plants</i>	<i>Regulatory Office Implementation</i>  <i>Activities Covered by 10 CFR 50.54(f) Letters on items 2.1, 2.3 &amp; 9.3 of the Japan Near-Term Task Force (NTTF) Recommendations</i>	<i>To Be Determined</i>	<i>122</i>	<i>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"</i>  <i>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"</i>

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204	<i>Flooding of Nuclear Power Plant Sites Following Upstream Dam Failures</i>	<i>Regulatory Office Implementation</i>  <i>Activities Covered by 10 CFR 50.54(f) Letters on Items 2.1, 2.3 &amp; 9.3 of the Japan NTTF Recommendations</i>	<i>To Be Determined</i>	42	<i>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"</i>