

Status Report on Proposed Generic Issues
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Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Division of Risk Analysis
Operating Experience and Generic Issues Branch

CONTENTS

Introduction 3

PRE-GI-0001, “Multi-Unit Core Damage Events” 4

PRE-GI-0009, “Flooding of Nuclear Power Plant Sites Following Upstream Dam Failures” 5

PRE-GI-0010, “Dispersal of Fuel Particles During a Loss of Coolant Accident” 6

PRE-GI-0011, “Effect of Downstream Dam Failures on NRC Licensed Facilities” 7

PRE-GI-0012, “Effects of Upstream Dam Failures on Fuel Facilities” 8

PRE-GI-0013, “Effect of External Flooding on Independent Spent Fuel Storage Installations” 9

INTRODUCTION

This report provides a summary of activity for Proposed Generic Issues that existed since the previous report was issued [August 31, 2011, ML112370098].

The Generic Issues Program addresses proposed safety or security issues that may fit the criteria specified in NRC Management Directive 6.4, "Generic Issues Program". Proposed Generic Issues and Generic Issues are assessed through five stages of activity defined and described as follows:

Stage 1 - **Identification** begins when a potential generic issue is identified by an individual or organization

Stage 2 – The **Acceptance Review** begins when the potential generic issue is submitted as a Proposed Generic Issue and ends when the issue is accepted (moves to Screening Analysis) or not accepted per the guidance in Management Directive 6.4.

Stage 3 – The **Screening Analysis** begins when a Proposed Generic Issue is accepted by the program and ends when a screening analysis report has been completed and a recommendation from an associated review panel has been approved by the Director of the Office of Nuclear Regulatory Research.

Stage 4 – The **Safety/Risk Assessment** begins with the approval of a Proposed Generic Issue as a Generic Issue by the Director of the Office of Nuclear Regulatory Research and ends when the issue is closed or proceeds to Regulatory Assessment.

Stage 5 – **Regulatory Assessment** is a final stage of activity where regulatory changes are considered. This activity ends with the closure of the Generic Issue, either with or without associated regulatory changes.

NUREG-0933, "Resolution of Generic Safety Issues", contains a description of the process and the status or resolution of each Generic Issue under the Generic Issues Program (as of the most recent supplement). An updated status is routinely provided in the quarterly Generic Issues Management Control System Report issued by the Generic Issues Program. This information is available on the NRC website at <http://www.nrc.gov/about-nrc/regulatory/gen-issues.html>.

Issue ID: PRE-0001

Multi-Unit Core Damage Events

Overall Status: The screening analysis panel recommendation is in review by the Director of the Office of Nuclear Regulatory Research.

Date Received: 02/18/2008

Submitter: State-of-the-Art Reactor Consequence Analyses Project staff, RES/DRA/PRAB

Submission Documents: Generic Issue Form 2/14/2004 (ML081070400), Candidate Generic Issue, Multi-Unit Core Damage Events (ML081070392)

Acceptance Review Information

Status: Accepted on 08/26/2008 POC: John Kauffman

Acceptance Review Document: Acceptance Review of Proposed Generic Issue (PRE-GI-001) on Multi-Unit Core Damage Events (ML081070425)

Screening Analysis Information

Status: Panel recommendation completed on 11/2/2012 POC: John Kauffman

Working Group: John Kauffman, Marty Stutzke

Screening Panel: Dube, Donald; Stutzke, Martin; Weerakkody, Sunil

Brief Description

A potential safety concern was identified during the sequence identification and selection process for the State-of-the-Art Reactor Consequence Analysis (SOARCA) project for the Surry and Peach Bottom plants. Staff working on the SOARCA project identified scenarios in which both units at each plant would be expected to experience accident sequence progression pathways leading to core damage as a result of the initiating event. These scenarios had core damage frequencies in the range of 10^{-6} per year. This frequency is low in an absolute sense, but it is in the range of other scenarios being evaluated in probabilistic risk assessment (PRA) studies. This topic was proposed as a Generic Issue because such multiunit core damage sequences may challenge the ability of the plant operating personnel to respond and may require resources (technical staff and equipment) beyond that which is available for single unit scenarios. Multiunit core damage scenarios may also increase the radionuclide releases and offsite consequences.

Current licensing policy and practice considers each plant individually; that is, a single license is not obtained for a site composed of multiple plants. There are currently 36 sites with multiple nuclear units and there are applications for more units at existing sites. A number of actions or policy changes can be envisioned to address this issue. However, the first necessary step to determine whether actions and policy changes may be warranted is to quantify the risk or safety significance of multiunit scenarios. This entails the development of appropriate risk tools, such as multiunit PRA models.

During the screening of this issue, the March 2011 accident at Fukushima Dai-ichi in Japan occurred, further underscoring the importance of better understanding and quantification of multiunit risk. Post-Fukushima, the NRC determined that U.S. plants are safe for continued operation. In addition, as described in 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" numerous actions, such as orders and requests for information, are in progress which will enhance the resources (equipment, procedures, and emergency response staffing) available to respond to a multiunit event; thus reducing multiunit risk.

Issue ID: PRE-0009

Flooding of Nuclear Power Plant Sites Following Upstream Dam Failures

Overall Status: Established as Generic Issue 204

Date Received: 07/19/2010

Submitters: Lois James; Fernando Ferrante; Meena Khanna, NRR/DRA/APOB

Submission Document: Identification of a Generic External Flooding Issue Due to Potential Dam Failures
(ML101900305, not publicly available)

Acceptance Review Information

Status: Accepted on 08/09/2010 POC: Richard Perkins

Acceptance Review Document: Acceptance Review of Proposed Generic Issue on Flooding Due to Potential Dam Failures (ML102210339)

Screening Analysis Information

Status: Panel recommendation completed on 12/7/11 POC: Richard Perkins

Screening Review Document: Screening Analysis Report for the Proposed Generic Issue on Flooding of Nuclear Power Plant Sites Following Upstream Dam Failures [ML113500495]

Screening Review Document: Generic Issue Review Panel Recommendation for the Proposed Generic Issue Pertaining to the Flooding of Nuclear Power Plant Sites Following Upstream Dam Failure (ML113260158)

Working Group: Richard Perkins, Selim Sancaktar, Jacob Philip, Michelle Bensi

Panel: William Ruland, Marie Pohida, Keith Compton

Brief Description

This GI pertains to the flooding of U.S. nuclear power plant sites following upstream dam failure. Possible effects on spent fuel pools at nuclear power plant sites are also within the scope of the GI. New sources of information on this issue have accumulated over the past few years. This information includes inspections of flood protection and related procedures, as well as recent re-evaluations of dam failure frequencies and possible flood heights at some U.S. nuclear power plants, suggesting that flooding effects in some cases may be greater than previously expected.

Nuclear power plant designs include protection against serious but very rare flooding events, including flooding from dam failure scenarios. Dam failures can occur as a consequence of earthquakes, overtopping, and other mechanisms such as internal erosion and operational failures. A dam failure could potentially cause flooding at a nuclear power plant site depending on a number of factors including the location of the dam, reservoir volume, dam properties, flood routing and site characteristics. While this screening did not identify any immediate safety concerns, inspections or other reviews at individual plants have led to those plants taking actions regarding flooding scenarios.

Generic Issue Information

This issue was designated as Generic Issue #204 (GI-204) in March 2012. Evaluation of the issue will continue as part of recommendations 2.1 and 2.3 of the Fukushima Near-Term Task Force activities.

GI-204 point of contact is Christopher Cook, NRO.

Issue ID: PRE-0010
Dispersal of Fuel Particles during a Loss of Coolant Accident
Overall Status: Screening review in progress

Date Received: 10/06/2011
Submitter: Patrick Raynaud, RES/DSA/FSCB
Submission Document: Fuel Dispersal During a LOCA: Generic Issue Proposal (ML112930079)

Acceptance Review Information

Status: Accepted on 10/21/2011 POC: Jose Ibarra
Acceptance Review Document: Acceptance Review of Proposed Generic Issue on Dispersal of Fuel Particles during a Loss of Coolant Accident (ML112910156)

Screening Analysis Information

Status: In progress POC: John Kauffman, RES
Working Group: Mehdi Reisifard, Richard Lee, Patrick Raynaud
Panel: Ralph Landry, Michelle Flanagan, Doug Coe, Jack Davis

Brief Description

This issue concerns possible fuel dispersal into the core from ballooned and ruptured fuel rods during a loss-of-coolant accident (LOCA) and the potential adverse effects on accident progression and radiological activity levels. While the consequence of fuel fragmentation and dispersal during a LOCA are being evaluated to determine the safety significance of the issue, these consequences are not likely to result in an imminent safety hazard at the current fuel burn-up limits. The pellet cracking, grain and pore structure evolutions coincident with high burn up may enhance the ability of fuel material to flow freely under the influence of gravity and pressure differences out of the rupture opening.

Issue ID: PRE-0011
Effect of Downstream Dam Failures on NRC Licensed Facilities
Overall status: Screening review in progress

Date Received: 11/18/2011
Submitter: Fernando Ferrante, NRR/DRA
Submission Document: Proposal of a Generic Issue Related to the Effect of Downstream Dam Failures on NRC Licensed Facilities (ML11308B373, not publicly available)

Acceptance Review Information

Status: Accepted on 11/29/2011 POC: Jose Ibarra, RES/DRA/OEGIB
Acceptance Review Document: Acceptance Review of Proposed Generic issue on Down Stream Dam Failures (ML113260074)

Screening Analysis Information

Status: In Progress POC: Lawrence Criscione
Working Group: Lawrence Criscione
Panel: John Monninger, Les Cupidon, Rich Correia, Marie Pohida

Brief Description

Sources of cooling water for normal and/or emergency operations at some nuclear power plant sites are provided by reservoirs formed by onsite or offsite dams that block a river/stream or create an onsite lake or pond. In such cases, failure of the dam could affect the ability of cooling water systems to perform their intended functions (e.g., control of various heat loads via the ultimate heat sink). The loss of heat sink due to failure of one or more dams differs from other postulated events that can cause the loss of a heat sink (e.g., clogging of intake screens or failure of individual components) due primarily to differences in the capability of a site to recover from the event (e.g., remove obstructions blocking an intake screen).

Issue ID: PRE-0012
Effects of Upstream Dam Failures on Fuel Facilities
Overall status: Not accepted

Date Received: 12/15/2011
Submitter: Jose G. Ibarra, RES/DRA/OEGIB
Submission Document: Identification of a Proposed Generic Issue on the Effects of Upstream Dam Failures on Fuel Facilities (ML113470236)

Acceptance Review Information

Status: Not accepted on 02/24/2012 POC: Benjamin Beasley
Acceptance Review Document: Acceptance Review of Proposed Generic Issue on the Effects of Upstream Dam Failures on Fuel Facilities (ML120390095)

Brief Description

Generic Issue #204 concerns the possibility of adverse consequences at nuclear power plants as a result of upstream dam failure. Since there are fuel cycle facilities located near rivers downstream from dams, this proposal considered the possibility of adverse consequences of upstream dam failure on fuel cycle facilities.

As part of the agency actions after the Tohoku earthquake, the NRC Office of Nuclear Material Safety and Safeguards (NMSS) distributed Information Notice 2011-08 to inform fuel cycle facilities of the potential challenges when preventing or mitigating the effects of natural phenomena events. The Information Notice suggests that facilities review and consider actions, as appropriate, to ensure that features and preparations necessary to withstand or respond to severe external events from natural phenomena (e.g., earthquakes, tsunami, floods, tornadoes, and hurricanes) are reasonable.

In addition, NMSS implemented Temporary Instruction 2600/015 to independently verify that licensees are adequately prepared to prevent and/or mitigate the consequences of selected safety/licensing bases events and to evaluate the adequacy of those emergency prevention and/or mitigation strategies for dealing with the consequences of selected beyond safety/licensing bases events.

Based on the regulatory requirements and guidance described above, and the actions taken by the Fuel Cycle Safety and Safeguards division of NMSS, existing regulatory processes addressed the possibility of flooding at fuel cycle facilities from failure of upstream dams. Therefore, because the proposed issue did not meet the 3rd Generic Issue criterion specified in Management Directive 6.4, the proposed issue was not accepted into the Generic Issues Program.

Issue ID: PRE-0013

Effect of External Flooding on Independent Spent Fuel Storage Installations

Overall Status: Not accepted

Date Received: 02/10/2012

Submitter: Michele Sampson, NMSS/SFT/TCB

Submission Document: Proposal of a Generic Issue Related to the Effect of External Flooding on Independent Spent Fuel Storage Installations (ML120410569)

Acceptance Review Information

Status: Not accepted on 09/06/2012 POC: Zeechung Wang

Acceptance Review Document: Memo from B. Pham to M. Sampson, Re: Acceptance Review of the Proposed Generic Issue (Pre-GI-0013) on the Effect of External Flooding on Independent Spent Fuel Storage Installations (ML12240A096)

Acceptance Review Document: Acceptance Review of Proposed Generic Issue, "Effect of External Flooding on Independent Spent Fuel Storage Installations Caused by Upstream Dam Failure" (ML12240A097)

Brief Description

Generic Issue #204 concerns the possibility of adverse consequences at nuclear power plants as a result of upstream dam failure. This issue was proposed because Independent Spent Fuel Storage Installations (ISFSIs) are often located above ground on unsheltered concrete pads or in underground storage vaults on sites below upstream dams. The proposal reflected concern that adverse effects of flooding might include changes in the thermal performance of the dry cask storage system, structural effects from sliding or overturning, and (in the unlikely event of a breach to the confinement system) the release of radioactive materials or in-leakage of flood water.

The acceptance review concluded that external dam-failure-induced flooding is unlikely to cause breach to the confinement systems, corrosion to the structural components, release of radioactive materials, or in-leakage of flood water. Many elements of the issue are addressed in the current regulatory framework in the form of rules regarding natural phenomenon, including earthquake, water waves, flooding, tsunami, and beyond-design-basis events.

Based on a review of the existing regulatory requirements and technical basis of the issue, the staff determined that existing regulatory processes can, and are, addressing the risk and safety significance of flooding at ISFSIs from failure of upstream dams. Therefore, the proposed issue does not meet the 1st and 3rd Generic Issue Criterion specified in NRC Management Directive 6.4. As a result, the proposed issue was not accepted into the Generic Issue Program.