

Regulatory Guide Periodic Review

Regulatory Guide Number: 3.14, Revision 0

Title: Seismic Design Classification for Plutonium Processing and Fuel Fabrication Plants

Office/division/branch: NMSS/DFM/MSB
Technical Lead: Bharat Patel

Staff Action Decided: Reviewed with issues identified for future consideration

(1) What are the known technical or regulatory issues with the current version of the Regulatory Guide (RG)?

Regulatory Guide 3.14, "Seismic Design Classification for Plutonium Processing and Fuel Fabrication Plants," provides guidance to applicants for a plutonium processing and fuel fabrication facility license regarding an acceptable method for identification of principal structures, systems, and components important to safety that must be designed to withstand the effects of earthquakes.

The staff has not identified any specific technical issues or concerns with the guidance in RG 3.14. Nonetheless, since the original RG was issued in 1973 by the US Atomic Energy Commission, in a future revision the RG could be updated to incorporate any relevant industry operating experience (e.g. clarify seismic category I and non-seismic category I design interface requirements in regulatory position C.3.).

In addition, this RG designates "seismic category 1" to those plant structures, systems, and components (SSCs) important to safety that need to remain functional during and after an earthquake event. However, the staff's standard review plan (SRP) related to plutonium processing and fuel fabrication facilities in NUREG-1718 "Standard Review Plan for the Review of an Application for a Mixed Oxide Fuel Fabrication Facility" (issued 2000), provides more recent guidance for evaluating natural phenomena events (including earthquakes) and other external events using the risk-informed approach described in 10 CFR Part 70, Subpart H, "Additional Requirements for Certain Licensees Authorized To Possess a Critical Mass of Special Nuclear Material". The NUREG does not use or define the term "seismic category I". Instead, the NUREG uses and defines the generic term "Principle SSCs" as safety controls that are identified in the design bases as providing protection against the consequences of accidents or natural phenomena. The NUREG also uses another synonymous term "Item relied on for Safety (IROFS)," which is defined in 10 CFR 70.4, "Definitions." Therefore, in the context of this RG and the NUREG, designating a plant SSC as a "Principal SSC" or "IROFS" is synonymous with designating it as a "seismic category I" when it pertains to designing for or evaluating a natural phenomenon (e.g., earthquake) event. A clarification of related terminologies between the RG and the NUREG should be included in a future revision of the RG. More broadly, a clearly defined graded approach to SSC classification would be ideal for the future reviews of fuel fabrication facilities.

From a regulatory standpoint, relevant references that have been issued since 1973 should be added to the RG (e.g. NUREG-1718, "Standard Review Plan for the Review of an Application for a Mixed Oxide Fuel Fabrication Facility").

(2) What is the impact on internal and external stakeholders of not updating the RG for the known issues, in terms of anticipated numbers of licensing and inspection activities over the next several years?

The guidance in RG 3.14 was used in the licensing basis of the U.S. Department of Energy (DOE) Mixed Oxide (MOX) Fuel Fabrication facility (MFFF). The applicant ceased NRC regulated construction of the MFFF following receipt of a Notice of Termination of the contract from the DOE (ML18305A356) in 2018.

There are currently no license applications for a plutonium processing and fuel fabrication facility under review by the agency. However, a few applicants have informed the NRC of their intent to submit an application in the next several years. If the RG is not updated, the impact on these licensing activities is anticipated to be small because there were no specific technical issues identified and the regulatory issues would be addressed as part of the license application. The fuel fabrication facilities have different classes of equipment safety, non-safety or support some safety function.

(3) What is an estimate of the level of effort needed to address the identified issues in terms of full-time equivalent (FTE) and contractor resources?

It would require approximately 0.1 FTE to review and incorporate industry operating experience, and revise RG 3.14. No contractor resources are anticipated to be needed.

(4) Based on the answers to the questions above, what is the staff action for this guide (Reviewed with no issues identified, Reviewed with issues identified for future consideration, Revise, or Withdraw)?

Reviewed with issues identified for future consideration.

(5) Provide a conceptual plan and timeframe to address the issues identified during the review.

The staff could consider revising the subject RG if it anticipates that it would be useful in support of the review of an application for a plutonium processing and fuel fabrication facility in the future. The schedule would be developed as needed to support acceptance of the application.

NOTE: This review was conducted in February 2024 and reflects the staff's plans as of that date. These plans are tentative and are subject to change.