



Document: ISO/TC 85/SC 5/WG 8/ISO-27468:2011 Summary

Nuclear criticality safety – Evaluation of systems containing PWR UOX fuels— Bounding burnup credit approach

This document provides a summary of the following:

ISO-27468:2011 (First Edition) *Nuclear criticality safety — Evaluation of systems containing PWR UOX fuels — Bounding burnup credit approach*

Sûreté-criticité — Evaluation des systèmes mettant en œuvre des combustibles REP UOX — Approche conservatrice de crédit burnup

What is this standard?

This international standard establishes a methodology for carrying out Nuclear Criticality Safety (NCS) evaluations using burnup credit. It identifies important parameters and specifies requirements, recommendations and precautions to be considered in the evaluations in addition to those established for fresh fuel. It also highlights the main important technical fields to ensure that the fuel composition or irradiation history considered in criticality calculations provides a conservative value of the effective neutron multiplication factor, k_{eff} .

What does it cover?

The standard covers requirements, recommendations and guidance about:

- The distribution of burnup within the fuel assembly
- The nuclide concentration calculations
- The selection of nuclides to be included in the NCS evaluation
- Criticality safety calculations considering the irradiation of the fuel
- Implementation of criticality safety evaluations considering burnup of the fuel

In addition, two annexes provide guidance about the validation of the depletion codes against Post-Irradiation Examination (PIE) data and about the operational implementation of a burnup credit application.

Only Uranium Oxide (UOX) fuel assemblies irradiated in a Pressurized Water Reactor (PWR) are covered by this standard.

Why is it useful?

Considering the nuclear properties of irradiated fuels in NCS evaluations (*i.e.* accounting for the “burnup credit”) makes it possible to optimize the design or the operation of a process, a facility, a transport or a storage involving such fuels. It can also help to reduce the overall risk by, for example, minimising the number of fuel handling operations. However, taking credit for the burnup in NCS evaluations leads to more complex assessments and calculations to demonstrate an adequate margin of safety. ISO-27468 presents the concerns needed to be addressed to support NCS evaluations of burnup credit and identifies a bounding approach to perform such evaluations.

Who should use it?

An individual or body who has a responsibility in the design, fabrication or maintenance of a process or facility or transport system involving irradiated UOX fuels. These individuals would typically be NCS specialists with the responsibilities of assessment, calculation or peer review of NCS documentation. Also, individuals or bodies with responsibilities of oversight and regulation of facilities and processes.

Where can I find out more?

The ISO-27468 standard webpage can be found at the ISO website:

<https://www.iso.org/standard/44173.html>