

FOR DISCUSSION PURPOSES ONLY

Follow up on resolution for the fuel qualification table issue

In proposed amendment 16 to Certificate of Compliance (CoC)-1004 for the NUHOMS system, TN (Orano) proposed to relocate the fuel qualifications table (FQT) from the technical specifications to the final safety analysis report. One of the remaining issue related to the review of the request for amendment 16 to the TN NUHOMS CoC is the resolution of the definition of the allowable spent fuel contents with respect to the design basis source terms.

Regulatory basis

10 CFR 72.234(a) requires that the cask design meets the requirements of 72.236 and 72.236(d) requires that cask design is capable of meeting the dose limits of 72.104 and 72.106.

In accordance with the regulatory requirement of 10 CFR 72.236(a), specifications must be provided for the spent fuel to be stored in the spent fuel storage cask. To assure that the cask shielding design is adequate for the allowable contents, it is imperative to include fuel parameters that can uniquely define the source terms, which include the strengths and spectra of the neutron and gamma emitted from the spent fuel, in the TS.

Technical Considerations

Based on the study published in NUREG/CR-6716 and NUREG/CR-6802, the source terms, among other irradiation parameters, are dependent primarily on the burnup, cooling time and enrichment (BECT). Because a wide variety of different combinations of BECT may produce the same source terms, it is imperative to accurately define the allowable BECTs with reasonable assurance that the source terms from the allowable fuel assembly are within the bound of the design basis source terms.

With consideration of risk-informed regulation, the NRC contracted Oak Ridge National Laboratory to perform a study on the sensitivities of the neutron and gamma source terms of the spent fuel against all major parameters that impact the source terms and published the results in NUREG/CR-6716, "Recommendations on Fuel Parameters for Standard Technical Specifications for Spent Fuel Storage Casks". The study found that the fuel parameters with most significant impact on dose rate are fuel burnup, enrichment and cooling time and recommends that these parameters be included in standard TS.

The recommendation is based on a balanced consideration of the parameters that are important to safety and appropriate flexibility for the applicant to make changes to the allowed contents. Specifically, NUREG/CR-6716 states: "[T] the objective is to replace the current detailed TS with more general Standard Technical Specifications (STS) that concentrate control on those fuel parameters that are most important to maintaining safety. The remaining fuel parameters are of lesser importance and would be handled under the Section 72.48 process, which allows the licensees to change those parameters by performing additional safety analyses to update the FSAR."

Based upon the discussion above, the staff requests the applicant to provide the bounding BECT combination which represents the design basis source term to be defined in the TS in place of the content definition currently provided by the FQTs.