Spent Fuel Project Office
Interim Staff Guidance - 6

Issue: **Establishing minimum initial enrichment for the bounding design basis fuel assembly(s).**

The Standard Review Plan, NUREG-1536, Chapter 5, Section V, 2 recommends that "the applicant calculate the source term on the basis of the fuel that will actually provide the bounding source term," and states that the applicant should, "either specify the minimum initial enrichment or establish the specific source terms as operating controls and limits for cask use." A specified source term is difficult for most cask users to determine and for inspectors to verify. The specification of a minimum initial enrichment is a more straightforward basis for defining the allowed contents. The specification should bound all assemblies proposed for the casks in the application. Specific limits are needed for inclusion in the Certificate of Compliance.

Lower enriched fuel irradiated to the same burnup as higher enriched fuel produces a higher neutron source. Sometimes fuel assemblies are driven to burnups beyond the value normally expected for the given enrichment. According to the U.S. Department of Energy's Characteristic Data Base, the lower enrichment for fuel burned to 45,000 MWd/MTU is about 3.3%. The neutron source for an initial enrichment of 3.3% is expected to be 70% higher than the neutron source for 4.05% enriched fuel.

Recommendation:

Rewrite the last sentence of paragraph 1 in Chapter 5, Section V, 2 (page 5-3) to read "Consequently, the SAR should specify the minimum initial enrichment as an operating control and limit for cask use, or justify the use of a neutron source term, in the shielding analysis, that specifically bounds the neutron sources for fuel assemblies to be placed in the cask. Absent adequate justification acceptable to the staff, the SAR should not attempt to establish specific source terms as operating controls and limits for cask use."

Approved _____

William F. Kane **Date**