

DOE-STD-1237-2021
Frequently Asked Questions
November 2025

Q1: In both Sections 3.4 and 3.5 of DOE-STD-1237-2021, under the heading “SSC Classification Hierarchy,” the following sentence is included: “SSCs that protect the reactor core shall be designated at least safety significant.” What is the intended scope of “SSCs that protect the reactor core?”

A1: The intent of this statement is to identify those SSCs that may be necessary to prevent or minimize damage to the reactor core. While the reactor core¹ may be defined as consisting of a number of components, it was intended that specific consideration be given to protecting reactor fuel and cladding (primary fission product boundary) in response to evaluated hazardous event scenarios. Protection and credit may primarily be focused on the fuel and cladding, or it could also encompass elements of an automatic reactor shutdown system that provides the function of fuel and cladding protection. In addition, if shutdown cooling is necessary to protect the reactor core from damage due to reactor decay heat, the SSCs providing shutdown cooling may also require a minimum of safety significant (SS) safety designation. The SSC designations would typically be reactor type dependent.

The purpose of classifying reactor protection SSCs as at least SS (regardless of dose consequences) is recognition of the inherent safety function of the fuel and cladding to serve as a barrier to contain fission products and fissionable materials. This classification also supports mission availability, as fuel damage can have a significant impact on mission.

The sentence in question is not intended to cover administrative controls, safety management programs, or reactor support systems (clean-up system, water re-circulation system, secondary cooling system) that could contribute to protecting the reactor core, and whose failure does not result in significant worker or public consequences based on accident analysis. For example, while reactors typically maintain a tight chemistry program for reactor moderators to promote fuel integrity, this control would not be required to be designated a SAC unless the estimated dose consequences of not doing so exceeded the SS protection thresholds. As another example, an administrative control may be needed to prevent fuel damage from an overhead crane, however, the crane itself would not need to be designated SSt, although seismic qualification and failure mode of the crane would need to be evaluated.

¹ The Nuclear Regulatory Commission defines “reactor core” as “The central portion of a nuclear reactor, which contains the fuel assemblies, moderator, neutron poisons, control rods, and support structures. The reactor core is where fission takes place.”