

Non SC/SS LEAP Controls Evaluation

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In response to a need expressed by the Savannah River Site Department of Energy, a new approach has been developed by Westinghouse Safety Management Solutions to augment the current authorization basis approach and identify new defense-in-depth equipment. The defense-in-depth philosophy is a fundamental approach to hazard control for nonreactor nuclear facilities. In keeping with the graded-approach concept, no requirement to demonstrate a generic, minimum number of layers of defense-in-depth is imposed. However, defining defense-in-depth as it exists at a given facility is crucial for determining a safety basis. Operators of Department of Energy facilities use the application of defense-in-depth thinking in their designs and operations. Such an approach is representative of individual operations with an effective commitment to public and worker safety and the minimization of environmental releases. These new defense-in-depth controls are referred to as non-safety class, non-safety significant defense-in-depth controls called LEAP controls and the limited evaluation procedure is called the LEAP process. The new controls have a unique limited treatment in operation.

The identification of LEAP controls is evaluated to reduce the risk of operations to the public, the worker, and the environment and are chosen to cause offsite doses to be below more restrictive guidelines than the usual offsite guidelines. These controls may previously have been SSCs classified as Production Support or General Service, or may have been Administrative Controls.

During the usual Safety evaluation process, mitigative and preventative controls are identified. During the classification process, some of the controls are selected to perform a Safety-Class function and some a Safety-Significant function. Generally, this leaves a number of other candidate SSCs or administrative controls that are available, however, they were not selected to perform a Safety-Class or Safety-Significant function.

In a LEAP, the safety benefit of existing SC and SS controls is evaluated on a consistent phenomenological confidence basis as was done in the design basis accident analysis. The SS items are qualitatively added by group consensus to the evaluation performed for SC items in the DBA of Chapter 3 to demonstrate the lower level of risk provided by SS items. To provide the safety benefit of additional controls, (i.e., those not classified as Safety-Class or Safety-Significant), the LEAP process selects and evaluates additional mitigators and preventers. After comparing the SC and SS evaluation results to more stringent LEAP offsite dose guidelines (about a fraction of 10 reduction from the usual goals), a qualitative evaluation of the risk reduction considering additionally selected controls (i.e., Safety-Class, Safety-Significant, with additional Non-SS/SC LEAP) is performed and documented for these accidents.

Sample results and observations of the application of LEAP control evaluation as performed by WSMS are presented.

