The 10 CFR 50.59 Process – Change Isn’t Always Good

A second issue involved in the Rancho Seco event is the change process required by the NRC, specifically the requirement to determine whether there are any “unreviewed safety questions.”

This is necessary due to the complexity of a nuclear power plant, with many systems and structures for which a change may create undesirable interactions. A quick example is the Fermi 1 reactor, near Monroe, MI. Just before operation, baffle plates were installed at the bottom of the reactor vessel, to improve coolant flow through the reactor core. Although well-intentioned, this last-minute change was not properly reviewed or documented. During operation, one of these plates broke loose, blocking coolant flow and causing a partial fuel meltdown.

To license a nuclear power plant, the operators must submit a “Final Safety Analysis Report (FSAR),” which describes, in detail, the structures, systems, and procedures which assure safe operation, and shows, through an analysis of potential accidents, that public safety is assured, even in the event of a credible accident.

Sooner or later, the plant operators must make changes to the plant as described in the FSAR. For example, the FSAR where I worked specified that Ge(Li) detectors are used for gamma spectrometry measurements. These detectors soon became obsolete, and were replaced by hyper pure Ge detectors, which are better. Nevertheless, this was not as described in the FSAR, so it was necessary to go through the change process.

The criteria for reviewing a change to the plant, both the physical plant and procedures, are specified in Title 10, Part 50, Subpart 59 of the Code of Federal Regulations (10CFR50.59). These have changed since Rancho Seco was operating. The regulation at the time specified the criteria as not increasing the probability or severity of an accident or malfunction as described in the FSAR, not creating a new type of accident or malfunction, and not decreasing the margin of safety as described in the plant license.

Such a review of the Fermi 1 baffle plates should have identified a new type of accident, i.e., a baffle plate coming loose.

If the licensee wishes to make a change that does not meet these criteria, NRC approval is required.

It’s also important to keep in mind that meeting these criteria does not mean that the proposed change is safe or the right thing to do. It only means that the change can proceed without prior NRC approval.