

Safety Basis for the Irradiated Materials Characterization Laboratory

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Abstract

The Battelle Energy Alliance (BEA) at the Idaho National Laboratory (INL) is constructing a new building at the Materials and Fuels Complex (MFC) to support missions in material and fuel development.

The need for capability to analyze and characterize irradiated fuel and structural components is important to the fuel and component development programs at the INL. In the past this type of analysis was performed at the Hot Fuel Examination Facility (HFEF), the Analytical Laboratory (AL), and the Electron Microscope Laboratory (EML), all located at MFC. Given the range of new analytical equipment available, the IMCL will provide a flexible environment in which to utilize a wider variety of equipment and analyses than has been previously available at the MFC.

In accordance with Department of Energy (DOE) Order 413.3A, "Program and Project Management for the Acquisition of Capital Assets", safety must be integrated into the design process of new nuclear facilities or modifications to existing DOE Hazard Category 1, 2, and 3 nuclear facilities. DOE-STD-1189-2008, "Integration of Safety into the Design Process" provides expectations for identifying hazards and accidents early in the design and incorporating appropriate controls to mitigate those hazards throughout the design and construction process.

This paper discusses the process and methods used to successfully integrate nuclear safety into the design of the IMCL such that design and administrative controls are utilized to provide a framework for safe facility operation. Nuclear safety work to date includes a Safety Design Strategy (SDS) report, Preliminary Hazard Analysis (PHA), Conceptual Safety Design Report (CSDR), and a draft Preliminary Documented Safety Analysis (PDSA). Supporting documentation includes a Fire Hazards Analysis (FHA) and a number of dose consequence analyses supporting the hazard and accident analysis.

As a result of early involvement from the nuclear safety analysis team, the project is moving forward with construction with safety requirements clearly identified. This will help reduce the risk of unforeseen expenses associated with project delays.