Evaluation of the Impact to the Safety Basis of Research Conducted in Production Facilities at Y-12

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Objective

This paper describes the unique challenges to maintaining the integrity of the safety basis during the conduct of nuclear research in existing production facilities at the Y-12 National Security Complex. It reviews lessons learned in the performance of advanced radiation measurement evaluations performed as part of the Nuclear Materials Identification System (NMIS) and Advance Portable Neutron Imaging System (APNIS) in operating facilities at Y-12.

Relationship to Overall Interests of DOE Safety Analysis

Section 203(d)(3) of 10 CFR 830 Subpart B requires the contractor responsible for a hazard category 1, 2, or 3 DOE nuclear facility to implement the DOE approved USQ procedure in situations where there is a: (1) Temporary or permanent change in the facility as described in the existing documented safety analysis; (2) Temporary or permanent change in the procedures as described in the existing documented safety analysis; (3) Test or experiment not described in the existing documented safety analysis. This paper shares how Y-12 production facilities ensure the integrity of the safety basis by evaluating the conduct of nuclear experiments prior to them being performed in operating facilities.

Results

The unique challenges of ensuring the integrity of the safety basis, while utilizing neutron generators to evaluate nuclear materials and components, resulted in the development of good business practices. The information collected has use in applications such as nuclear safeguards, arms control, nonproliferation and counter terrorism.

Benefits of Work to Mission of Sponsoring Organization

The dissemination of these good business practices and lessons learned allow other sites to benefit from the methods used at Y-12.