

Information Bulletin

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Title: Inadequate Design Verification

Date: December 21, 2006

Identifier: 2006-RL-HNF-0054

Lessons Learned Summary: Documents used to verify a design requirements must demonstrate that the requirements have been met. Documents that simply calculate what needs to be done do not verify that the design requirements have been met.

Discussion of Activities: The K Basin Closure (KBC) Project Plant Review Committee (PRC) declared two Unreviewed Safety Questions (USQs) regarding the ability of the telescoping doors at the Cold Vacuum Drying Facility (CVDF) to withstand the specified Natural Phenomena Hazards (NPH). The positive USQs resulted from two errors. First, the design requirements were not properly implemented in the design documents. Second, the design verification that was performed did not detect the first error. The design verification used documents that restated the requirements rather than documents that implemented the requirements to verify the design. If the design verification had been properly performed, the errors would have been caught prior to construction.

Analysis: Straight wind pressure, wind driven missiles, and tornado pressure NPH requirements were imposed on the CVDF design. These requirements applied to both the building and the telescoping doors. The Design Requirements Document (DRD) correctly stated all of the NPH requirements in one section. However, only the requirements applicable to the straight wind pressure were translated into detailed, specific design requirements for the doors in a subsequent section of the DRD. The construction specification duplicated this incorrect specific design information in its section on telescoping door requirements.

A Design Verification Report (DVR) referenced numerous calculations, other design basis documents, and the Safety Analysis Report as proof that the NPH requirements had been met. The DVR did not confirm that the calculated minimum thickness of the doors for the wind driven missile was correctly incorporated into the design documents.

Recommendations/Actions: Improvements included the development of Project Execution Plan that addresses the organizational responsibilities for project design as well as the need to identify any third-party responsibilities related to engineering/design. Improvements were added to the design control process section of the Project Initiation and Execution procedure. A formal design review document was developed that defines requirements and expectations for Client Design Review of subcontracted engineering design work, including requirements for 30/60/90% design review processes.

Cost Savings/Avoidance: Not determined

Work Function: Engineering and Design - Nuclear

Hazards: Natural Phenomena

Keywords: Design verification, natural phenomena, design documents, USQ,

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References: Occurrence Reports: EM-RL--PHMC-SNF-2006-0011 and EM-RL--PHMC-SNF-2006-0012

Distribution: General