

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
OFFICE OF NEW REACTORS
WASHINGTON, DC 20555-0001

March 1, 2010

NRC INFORMATION NOTICE 2010-01: PIPE SUPPORT ANCHORS INSTALLED
IMPROPERLY

ADDRESSEES

All holders of an operating license or construction permit for a nuclear power reactor issued under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

All holders of or applicants for an early site permit, standard design certification, standard design approval, manufacturing license, or combined license issued under 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants."

All holders of or applicants for a license for a fuel cycle facility issued pursuant to 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material."

All holders of or applicants for a certificate of compliance issued under 10 CFR Part 76, "Certification of Gaseous Diffusion Plants."

PURPOSE

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice (IN) to alert addressees of recent construction-related issues involving improperly installed pipe support anchors at several German nuclear power plants. Recipients should review the information for applicability to their facilities and consider actions to avoid similar problems. The suggestions contained in this IN are not NRC requirements, and no specific action or written response is required.

DESCRIPTION OF CIRCUMSTANCES

Improper Assembly of Pipe Support Undercut Anchors at Biblis, Unit A, in Germany

During a plant shutdown in September 2006 at Biblis Unit A, a four-loop pressurized-water reactor located in South Hessian, Germany, a walkdown revealed that some Hilti HDA-T self-undercutting anchors had loosened from their positions on two feedwater system pipe supports. These supports were recently installed as part of an upgrade program.

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Inspections of other upgraded anchors of the same type revealed some additional improperly installed anchors. The Hilti HDA-T was the only anchor design with this problem. Examination revealed that bore holes for the affected anchors were either drilled too deep or not deep enough because the utility staff did not use bits that limit drilling depth. As a result, the anchors could not undercut properly. In places where bore holes were drilled to the correct depth, the expander sleeves were not driven in deep enough. Further investigations revealed that in some instances too few anchors were installed, anchors were installed in the wrong position, missing washers were identified, wrong anchor types were used, and misdrilled holes were not plugged properly. Of the approximately 15,000 Hilti HDA-T anchors installed in the two Biblis units since 2001, about 7,500 needed repair.

Insufficient oversight and training, improper tools, lack of detailed checklists, insufficient written instructions, inadequate supervision during construction, lack of inspection after work was completed, and inadequate quality assurance controls and quality control measures contributed to the utility's failure to achieve early detection and correction of these defects.

Other German plants inspected their safety relevant anchors after the problem was discovered. Similar problems were found at Gundremmingen, Krümmel, Brunsbüttel, Grohnde, Emsland, and Munich FRM-II research power plants. Hilti, Fischer, Paslode, TiFix, and Liebig manufactured the affected anchors. The improperly installed anchors were undercut anchors, self-undercut anchors, and expansion anchors.

BACKGROUND

The following NRC communications related to this issue include:

- NUREG-1055, "Improving Quality and the Assurance of Quality in the Design and Construction of Nuclear Power Plants," issued May 1984, can be found on the NRC's public website in the Agency Documents Access and Management System (ADAMS) under Accession No. ML063000293.
- IN 2007-04, "Construction Experience Related to the Assurance of Quality in the Construction of Nuclear Facilities," dated February 7, 2007, ADAMS Accession No. ML063040426.
- Regulatory Guide 1.199, "Anchoring Components and Structural Supports in Concrete," issued November 2003, ADAMS Accession No. ML033360660.
- Inspection and Enforcement Bulletin 79-02, "Pipe Support Base Plate Designs Using Concrete Expansion Anchor Bolts," originally dated March 8, 1979, and revised June 21, 1979, and November 8, 1979; ADAMS Accession Nos. ML031210357, ML031210363, and ML031210461, respectively.

DISCUSSION

Hangers, supports, pipe anchors, and restraints are selected to withstand all static and dynamic loading conditions that act upon the piping system and associated equipment. They should be considered as a total system, since failure of some supports could redistribute the loads to other supports. Pipe supports control the effects of accident-related forces and displacement, seismic-induced displacement, and vibrations. Improperly installed pipe supports and anchors can adversely affect the analyzed stresses of connected piping systems, which can lead to piping failure and render the affected systems inoperable. Properly installed undercut anchors are necessary to develop the anchor-bolt rated allowable loads. The risk significance of multiple improper anchor installations is increased by a potential common-mode failure of other piping. This IN stresses the importance of following anchor installation procedures and illustrates some of the consequences of departure from the required procedures. Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50 establishes quality assurance requirements for safety-related equipment at U.S. nuclear power plants. Adequate quality assurance and quality control measures provide for the early detection and correction of such defects.

The affected utilities have since improved personnel training, post-installation checks, and cooperation between the plant's system design and construction departments.

CONTACT

This IN requires no specific action or written response. Please direct any questions about this matter to the technical contacts listed below.

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Note: NRC generic communications may be found on the NRC public Web site, <http://www.nrc.gov>, under Electronic Reading Room/Document Collections.

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