

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

April 24, 2012

NRC INFORMATION NOTICE 2012-06: INEFFECTIVE USE OF VENDOR TECHNICAL
RECOMMENDATIONS

ADDRESSEES

All holders of an operating license or construction permit for a nuclear power reactor 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."

PURPOSE

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice (IN) to inform addressees of recent operating experience regarding ineffective use of vendor technical recommendations at U.S. nuclear power plants. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this IN are not NRC requirements; therefore, no specific action or written response is required.

DESCRIPTION OF CIRCUMSTANCES

Farley Nuclear Plant, Unit 1

On February 4, 2008, the 1B emergency diesel generator (EDG) was removed from service for an exhaust header like-for-like replacement and routine maintenance. On February 10, 2008, the EDG passed the post-maintenance test and was returned to service. Between February 10 and March 13, 2008, the EDG was intermittently operated successfully during routine surveillance and maintenance activities. On March 13, 2008, the EDG was started for a post-maintenance surveillance test. Approximately 2 hours into the test, the control room received an alarm because of carbon dioxide (CO₂) actuation in the 1B EDG room. The EDG exhaust heated the room and caused actuation of the CO₂ fire protection system, and a control room operator manually shut down the 1B EDG. Post-event inspections identified that temporary welds on an exhaust header elbow had broken, which resulted in the elbow separating from the exhaust header.

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Investigation revealed that the work order did not provide the specific vendor's instructions to install the exhaust header. Instead, it included a reference to the vendor's technical manual. The specific vendor's instructions were contained in a Service Information Letter (SIL) dated October 17, 1989, which the licensee had incorporated into the referenced vendor manual. The SIL stated that the exhaust header assemblies were shipped with one or more flanges or fittings temporarily welded to allow for repositioning to fit the EDG, and that final welding, along with a hydrostatic test, was required to verify weld integrity. However, the work order to install the exhaust header did not include these instructions. As a result, the 1B EDG exhaust header failed.

Additional information is available in Joseph M. Farley Nuclear Plant, Unit 1, NRC Inspection Report 05000348/2008011 and Preliminary White Finding, dated July 16, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML081980786).

Calvert Cliffs Nuclear Plant, Unit 2

On February 18, 2010, the licensee experienced a Unit 2 automatic reactor trip and loss of a 500 kilovolt switchyard bus. The loss of the bus resulted in loss of power to a safety bus that caused an automatic start of the 2B EDG. However, the EDG tripped on low lube oil pressure after running for 15.2 seconds because of the failure of an Agastat T3A time-delay relay. This relay is designed to bypass the low lube oil pressure trip on an EDG start to allow oil pressure to initially build up to operating conditions. The relay begins timing when sufficient EDG speed is sensed (approximately 6 seconds following engine start) and bypasses the low lube oil pressure trip for 15 seconds. In this instance, the relay bypassed the lube oil trip for only 9.2 seconds, which did not allow enough oil pressure to build up in the upper crankcase of the EDG, causing the engine to trip.

The Agastat T3A time-delay relay, which timed out early, had been in service on the 2B EDG for approximately 13.5 years, 3.5 years beyond its vendor-recommended 10-year service life. In 2001, the licensee discontinued the vendor recommended 10-year replacement preventive maintenance requirement and substituted a performance monitoring program for Agastat relays (approximately 200 safety-related applications and 200 nonsafety-related applications in the two Calvert Cliffs units). However, the NRC identified that the performance monitoring program was never implemented. In addition, the licensee did not ensure that the impact of this change on the preventative maintenance program for the Agastat relays was fully evaluated.

Additional information is available in Calvert Cliffs Nuclear Power Plant – NRC Special Inspection Report 05000317/2010006 and 05000318/2010006; Preliminary White Finding, dated June 14, 2010 (ADAMS Accession No. ML101650723), and Calvert Cliffs Nuclear Power Plant, Unit 2 – NRC Inspection Procedure 95001 Supplemental Inspection Report 05000318/2011008, dated April 29, 2011 (ADAMS Accession No. ML111190104).

Byron Station, Unit 2

On November 17, 2010, during a normal monthly surveillance run of the 2A EDG, an operator assigned to monitor the EDG identified a significant lubricating oil leak from the EDG upper lube oil cooler heat exchanger. The EDG was emergency stopped and declared inoperable. The oil leak was determined to be coming from the upper lubricating oil cooler at the bolted flange connection between the cooler's shell and the stationary channel head. During troubleshooting, the licensee checked the 2A EDG upper lube oil cooler stationary head flange connection as-found bolt torque values and found 3 bolts to be loose, with the remaining bolts at less than

the expected torque value. The loose bolts and resulting reduction in clamping force allowed the gasket to extrude, which led to the oil leak.

The licensee determined that the torquing of another flange misaligned during the 2A EDG maintenance in January 2010 had caused the loosening of the bolts. The licensee's investigation of the leak revealed that it was caused by insufficient directions in the work order to re-torque the upper lube oil cooler bolted connections after initial torquing. Several documents on bolted connections from the Electric Power Research Institute contain recommendations, which if they had been incorporated into the bolting procedure, would have prevented this event. Both the Institute and the gasket manufacturer (vendor) recommended the direction to conduct the re-torque. Additionally, industry experience has demonstrated that when connections in multiple dimensions are made, bolt torquing on the final connection can affect those connections completed first.

Additional information is available in Byron Station, Unit 2, NRC Follow-up Inspection Report 05000455/2011011; Preliminary White Finding, dated February 11, 2011 (ADAMS Accession No. ML110460207).

Peach Bottom Atomic Power Station, Unit 2

On January 29, 2010, during a planned load reduction of Unit 2 to 55 percent power, the licensee conducted required technical specification scram time testing. The periodic surveillance testing of a representative sample of control rods was performed (10 percent, or 19 of 185 control rods). Results indicated that in the initial sample of 19 control rods, 3 control rods were determined to be slow between control rod notch positions 48 and 46. All remaining control rods (185 total) were tested, resulting in the identification of 21 slow control rods.

Operating experience reviews performed by the licensee and independently by the inspectors identified a 1996 SIL 584, Supplement 1, which described slower 5-percent scram insertion times experienced at several boiling-water reactors as a result of material degradation issues with the scram solenoid pilot valves. The SIL recommended that owners of boiling-water reactors trend the performance of these valves over time and evaluate scram time data. Vendor documents and an NRC generic communication described this issue. However, the licensee did not develop an appropriate performance monitoring and trending program, as described by the vendor.

Additional information is available in Peach Bottom Atomic Power Station - NRC Integrated Inspection Report 05000277/2010002; 05000278/2010002, dated May 12, 2010 (ADAMS Accession No. ML101320455).

DISCUSSION

Since 1980, the staff has issued numerous NRC generic communications highlighting the importance of licensee attention to vendor recommendations. The 1983 Salem anticipated transient without scram (ATWS) was a significant industry event in which the problem with the reactor trip breakers was identified as inadequate attention to the importance of vendor-supplied information; absence of an adequate preventive maintenance program; and an inadequate supply, control, and verification of information by the vendor. The Salem ATWS event resulted in the staff issuing [Generic Letter \(GL\) 83-28](#), "Required Actions Based on Generic Implications of Salem ATWS Events," dated July 8, 1983, which directed the industry to establish formal vendor interface programs. The staff revised (and relaxed) its position with the issuance of

[GL 90-03](#), "Relaxation of Staff Position in Generic Letter 83-28, Item 2.2, Part 2, 'Vendor Interface for Safety-Related Components,'" dated March 20, 1990, which conveyed that it may be impractical for licensees to include every safety-related component in formal vendor interface programs. However, in GL 90-03, the staff still retained the position that licensees should have programs in place to interact with vendors and that these programs contain certain expectations.

Briefly, these expectations include:

- 1) Program provisions which ensure that licensees receive all vendor issued information pertinent to its safety-related equipment,
- 2) A vendor interface program that, in good faith, documents efforts to periodically contact the vendors of key, safety-related components (such as auxiliary feedwater pumps, batteries, inverters, battery chargers, cooling water pumps, and valve operators) not already included in the Vendor Equipment Technical Information Program, as described in the 1984 Nuclear Utility Task Action Committee Report, and
- 3) A reasonable and prudent review of operating experience, availability of vendor information, and component safety significance using insights obtained from generic or plant specific probabilistic risk analyses that will yield a set of component vendors that will make up each licensee's vendor interface program. In the event that vendors have gone out of business, cannot be identified, or will not supply information, the licensee or applicant should implement or continue to maintain a program that will assure sufficient attention is paid to equipment maintenance, replacement, and repair to compensate for the lack of vendor backup such that equipment reliability commensurate with its safety function is assured.

Licensees are reminded that vendor technical recommendations can contain information that might not be suitable for all designs and applicable under all conditions for which the equipment is expected to function. However, ineffective use of vendor technical recommendations can cause or contribute to operational transients, scrams, and component failures. Maintenance activities; design, test, and procedural controls; and corrective actions can identify ineffective use of vendor technical recommendations. Additionally, the NRC staff's review of recent operating experience involving ineffective use of vendor technical recommendations indicates that many of these events potentially allow latent failures to exist undetected and become an underlying cause of risk-significant initiating events. Many, if not most, of these events are preventable.

CONTACT

This IN requires no specific action or written response. Please direct any questions about this matter to the technical contact listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

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Note: NRC generic communications may be found on the NRC public Web site, <http://www.nrc.gov>, under NRC Library.

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