

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555-0001

September 25, 2006

NRC INFORMATION NOTICE 2006-14, SUPPLEMENT 1: POTENTIALLY DEFECTIVE
EXTERNAL LEAD-WIRE
CONNECTIONS IN BARTON
PRESSURE TRANSMITTERS

ADDRESSEES

All holders of operating licenses for nuclear power reactors, except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor.

PURPOSE

The U.S. Nuclear Regulatory Commission (NRC) is issuing this supplement to Information Notice (IN) 2006-14, "Potentially Defective External Lead-Wire Connections in Barton Pressure Transmitters," to provide additional information regarding Barton 763 and 763A gauge pressure transmitters and Barton 764 differential pressure transmitters supplied by PRIME Measurement Instruments, LLC, (PRIME - previously known as Barton and ITT-Barton) and Westinghouse Electric Company, LLC, Reactor Systems and Services (Westinghouse). Specifically, subsequent to the issuance of IN 2006-14, NRC staff inspections found that neither PRIME nor Westinghouse could provide documentation to indicate that Barton 763, 763A, and 764 pressure transmitters manufactured after May 1982 had been demonstrated to be environmentally qualified. It is expected that addressees of this notice will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

DESCRIPTION OF CIRCUMSTANCES

IN 2006-14 discussed a defect in the Barton Models 763, 763A and 764 pressure transmitter connector assemblies in which the external lead wires could be stressed in such a way as to pull the insulation (which covered the external lead wires) out of the epoxy potting material and expose the bare conductor. IN 2006-14 also addressed the manufacturer's recommendation for mechanically testing the external lead wires to determine whether they were susceptible to this failure.

Prior to May 1982, the pressure transmitter connector external lead wires were individually covered with Polyolefin heat-shrink sleeving which encompassed the solder joints of the external lead wires and extended outside the case for about two inches before the external cavity was filled with epoxy potting material (for approximately six months in early 1982, the Polyolefin heat-shrink sleeving was replaced with Kynar heat-shrink sleeving).

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The connector configuration using the Polyolefin heat-shrink sleeving was environmentally qualified by PRIME using a loss-of-coolant accident and high-energy line break simulation (performed at the Westinghouse testing facility). The connector configuration using Kynar heat-shrink sleeving was identical to the tested configuration except for the use of Kynar heat-shrink sleeving (a material demonstrated to have harsh-environment durability) in lieu of Polyolefin heat-shrink sleeving. This design, with Kynar heat-shrink sleeving, was environmentally qualified by the use of applicable material qualification data and similarity analysis. Westinghouse performed a separate environmental qualification to support the supply of qualified pressure transmitters to Westinghouse customers.

Subsequent to May 1982, all the connector assemblies for Barton Models 763, 763A and 764 pressure transmitters were manufactured without heat-shrink sleeving over the individual external lead wires extending into the epoxy potting material.

The NRC staff performed an inspection of PRIME in July 2006 and determined that the most recent PRIME environmental qualification for Barton Models 763, 763A and 764 pressure transmitters was performed for the pre-May 1982 connector design with Polyolefin heat-shrink sleeving over the individual external lead wires extending into the epoxy potting material. The NRC staff found that PRIME was unable to provide documentation to demonstrate that the post-May 1982 connector design, which does not have heat-shrink sleeving over the individual external lead wires extending into the epoxy potting material, is environmentally qualified. The environmental qualification of electrical equipment is described in NRC Regulatory Guide 1.89, "Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants," the Institute of Electrical and Electronics Engineers, Inc., (IEEE) Standard 323-1974, "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations," IEEE Standard 344-1975, "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations," and other applicable industry standards.

The NRC staff also performed an inspection of Westinghouse in August 2006 and determined that Westinghouse had performed a separate environmental qualification of the pre-May 1982 design of the Barton 763, 763A, and 764 pressure transmitters and did not take credit for the environmental qualification activities performed by PRIME. Westinghouse supplied its customers with Barton pressure transmitters, manufactured by PRIME to Westinghouse specifications, in accordance with the Westinghouse environmental qualification, and shipped with a Westinghouse Certificate of Qualification. The NRC staff found that Westinghouse was unable to provide documentation to demonstrate that the post-May 1982 connector design of the Barton 763, 763A, and 764 pressure transmitters, which does not have heat-shrink sleeving over the individual external lead wires extending into the epoxy material, is environmentally qualified.

DISCUSSION

Based on the above information, the NRC staff found that neither PRIME nor Westinghouse (which performed separate environmental qualification of the pressure transmitters) could provide documentation to indicate that Barton 763, 763A, and 764 pressure transmitters manufactured after May 1982 and which do not have heat shrink sleeving over the external lead wires extending into the epoxy material, had been demonstrated to be environmentally

qualified, as required by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants." It should be noted that the issue concerning environmental qualification does not apply to pressure transmitter connectors supplied by PRIME or Westinghouse which were manufactured prior to May 1982, with heat-shrink sleeving over the individual external lead wires extending into the epoxy material. It should also be noted that transmitters manufactured prior to May 1982 may have had the connector assemblies replaced with the post-May 1982 design either in the field or at PRIME during maintenance or repair activities.

NRC Regulatory Issue Summary 2005-20, "Revision to Guidance Formerly Contained in NRC Generic Letter 91-18, 'Information to Licensees Regarding Two NRC Inspection Manual Sections on Resolution of Degraded and Nonconforming Conditions and on Operability,' " and NRC Inspection Manual Part 9900 Technical Guidance, "Operability Determinations & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety," provides guidance on nonconforming conditions related to environmental qualification (Agencywide Documents Access and Management System, Accession No. ML052700274). Further, NRC Generic Letter 88-07, "Modified Enforcement Policy Relating to 10 CFR 50.49, Environmental Qualification of Electrical Equipment Important to Safety For Nuclear Power Plants," provides guidance regarding the application of 10 CFR 50.49.

CONTACT

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

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