

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

August 26, 1992

NRC INFORMATION NOTICE 92-63: CRACKED INSULATORS IN ASL DRY TYPE
TRANSFORMERS MANUFACTURED BY WESTINGHOUSE
ELECTRIC CORPORATION

'92 AUG 31 P3:51

Addressees

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to problems that could result from the cracking of ceramic insulators on ASL Dry Type Power Center 4160/480 volt (V) 3-phase transformers manufactured by the Westinghouse Electric Corporation (Westinghouse). 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 information notice are not NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

On May 13, 1991, the Washington Public Power Supply System (WPPSS), the construction permit holder for the Washington Nuclear Project, Unit 3, (WNP-3) reported to the NRC that cracks were observed on ceramic insulators that support the high voltage coils in certain Class 1E and Non-Class 1E 4160/480 V transformers rated at 1000 and 1500 kVA.

The Pacific Gas and Electric Company (PG&E), the licensee for the Diablo Canyon Nuclear Power Plant, Units 1 and 2, found a hairline crack on an insulator in one of the 4160/480V, 1000 KVA rated transformers in Unit 2. In a letter of August 30, 1991, Westinghouse, the supplier of the transformer, recommended that PG&E replace the cracked insulator as soon as possible. On September 19, 1991, PG&E evaluated the operability to justify continued operation with the hairline crack on one of its insulators.

Discussion

The design of these transformers typically includes a magnetic iron core, three high voltage coil assemblies and a steel frame. The high voltage coil assemblies are held in position and are electrically separated from the ground plane of the transformer by a set of insulators uniformly spaced around the top and bottom periphery of each coil assembly. In turn, the insulators are

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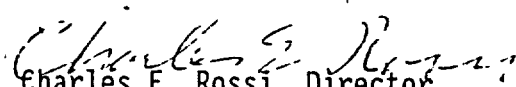
held in place by pressure rings. A compressive force is applied to the top of each pressure ring by four jack bolts. The assembly is designed to maintain the spatial relationship of the coils, insulators, and the pressure ring during normal operation, a seismic event, or an electrical fault condition.

The 1000 kVA transformer has six insulators at the top and bottom of each high voltage coil assembly while the 1500 kVA transformer has eight. The insulators are 4 3/8 inches long and 1 inch in diameter. The center portion of each insulator has a series of annular indentations that form five rings or skirts. Typically, the cracks were found in these indentations.

At WNP-3, both the WPPSS and NRC staff observed that some of the cracked insulators in the affected transformers were installed off-center and were not perpendicular to the pressure ring. The cracks were on insulators located at the top or bottom of the high voltage coils and at least one hairline crack was observed along the smallest cross section in the upper half of each affected insulator.

On November 14, 1991, Westinghouse informed the NRC (Attachment 1) that it had sent a customer notification letter to all utilities that may have received Westinghouse safety-related ASL Dry Type transformers. Westinghouse stated that it had received information from the ABB Power Transmission and Distribution Company, Incorporated, that the cracking of the insulators could have a catastrophic effect on the structural integrity of the transformer.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.


Charles E. Rossi, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical contact: K. R. Naidu, NRR
(301) 504-2980

Attachments:

1. Westinghouse letter ET-NRC-91-3638
2. List of Recently Issued NRC Information Notices



Attachment 1
IN 92-63
August 26, 1992
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Westinghouse
Electric Corporation

Energy Systems

Nuclear and Advanced
Technology Division

Box 355
Pittsburgh Pennsylvania 15230-0355

ET-NRC-91-3638

November 14, 1991

Document Control Desk
US Nuclear Regulatory Commission
Washington, DC 20555

Attention: Dr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation

Dear Dr. Murley:

Attached is a generic version of the customer notification letter, issued by Westinghouse to all utilities, both domestic and international which may have been supplied with safety related ASL Dry Type Transformers. This letter was prepared to document Westinghouse's evaluation, of the ASL Dry Type Transformer issue, pursuant to the requirements of 10CFR Part 21.

S. R. Tritch, Manager
Engineering Technology Department

LRH/sa

Attachment

cc: ABB Power T&D Company Inc.
651 Holiday Drive
Pittsburgh, PA 15220

Attn: P. J. Pillitteri, Field Service Manager Integrated Logistics Support

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Subject: Westinghouse ASL Dry Type Transformers

To: Utility

On June 10, 1991 the Washington Public Power Supply System (WPPSS) notified the NRC of a potential deficiency regarding ASL Power Center Dry Type Transformers. In September 1987, an insulator that supports the C-phase coil of a Westinghouse supplied dry type air ventilated 2000KVA Non Class IE transformer was discovered to be cracked at WNP-3. In January 1990, three additional cracked insulators were discovered in another Non Class IE transformer purchased under the same contract.

Due to the above, WNP-3 engineering personnel inspected the plant's six Class IE power center transformers purchased under the same contract. These transformers, which have not yet been energized, were inspected in November 1990. This inspection revealed cracked insulators in two of the six transformers.

Westinghouse sold the transformer product lines, including the ASL Dry Type Power Center Transformers, to ABB Power Transmission and Distribution Company Inc. Consequently, Westinghouse does not have the necessary technical information or expertise available to identify all of the potentially affected plants, the cause, nor the ultimate solution. Westinghouse has been informed by ABB that the cracking of the insulators could have catastrophic effect on the structural integrity of the transformer. If your plant was supplied or utilizes the ASL Power Center Dry Type Transformer, Westinghouse recommends that you pursue this matter directly with ABB. Westinghouse has provided a copy of this generic notification to ABB and the NRC and has concluded its evaluation of this issue pursuant to the requirements of 10CFR Part 21.

Project Manager

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LIST OF RECENTLY ISSUED
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
92-62	Emergency Response Information Requirements for Radioactive Material Shipments	08/24/92	All U.S. Nuclear Regulatory Commission licensees.
92-61	Loss of High Head Safety Injection	08/20/92	All holders of OLs or CPs for nuclear power reactors.
92-60	Valve Stem Failure Caused by Embrittlement	08/20/92	All holders of OLs or CPs for pressurized water reactors (PWRs).
92-59	Horizontally-Installed Motor-Operated Gate Valves	08/18/92	All holders of OLs or CPs for nuclear power reactors.
-58	Uranium Hexafluoride Cylinders - Deviations in Coupling Welds	08/12/92	All Fuel Cycle Licensees.
92-57	Radial Cracking of Shroud Support Access Hole Cover Welds	08/11/92	All holders of OLs or CPs for boiling water reactors (BWRs).
92-56	Counterfeit Valves in the Commercial Grade Supply System	08/06/92	All holders of OLs or CPs for nuclear power reactors.
92-55	Current Fire Endurance Test Results for Thermo-Lag Fire Barrier Material	07/27/92	All holders of OLs or CPs for nuclear power reactors.
92-54	Level Instrumentation Inaccuracies Caused by Rapid Depressurization	07/24/92	All holders of OLs or CPs for nuclear power reactors.
92-53	Potential Failure of Emergency Diesel Generators due to Excessive Rate of Loading	07/29/92	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
CP = Construction Permit