

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

December 7, 1987

NRC INFORMATION NOTICE NO. 87-61: FAILURE OF WESTINGHOUSE W-2-TYPE  
CIRCUIT BREAKER CELL SWITCHES

Addressees:

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

Purpose:

This information notice is being provided to alert addressees to potential problems resulting from the failure of Westinghouse W-2-type circuit breaker cell switches. 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 do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

On October 16, 1987, Westinghouse Electric Corporation notified the Nuclear Regulatory Commission (NRC) staff, pursuant to the requirements of 10 CFR Part 21, of the failure of a modified Westinghouse W-2-type switch that was being utilized as a circuit breaker cell switch. The failure was identified at Indian Point Station, Unit 3, on May 15, 1987, while the reactor was at cold shutdown for a scheduled refueling outage. The output breaker for emergency diesel generator (EDG) No. 31 was prevented from re-energizing the 480-volt bus 2A after plant personnel had inadvertently de-energized 480-volt buses 2A and 5A. Subsequent investigation by the licensee determined that an erroneous input to the EDG logic system had prevented the EDG output breaker from closing. The licensee identified deformation of the spring retainer in the spring-return mechanism of the cell switch in the 52/2A breaker cell as the root cause of the erroneous input.

The spring retainer is continuously under stress whenever the breaker is racked in (which it is, except when the breaker is racked out for testing or maintenance) and releases whenever the breaker is racked out. Its deformation allowed a loss of spring tension that rendered the cell switch unable to spring-return to the racked out position when normal supply breaker 52/2A was racked out for maintenance. Thus, the EDG logic system received an erroneous input indicating that breaker 52/2A was racked in and the main contacts were still closed. This erroneous input prevented the EDG No. 31 output breaker from closing automatically in response to a loss of power. During

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subsequent inspections by Indian Point personnel, 35 of a total of 37 similar W-2-type switch spring retainers in the 480-volt system breakers exhibited some sign of deformation.

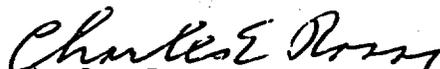
All the cell switches had been shipped to Indian Point in 1971-1972 and all had been in service for close to 15 years. The licensee reported the results of its investigation to the NRC in Licensee Event Report 87-009-00 on October 2, 1987.

Discussion:

Westinghouse has determined (1) that the deformation of the spring retainer in the spring-return mechanism of the cell switches was related to the aging of the component and (2) that the failure mechanism was the continuous stress it experiences while the breaker is racked in. The W-2-type cell switches are available as optional equipment for all Westinghouse DS switchgear cabinets. Westinghouse has indicated that inspection or testing performed when the breaker is racked out would determine if a failure has occurred. Where inspections and/or testing have not been performed, the potential exists that if the breaker is not racked in, a cell switch malfunction may prevent the completion of safety-related functions dependent on cell switch indication of the breaker being racked out or in the test position.

In the 10 CFR Part 21 notification submitted to the NRC, Westinghouse recommends that proper cell switch operation be verified through periodic inspections or testing, or whenever the breaker is racked out. Proper operation of the spring retainer is only verifiable when the breaker is moved from its racked in position. Visible inspection may be used to verify cell switch operation. However, it will be necessary to move the breaker out on the rails to observe whether the switch operating lever is in its proper position (30 degrees off vertical for the W-2 cell switch). Any uncertainty in this observation may be resolved by manually ensuring that the switch has returned to the proper position. Persons performing this inspection should use caution not to contact any energized terminals.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the technical contact listed below or the Regional Administrator of the appropriate regional office.

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

Technical Contacts: K. R. Naidu, NRR  
(301) 492-9656

Jaime Guillen, NRR  
(301) 492-8933

Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED  
NRC INFORMATION NOTICES 1987

Information Notice No.	Subject	Date of Issuance	Issued to
87-60	Depressurization of Reactor Coolant Systems in Pressurized-Water Reactors	12/4/87	All holders of OLs or CPs for PWRs.
86-108, Supp. 2	Degradation of Reactor Coolant System Pressure Boundary Resulting from Boric Acid Corrosion	11/19/87	All holders of OLs or CPs for nuclear power reactors.
87-59	Potential RHR Pump Loss	11/17/87	All holders of OLs or CPs for nuclear power reactors.
87-58	Continuous Communications Following Emergency Notifications	11/16/87	All nuclear power reactor facilities holding an OL and the following fuel facilities that have Emergency Notification Systems: Nuclear Fuel Services, Erwin, TN; General Atomics, San Diego, CA; UNC, Montville, CT; and B & W LRC and B & W Navy, Lynchburg, VA.
87-57	Loss of Emergency Boration Capability Due to Nitrogen Gas Intrusion	11/6/87	All holders of OLs or CPs for nuclear power reactors.
87-56	Improper Hydraulic Control Unit Installation at BWR Plants.	11/4/87	All holders of OLs or CPs for boiling water reactors (BWRs).
87-55	Portable Moisture/Density Gauges: Recent Incidents of Portable Gauges Being Stolen or Lost	10/29/87	All NRC licensees authorized to possess portable gauges.
87-54	Emergency Response Exercises	10/23/87	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License  
CP = Construction Permit

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In the 10 CFR Part 21 notification submitted to the NRC, Westinghouse recommends that proper cell switch operation be verified through periodic inspections or testing, or whenever the breaker is racked out. Proper operation of the spring retainer is only verifiable when the breaker is moved from its racked in position. Visible inspection may be used to verify cell switch operation. However, it will be necessary to move the breaker out on the rails to observe whether the switch operating lever is in its proper position (30 degrees off vertical for the W-2 cell switch). Any uncertainty in this observation may be resolved by manually ensuring that the switch has returned to the proper position. Persons performing this inspection should use caution not to contact any energized terminals.

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JGuillen KNaidu FRosa TechEd CHBerlinger CERossi  
11/03/87 11/ /87 11/06/87 10/31/87 11/20/87 12/ /87

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In the 10 CFR Part 21 notification submitted to the NRC, Westinghouse recommends that proper cell switch operation be verified through periodic inspections or testing, or whenever the breaker is removed from its "connected" position. Proper operation of the spring retainer is only verifiable when the breaker is moved from its racked in position. Visible inspection may be used to verify cell switch operation. However, it will be necessary to move the breaker out on the rails to observe whether the switch operating level is in its proper position (30 degrees off vertical for the W-2 cell switch). Any uncertainty in this observation may be resolved by manually ensuring that the switch has returned to the proper position. Persons performing this inspection should use caution not to contact any energized terminals.

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