



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION IV
611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TEXAS 76011

January 27, 1982

Gentlemen:

The enclosed IE Information Notice provides early notification of an event that may have safety significance. It is expected that recipients will review the information notice for possible applicability to their facilities.

If you have any questions regarding this matter, please contact this office.

Sincerely,

John T. Collins
Regional Administrator

Enclosures:

1. IE Information Notice No. 82-02
2. List of Recently Issued
IE Information Notices

IE 315
1/1

IE INFORMATION NOTICE 82-02: WESTINGHOUSE NBFD RELAY FAILURES IN REACTOR
PROTECTION SYSTEMS AT CERTAIN NUCLEAR POWER
PLANTS

<u>Licensee</u>	<u>Facility/Docket Number</u>
✓ Arkansas Power and Light Company Little Rock, Arkansas	Arkansas Nuclear One, Unit 1 & 2 ✓ 50-313; 50-368
✓ Nebraska Public Power District Columbus, Nebraska	Cooper Nuclear Station ✓ 50-298
✓ Omaha Public Power District Omaha, Nebraska	Fort Calhoun Station ✓ 50-285
✓ Public Service Company of Colorado Denver, Colorado	Fort St. Vrain Generating Station ✓ 50-267
✓ Gulf States Utilities Beaumont, Texas	River Bend ✓ 50-458; 50-459
✓ Houston Lighting & Power Company Houston, Texas	South Texas Project ✓ 50-498; 50-499
✓ Kansas Gas & Electric Company Wichita, Kansas	✓ Wolf Creek STN 50-482
✓ Louisiana Power & Light Company New Orleans, Louisiana	Waterford-3 ✓ 50-382
✓ Texas Utilities Generating Company Dallas, Texas	Comanche Peak Steam Electric Station ✓ 50-445; 50-446



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SSINS: 6835
Accession No.:
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IN 82-02

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

January 27, 1982

IE INFORMATION NOTICE NO. 82-02: WESTINGHOUSE NBFD RELAY FAILURES IN REACTOR
PROTECTION SYSTEMS AT CERTAIN NUCLEAR POWER
PLANTS

Discussion:

Westinghouse has notified the NRC of a higher-than-expected failure rate of Westinghouse type NBFD relay coils in reactor protection systems at certain power reactor plants. Investigation into the cause for failure revealed that, at high ambient temperature conditions, relay coils could fail due to the inductive voltage spike generated by the deenergization of the relay coil. It was also determined that the relay coil failures have been confined to normally energized relays used in the reactor protection systems where high ambient temperature conditions exist due to heat generated by the normally energized relays.

To date, no failures of NBFD relay coils have been reported in safeguard cabinets where these relays are normally in a deenergized state and temperature conditions are normal.

After reviewing the NBFD relay problem, Westinghouse issued Technical Bulletin NSD-TB-81-14 on December 7, 1981, to Westinghouse-designed power plants using BFD or NBFD relays in the reactor protection and safeguard systems. An extract of this bulletin is attached for your information and appropriate use. The bulletin provides interim test methods for verifying the operability of normally deenergized and energized NBFD relay applications and recommends replacement of NBFD relays manufactured prior to January 1, 1981. The bulletin also provides relay coil numbers as well as data codes to facilitate affected licensees' replacement efforts if required.

This information notice is provided as an early notification of a potentially significant matter. It is expected that recipients will review the information for applicability to their facilities. No specific action or response is required at this time. If you have any questions regarding this matter, please contact the Regional Administrator of the appropriate NRC Regional Office.

Attachment:

Extract of Westinghouse Technical Bulletin NSD-TB-81-14, dated 12/7/81

EXTRACT OF WESTINGHOUSE TECHNICAL BULLETIN NSD-TB-81-14

Subject	Number
BFD (NBFD) RELAYS	NSD-TB-81-14
System(s)	Date
REACTOR PROTECTION AND SAFEGUARDS SYSTEMS	December 7, 1981
Affected Plants	S.O.(s)
All those utilizing BFD or NBFD relays in the above systems.	385
References	Sheet Of
NSD-TB-79-5, 76-16, & 76-2. NRC IE BULLETIN 79-25	1 3

BACKGROUND

This bulletin pertains to the modified Westinghouse BFD relays designated as NBFD with the style number 5072A49 (followed by the letter G and a two-digit number, depending on pole configuration) and with coil style number 1271C50G01. The NBFD relay was first made available in December 1976. The purpose of this bulletin is to describe a Potential Substantial Safety Hazard attributable to the Westinghouse NBFD relay in certain applications.

Westinghouse has been notified of NBFD relay coil failures which have occurred in the reactor protection cabinets at certain sites. As a result, Westinghouse initiated an investigation to determine the failure mechanism involved. It was concluded that at high ambient temperature, relay coils could burn open due to an inductively induced voltage spike generated upon de-energization of the relay.

NBFD relay coil failures have been confined to the normally energized relays in the reactor protection rack where high ambient temperature conditions exist due to heat generated by the normally energized relays.

NBFD relays located in the safeguards cabinets are normally de-energized, and are energized to provide safeguards actuation. To date, no failures of NBFD relay coils have been reported in the safeguards cabinet. NBFD relays located in the safeguards cabinets are not subject to high temperature conditions due to the normally de-energized state. Also cyclic tests performed quarterly at the relay vendor show no abnormal coil failure.

Since an undetected open coil condition in the safeguards actuation circuitry (however remote) would prevent actuation of functions important to safety, it was reported by Westinghouse as a potential safety hazard for those plants which utilize these relays in the safeguards cabinet.

EXTRACT OF WESTINGHOUSE TECHNICAL BULLETIN NSD-TB-81-14 (continued)

INTERIM RECOMMENDATIONS

Westinghouse recommends the following interim measures for normally de-energized and normally energized NBFD relays.

(A) NORMALLY DE-ENERGIZED APPLICATIONS

In normally de-energized applications, test for continuity of the relay coil and amend applicable test procedures to require a continuity test following every energized/de-energize cycle of the relay, including cycles required by periodic test procedures.

Westinghouse plants with provisions for on-line test capability can utilize these provisions to verify continuity of the NBFD relay coils. Those plants which [do not] have on-line test capability should make use of portable test equipment to verify the continuity for each NBFD relay coil.

(a) Plants with on-line test capability:

Utilize established test procedures normally used during periodic on-line testing. These procedures which utilize the white test lamps provide indication of coil continuity.

(b) Plants without on-line test capability:

Utilize a volt-ohm meter to check resistance across the NBFD relay coil leads. If relays are connected in parallel, use the parallel resistance law to determine if any coil is open. If any parallel combination gives indication of an open coil, each individual coil must be checked to determine the failed coil.

(B) NORMALLY ENERGIZED APPLICATIONS

Although open relay coils in normally energized applications result in the system (i.e. reactor trip) falling into a safe state tending to trip the reactor, Westinghouse recommends the following: When the relay is energized, (after a previous de-energization), visually verify that the armature has moved to the pulled-in position by observing the pushbuttons atop the contact assembly. The relay is energized if the pushbuttons protrude from the assembly by no more than 1/8 inch.**

**NOTE: Manual depression of pushbuttons should result in no inward movement of the armature of an energized relay and may be used if desired in lieu of visual verification.

EXTRACT OF WESTINGHOUSE TECHNICAL BULLETIN NSD-TB-81-14 (continued)

LONG TERM RECOMMENDATIONS

Relays manufactured after January 1, 1981 incorporate additional (mylar) insulating material which has been confirmed by tests to resolve coil burnout by high voltage spikes generated when the relay coil current is interrupted. It is recommended that the utility consider installing this improved coil during the next scheduled outage.

Relay coils with improved insulating material manufactured after January 1981 bear the style number 1271C50G01 and a date code, visible on the unmounted coil. Those coils manufactured after October 28, 1981 bear the style number 1293C51G01 such that code date verification is unnecessary.

Contact your Westinghouse Nuclear Service Division representative...for additional information pertaining to replacement coils.

To preclude excessive heating of the NBFD relay coil and degradation of coil insulation, Westinghouse reaffirms its recommendations for review of station battery charging procedures, such that the NBFD relay coils should not be subject to battery equalization voltages in excess of the coil rating. Caution should be exercised to ensure that charging voltage be limited to 140 VDC and that charging at 140 VDC be limited to 24 hours duration if the previous charging period [occurred]...less than 30 days [previously].

APPLICABILITY

The information in this bulletin does not apply to Westinghouse plants using a Solid State Protection System.

IE Information Notice No. 82-02
January 27, 1982

LISTING OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date Issued	Issued To
81-33	Locking Devices Inadequately Installed on Main Steam Isolation Valves	11/9/81	All power reactor facilities with an Operating License (OL) or Construction Permit (CP)
81-34	Accidental Actuation of Prompt Public Notification System	11/16/81	All power reactor facilities with an Operating License (OL) or Construction Permit (CP)
81-35	Check Valve Failures	12/2/81	All power reactor facilities with an Operating License (OL) or Construction Permit (CP)
81-36	Replacement Diaphragms for Robertshaw Valve (Model No. VC-210)	12/3/81	All power reactor facilities with an Operating License (OL) or Construction Permit (CP)
81-37	Unnecessary Radiation Exposure to Public & Workers during Events Involving Thickness & Level Measuring Devices	12/15/81	All byproduct material licensees
81-38	Potentially Significant Equipment Failures Resulting from Contamination of Air-Operated Systems	12/17/81	All power reactor facilities with an Operating License (OL) or Construction Permit (CP)
81-39	EPA Crosscheck Program - Low Level Radioiodine in Water Test Program	12/23/81	All power reactor facilities with an Operating License (OL) or Construction Permit (CP), and Priority I material licensees
82-01	Auxiliary Feedwater Pump Lockout Resulting from Westinghouse W-2 Switch Circuit Modification	1/25/82	All power reactor facilities with an Operating License (OL) or Construction Permit (CP)

Enclosure