

Docket Nos. 50-289,395,275/323,382,  
 528/529/530,362,370,389,  
 413/414,362,389,370,341,  
 358,416

MAR 3 1983

MEMORANDUM FOR: Chairman Palladino  
 Commissioner Gilinsky  
 Commissioner Ahearne  
 Commissioner Roberts  
 Commissioner Asselstine

FROM: Darrell G. Eisenhut, Director  
 Division of Licensing

SUBJECT: BOARD NOTIFICATION 83-26 - FAILURE OF REACTOR TRIP BREAKERS  
 TO OPEN IN TRIP SIGNAL

In accordance with the procedures for Board notification, the enclosed information is being transmitted directly to the Commission. This information describes an event that occurred at Salem Unit 1 on February 25, 1983.

The event was a failure of the reactor trip breakers (Westinghouse DB-50) to open upon receipt of an automatic trip signal from the protection system. This information is significant since it may affect the NRC staff's conclusions related to the probability/corrective measures for anticipated transient without scram (ATWS) events (Unresolved Safety Issue A-9) which is discussed in the NRC safety evaluations for power reactors. In addition, it may affect the staff's evaluation concerning quality assurance measures as they are applied to specific components.

The enclosed information describes the event and the NRC short-term corrective action. We will inform the Commission and/or appropriate Boards of further information which would result in a change in the existing staff conclusions concerning the adequacy of the present ATWS and QA procedures.

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 PDR ADDOCK 05000272  
 S PDR

Darrell G. Eisenhut, Director  
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Enclosure: As stated

cc: OPE  
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DATE		2/26/83	3/3/83				

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Callaway 1&2 (Gleason, Bright, Kline)  
Comanche Peak (Miller, Cole, McCollum)  
Indian Point 2&3 (Gleason, Paris, Shon)  
Midland 1&2 (Beckhoefer, Cowan, Harbour)  
San Onofre 2&3 (Kelley, Hand, Johnson)  
Palo Verde 1-3 (Lazo, Callihan, Cole)  
Perry 1&2 (Bloch, Kline, Shon)  
Shoreham (Brenner, Carpenter, Morris)

ASLAB and Parties to the Proceedings for:

Comanche Peak (Miller, Cole, McCollum)  
Diablo Canyon 1&2 (Moore, Johnson, Buck)  
Fermi 2 (Eilperin, Gotchy, Moore)  
FNP 1-8 (Kohl, Johnson, Wilber)  
San Onofre 2&3 (Eilperin, Gotchy, Johnson)  
Palo Verde 1-3 (Rosenthal, Eilperin, Wilber)  
TMI-1 (Edles, Buck, Gotchy, Kohl)  
Waterford 3 (Eilperin, Gotchy, Kohl)  
Zimmer (Rosenthal, Eilperin, Wilber)

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SSIS No.: 6820  
OMB No.: 3150-00012  
Expiration Date: 04/30/85  
IEB 83-01

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

February 25, 1983

IE BULLETIN NO. 83-01: FAILURE OF REACTOR TRIP BREAKERS (WESTINGHOUSE DB-50)  
TO OPEN ON AUTOMATIC TRIP SIGNAL

Addressees:

All pressurized water nuclear power reactor facilities holding an operating license (OL) for action and to other nuclear power reactor facilities for information.

Purpose:

The purpose of this bulletin is to inform CP holders and licensees about recent failures of W DB type circuit breakers to trip open on receipt of an automatic trip signal from the reactor protection system (RPS) and to require action of all operating pressurized water reactors to assure proper operation of these breakers in the future.

Description of Circumstances:

On February 25, 1983, during startup of the Salem Unit 1 plant, both DB-50 RPS breakers failed to open automatically upon receipt of a valid trip signal on low-low steam generator level.

This failure to trip has been attributed to sticking of the undervoltage trip attachment. The reactor was tripped manually from the control room about 30 seconds after the automatic trip signal was generated. The manually initiated trip was accomplished by the shunt relays installed in each DB-50 breaker.

Background:

In some reactor protection system designs, the automatic protection signals are fed only to the undervoltage (UV) trip attachment of the reactor trip breakers; the manual signals are fed both to the UV trip and to a shunt trip coil of each breaker.

In the recent past, on two separate occasions, one RPS breaker at the Salem facility failed to open automatically due to binding of the UV trip attachment. These events have been reported in LER's 82-072/03X-1 and 83-001/03L. In addition, on February 22, 1983, Salem Unit 1 tripped on low-low steam generator level; however, since the operator manually tripped the reactor at a time almost coincidental with the automatic trip signal, the actual trip mechanism (manual or automatic) cannot be ascertained.



Similar failures involving the UV trip attachment to the RPS have been reported to the NRC. These failures only involved one of the two series breakers, therefore they did not result in a failure to automatically trip the reactor. Said failures have occurred at H. B. Robinson, Connecticut Yankee, Prairie Island and St. Lucie in addition to those at Salem. As a result of these events, the NRC issued IE Bulletin No. 71-02 and IE Circular No. 81-12, and Westinghouse issued Technical Bulletin No. NSD-78-74-1 dated January 11, 1974 and NSD Data Letter 74-2 dated February 14, 1974.

Required Actions for All Holders of Operating Licenses for Pressurized Water Reactors:

Licensees with W DB type breakers using undervoltage trip attachment in Reactor Protective System applications are requested to:

1. Perform surveillance test of undervoltage trip function independent of the shunt trip within 24 hours of receipt of this Bulletin unless equivalent testing has been performed within 5 days. Those plants for which on-line testability is not provided may complete this item before resuming operation or if currently operating, at the next plant shutdown.
2. Review the maintenance program for conformance to recommended W program (attachment) including frequency and lubricant applied to trip mechanism. Verify actual implementation of the W program. If maintenance including lubrication does not conform, initiate such maintenance within 5 days of receipt of this bulletin or provide an alternate maintenance program. Repeat the testing required in item 1 prior to declaring the breaker OPERABLE.
3. Notify all licensed operators of the failure-to-trip event which occurred at Salem. Review the appropriate emergency operating procedures for the event of failure-to-trip with each operator upon his arrival on-shift.
4. Provide written reply within 7 days of receipt of this bulletin,
  - a. identifying results of testing performed in response to item 1,
  - b. identifying conformance of maintenance program to W recommendation and describing results of maintenance performed directly as a result of this Bulletin in response to item 2,
  - c. provide statement that provisions are in place to notify licensed operators of the Salem event and bring to their attention appropriate failure-to-trip emergency procedures upon their arrival on-shift.
  - d. You are reminded of the requirements for prompt notification in accordance with 10 CFR 50.72 in the event of detecting an inoperable RPS breaker.

PWR Licensees not using the subject undervoltage trip attachment and therefore not affected by this bulletin shall submit a negative declaration within 7 days of the receipt of this bulletin.

The written report required shall be submitted to the appropriate Regional Administrator under oath or affirmation under provisions of Section 182a, Atomic Energy Act of 1954, as amended. The original copy of the cover letters and a copy of the reports shall be transmitted to the U. S. Nuclear Regulatory Commission, Document Control Desk, Washington, D.C. 20555 for reproduction and distribution.

This request for information was approved by the Office of Management and Budget under a blanket clearance number 3150-00012 which expires April 30, 1985. Comments on burden and duplication may be directed to the Office of Management and Budget, Reports Management, Room 3208, New Executive Office Building, Washington, D.C. 20503.

If you have any questions regarding this matter, please contact the Regional Administrator of the NRC Regional Office or the technical contact listed below.

Original signed by E. L. Jordan

Richard C. DeYoung, Director  
Office of Inspection and Enforcement

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Attachment:

1. Transcription of Westinghouse NSD Ltr. 74-2
2. List of Recently Issued IE Bulletins

ATTACHMENT 1  
IEB 83-01  
February 25, 1983

Verbatim transcription of Westinghouse NSD letter 74-2. Original signed by  
W. H. Furfari and Sydney G. Caslake.

FROM : Nuclear Service Division  
WIN : 236-4744  
DATE : February 19, 1974  
SUBJECT: Reactor Trip Breaker  
Maintenance

## NUCLEAR ENERGY SYSTEMS

TO: Distribution

Technical Bulletin NSD-TB-74-1 (issued 1/11/74) described a reactor trip breaker malfunction which occurred at H. B. Robinson station in December of 1973, and recommended certain additional periodic maintenance measures to improve the reliability of these breakers.

The malfunction (failure to trip during a regularly scheduled periodic test) was attributed to excessive friction in the linkage of the Under-voltage Trip Attachment, which is the device that initiates the breaker drop-open action by elevating the trip bar. The problem was corrected by cleaning and lightly lubricating certain portions of the linkage.

To preclude the possibility of reoccurrence of this malfunction, Westinghouse recommends that the reactor trip breakers be given regularly scheduled periodic inspection/maintenance as described in the Instruction Manual and in line with the following guidelines.

1. Scope. These recommendations are intended to apply to Westinghouse DB-50 (or DB-25) breakers in Reactor Trip applications. Some future WNES plants will be supplied with Westinghouse Type DS (stored energy) breakers, which should be maintained in accordance with their instruction manual.
2. Related Operations. It is expected that these inspection and maintenance measures would normally be carried out in conjunction with breaker periodic operational testing or during plant shutdowns. However, these recommendations in no way are intended to supersede breaker operational testing commitments and requirements.
3. Frequency. Intervals between maintenance will be influenced by operating and atmospheric conditions, but we would recommend that initially it be performed on a semi-annual basis. The period might then be extended to 9 or 12 months if experience shows this to be sufficient.

February 19, 1974

4. Cleaning. Clean the entire unit by blowing with dry instrument air (or a hand bellows), followed by vacuum cleaning. Particular attention should be paid to the cleanness of the undervoltage trip device, which can be inspected without component disassembly.
5. Solvents. In general, the use of a cleaning solvent is not encouraged since some can be damaging to electrical components. If there is a particularly heavy deposit of contaminants, an inert or mild solvent such as Stoddard solvent could be used if applied sparingly.
6. Lubricants. Although the Instruction Manual (page 5) cautions against any re-lubrication in the field, the manufacturers have agreed that the reliability of the breaker is improved by lightly lubricating the linkage of the undervoltage device occasionally. However, the lubricant should be applied only sparingly to the front and back faces of the vertical-traveling latch (interfacing with the flat copper-alloy spring).

A dry or near-dry molybdenum disulfide lubricant should be used. Technical Bulletin NSD-TB-74-1 indicated Molykote G as a possible choice. That information is incorrect and is hereby rescinded. Molykote G uses a thickened mineral oil as a vehicle, which would tend to collect foreign material. A better choice would be Molykote M-88, or Spray-kote. Both are commercially available Dow Corning products.

7. Inspection. Following the above cleaning and lubrication the entire breaker should be operationally checked and inspected for broken parts, loose bolts or excessive wear.

This Data Letter and the above information supersedes Technical Bulletin NSD-TB-74-1, which is hereby cancelled.

W. H. Furfari  
Electric Technology  
TECHNICAL OPERATIONS

APPROVED: Syndey G. Caslake, Manager  
Electric Technology  
TECHNICAL OPERATIONS

WHF/nev  
Attachment

LIST OF RECENTLY ISSUED IE BULLETINS

Bulletin No.	Subject	Date of Issue	Issued to
83-04	Deficiencies in Primary Containment Electrical Penetration Assemblies	12/03/82	All power reactor facilities holding an OL or CP
82-03 Rev. 1	Stress Corrosion Cracking in Thick-Wall Large-Diameter Stainless Steel, Recirculation System Piping at BWR Plants	10/28/82	Operating BWRs in Table 1 for action and other OLs and CPs for information
82-03	Stress Corrosion Cracking in Thick-Wall Large-Diameter, Stainless Steel, Recirculation System Piping at BWR Plants	10/14/82	Operating BWRs in Table 1 for action and other OLs and CPs for information
82-01 Rev 1, Supp 1	Alteration of Radiographs of Welds in Piping Subassemblies	08/18/82	All power reactor facilities with an OL or CP
82-02	Degradation of Threaded Fasteners in the Reactor Coolant Pressure Boundary of PWR plants	06/02/82	All PWR facilities with an OL for action and all other OLs or CPs for information
82-01 Rev. 1	Alteration of Radiographs of Welds in Piping Subassemblies	05/07/82	All power reactor facilities with an OL or CP
82-01	Alteration of Radiographs of Welds in Piping Subassemblies	03/31/82	The Table 1 facilities for action and to all others for information
81-02 Supplement 1	Failure of Gate Type Valves to Close against Differential Pressure	08/18/81	All power reactor facilities with an OL or CP
81-03	Flow Blockage of Cooling Water To Safety System Components by <u>CORBICULA SP.</u> (ASIATIC CLAM) and <u>MYTILUS SP.</u> (MUSSEL)	04/10/81	All power reactor facilities with an OL or CP

OL = Operating License  
 CP = Construction Permit

DOS No: 50272830225  
 Date: February 25, 1983

PRELIMINARY NOTIFICATION OF EVENT OR UNUSUAL OCCURRENCE--PNO-I-83-11

This preliminary notification constitutes EARLY notification of events of POSSIBLE safety or public interest significance. The information is initially received without verification or evaluation, and is basically all that is known by the Region I staff on this date.

Facility: Public Service Electric & Gas Company Licensee Emergency Classification:  
 Salem Unit 1  
 (DN 50-272)  
 Notification of Unusual Event  
 Alert  
 Site Area Emergency  
 General Emergency  
 Not Applicable

Subject: REACTOR TRIP BREAKERS FAILED TO OPEN ON TRIP SIGNAL (ATWS)

At 12:21 AM on February 25, 1983, with the reactor at 12% power, a low-low level steam generator signal initiated a reactor trip signal. Both reactor trip breakers remained closed until operators initiated a manual trip about 30 seconds later. At that time the trip breakers opened as designed, tripping the reactor. Licensee investigation disclosed that the undervoltage trip attachments in both reactor trip breakers had failed to actuate due to excessive friction. A parallel shunt trip attachment actuated by manual scram, was successful in opening the breaker. An ALERT was immediately declared by the licensee at 1:30 AM and terminated at 2:00 AM. A Westinghouse representative is on site, to analyze the malfunction. The plant is being maintained in Mode 3. The licensee is investigating the cause of the failure of the trip breakers and does not plan on returning Unit 1 to operation without NRC consultation.

The NRC was notified of this event via ENS at 1:46 PM on February 25, 1983. The NRC will followup on this event and determine generic implications.

The licensee does not plan a press release. NRC will respond to inquiries.

The State of New Jersey has been notified.

CONTACT: R. Summers 8-609-935-3850 R. Jacobs 488-1222 L. P. Pop 488-1127

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830303027



DCS No: 50272890225  
Date: February 25, 1983.

PRELIMINARY NOTIFICATION OF EVENT OR UNUSUAL OCCURRENCE--PNO-I-83-11A

This preliminary notification constitutes EARLY notice of events of POSSIBLE safety or public interest significance. The information is as initially received without verification or evaluation, and is basically all that is known by the Region I staff on this date.

Facility: Public Service Electric & Gas Co.  
Salem, Unit 1  
(DN 50-272)

Licensee Emergency Classification:  
         Notification of Unusual Event  
  X   Alert  
         Site Area Emergency  
         General Emergency  
         Not Applicable

Subject: REACTOR TRIP BREAKERS FAILED TO OPEN ON TRIP SIGNAL (ATWS)

The failure of the breakers to open was due to a malfunction of the mechanical latch associated with the undervoltage (UV) relay in the DB-50 reactor trip breakers (2). Within approximately 2 hours, PSE&G technicians verified that the solid state protection system had functioned properly, and that the UV coil was deenergized (the tripped condition) during subsequent testing. However, when the UV coil was deenergized the "A" trip breaker failed to trip 2 out of 3 times and the "B" trip breaker failed to trip at all (3 attempts).

The cause of the failure was binding in the vertical latch bar of the UV trip attachment due to excessive friction. The breaker can be tripped 3 ways: (1) UV relay, (2) a shunt trip attachment; and (3) manually, at the breaker. The UV relay trips on either the reactor protection system signal or a manual scram signal from the control room. The latter signal also exercises the shunt trip attachment. The breakers can also be operated individually by push button from the control room which actuates the shunt trip attachment.

The plant is proceeding to Mode 5 pending completion of the investigation of this matter.

CONTACT: R. Summers                      R. Jacobs                      L. Tripp  
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