
Closeout of IE Bulletin 83-08: Electrical Circuit Breakers With an Undervoltage Trip Feature in Use in Safety-Related Applications Other Than the Reactor Trip System

Prepared by W.J. Foley, R.S. Dean, A. Hennick

PARAMETER, Inc.

Prepared for
U.S. Nuclear Regulatory
Commission

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Closeout of IE Bulletin 83-08: Electrical Circuit Breakers With an Undervoltage Trip Feature in Use in Safety-Related Applications Other Than the Reactor Trip System

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Prepared by
W.J. Foley, R.S. Dean, A. Hennick

PARAMETER, Inc.
13380 Watertown Plank Road
Elm Grove, WI 53122

Prepared for
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555
NRC FIN B8729

ABSTRACT

The NRC/IE issued Bulletin 83-08 December 28, 1983 because of concern about circuit breaker deficiencies reported per previous bulletins 83-01 and 83-04. The object of IEB 83-08 was to assure proper operation of circuit breakers with undervoltage trip attachments (UVTAs) in all safety-related applications other than use as reactor trip breakers (RTBs). The bulletin was issued for action to all licensees and holders of construction permits of power reactors. Evaluation of utility responses and NRC/Region inspection reports shows that the bulletin can be closed out per specific criteria for 123 (99%) of the 124 facilities to which it was issued. A followup item is proposed for use by the NRC to assure completion of required actions at the remaining facility. Circuit breakers with UVTAs were used in safety-related applications other than the reactor trip system in six (6) facilities. Malfunctions of the UVTAs were reported only for the facility for which followup is proposed.

TABLE OF CONTENTS

	<u>Page</u>	
Abstract	iii	
Introduction	1	
Summary	1	
Conclusions	3	
Remaining Areas of Concern	3	
Criteria for Closeout of Bulletin	4	
Appendix A	Background Information and Required Actions	
	IE Bulletin 83-08	A-1
	IE Bulletin 83-01	A-6
	IE Bulletin 83-04	A-12
	IE Information Notice 83-76	A-15
Appendix B	Documentation of Bulletin Closeout	
	Table B.1 Bulletin Closeout Status	B-1
	Table B.2 List of Facilities Reporting Molded-Case Breakers with UVTAs	B-7
	References	B-8
Appendix C	Proposed Followup Item	C-1
Appendix D	Utility Manhours Expended on IEB 83-08	D-1
Appendix E	Abbreviations	E-1

CLOSEOUT OF IE BULLETIN 83-08:
ELECTRICAL CIRCUIT BREAKERS WITH AN UNDERVOLTAGE TRIP
FEATURE IN USE IN SAFETY-RELATED APPLICATIONS
OTHER THAN THE REACTOR TRIP SYSTEM

INTRODUCTION

In accordance with the Statement of Work in Task Order 016 under NRC Contract 05-85-157-02, this report provides documentation for the closeout status of IE Bulletin 83-08. Documentation is based on the records obtained from the NRC Document Control System.

IE Bulletin 83-08 was issued December 28, 1983 to assure proper operation of circuit breakers with undervoltage trip attachments (UVTAs) being used in safety-related applications other than use as reactor trip breakers (RTBs). The NRC/IE issued IEB 83-08 because of concern about the reliability of RTBs in operating PWRs as reported for IEBs 83-01 and 83-04. The object was to evaluate circuit breakers with UVTAs in remaining safety-related applications in all nuclear power facilities.

For background information and required actions, IE bulletins 83-08, 83-01 and 83-04 and IE Information Notice 83-76 are included in Appendix A. Evaluation of utility responses and NRC/Region inspection reports is documented in Appendix B as the basis for bulletin closeout. Facilities using molded-case breakers with UVTAs are tabulated separately in Appendix B because they are considered to be outside the scope of this bulletin. A followup item is proposed in Appendix C for use by the NRC in assuring satisfactory completion of required actions. Utility manhours expended on IEB 83-03 are tabulated in Appendix D. Abbreviations used in this report and associated documents are presented in Appendix E.

SUMMARY

1. The bulletin has been closed out for the following five (5) facilities which have been shut down indefinitely (Criterion 1):

Dresden 1	Indian Point 1	TMI 2
Humboldt Bay 3	La Crosse	

Note: Of these five facilities, only La Crosse is included in the 124 facilities mentioned in the abstract. Criterion 2 could be applied to La Crosse.

2. The bulletin has been closed out for the following 116 facilities which have no subject breakers (Criterion 2):

Arkansas 1,2	Ginna	*River Bend 1
Beaver Valley 1,2	*Grand Gulf 1	Robinson 2
Bellefonte 1,2	Harris 1	Salem 1,2
Big Rock Point 1	Hope Creek 1	San Onofre 1,2,3
Braidwood 1,2	Indian Point 2,3	Seabrook 1,2
*Browns Ferry 1,2,3	Kewaunee	Sequoyah 1,2
Brunswick 1,2	LaSalle 1,2	*Shoreham
Byron 1,2	*Limerick 1,2	South Texas 1,2
Callaway 1	Maine Yankee	St. Lucie 1
Calvert Cliffs 1,2	McGuire 1,2	*St. Lucie 2
Catawba 1,2	Millstone 1,2,3	Summer 1
Clinton 1	Monticello	Surry 1,2
Comanche Peak 1,2	Nine Mile Point 1,2	Susquehanna 1
Cook 1,2	North Anna 1,2	TMI 1
Crystal River 3	Oconee 1,2,3	Trojan
Davis-Besse 1	Palisades	Turkey Point 3,4
Diablo Canyon 1,2	Palo Verde 1,2,3	Vermont Yankee 1
Dresden 2,3	*Peach Bottom 2,3	Vogtle 1,2
Duane Arnold	Perry 1,2	WNP 1,2
Farley 1,2	*Pilgrim 1	Waterford 3
*Fermi 2	Point Beach 1,2	Watts Bar 1,2
FitzPatrick	Prairie Island 1,2	Wolf Creek 1
Fort Calhoun 1	Quad Cities 1,2	Yankee-Rowe 1
Fort St. Vrain	Rancho Seco 1	Zion 1,2

* Criterion 2 has been applied because only molded-case breakers with UVTAs in subject applications were used at these facilities. See the note which follows Criterion 2 on Page 4.

3. The bulletin has been closed out for the following five (5) facilities for which a utility response indicates compliance with required actions and an NRC/Region inspection report indicates that required actions have been completed satisfactorily (Criterion 3):

Cooper Station	Hatch 1,2
Haddam Neck	Susquehanna 2

Brief descriptions of affected breakers and performance of required actions at these facilities are provided below.

Cooper Station: The only breakers with UVTAs in subject applications were twelve (12) Westinghouse Type DB-50s. The required actions were completed satisfactorily, including compliance with Westinghouse Bulletin NSD-TB-83-02 (with revisions).

Haddam Neck: The only breakers with UVTAs in subject applications were thirty-one (31) Westinghouse Type DBs. All UVTAs were replaced with solid state overcurrent trip devices supplied by Westinghouse.

Hatch: 1,2 Westinghouse air circuit breakers Type 50 DHP 250 were provided with shunt trip attachments as well as UVTAs. The UVTAs were not the primary means of tripping. The utility committed to perform periodic testing. General Electric F225 molded-case breakers with UVTAs were used but are not applicable to this bulletin (see Table B.2).

Susquehanna 2: The UVTAs were removed from breakers in subject applications.

4. The bulletin has been closed out for the following permit holder with construction suspended (Criterion 4):

WNP 3

5. The bulletin is called open for the following facility. A followup item for this facility is proposed in Appendix C for use by the NRC.

Oyster Creek 1

CONCLUSIONS

1. Related IEB 79-09, "Failure of GE Type AK-2 Circuit Breakers in Safety-Related Systems," is considered closed because of the followup of the continuing problems with affected breakers by the requirements of later IEBs 83-04 (see NUREG/CR-4664) and 83-08. (See IEB 79-09 closeout report NUREG/CR-3791, pages 2 and 3.)
2. Circuit breakers with undervoltage trip attachments were used in safety-related applications other than the reactor trip system in six (6) facilities, listed as follows:

Cooper Station
Haddam Neck

Hatch 1,2
Oyster Creek 1

Susquehanna 2

3. Malfunctions of the undervoltage trip devices were reported for only one facility, Oyster Creek 1.

REMAINING AREAS OF CONCERN

There are no remaining areas of concern other than the proposed NRC followup of a facility where the bulletin is still open (see Appendix C).

CRITERIA FOR CLOSEOUT OF BULLETIN

The bulletin is closed out for facilities to which one of the following criteria applies:

1. The facility has been shut down indefinitely or permanently.
2. An acceptable utility response indicates that the facility has no safety-related circuit breakers with undervoltage trip attachments (UVTAs) other than reactor trip breakers (RTBs).

Note: Molded-case breakers with UVTAs in subject applications are listed in Table B.2. They are considered to be outside the scope of this bulletin because of characteristics such as sealed construction and ample minimum to required trip force margin. Criterion 2 is applied when these breakers are the only ones with UVTAs in subject applications.

3. A response for the utility indicates compliance with required actions and an NRC/Region inspection report indicates that required actions have been completed satisfactorily.
4. A letter from the utility indicates that a bulletin response will be submitted before resumption of construction activities.

Note: This criterion applies to WNP 3 only.

APPENDIX A

Background Information and Required Actions

Note: For required actions, see pages A-3 and A-4.

SSINS No.: 6820
OMB No.: 3150-00011
Expiration Date: 4/30/85
IEB 83-08

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

December 28, 1983

IE BULLETIN NO. 83-08: ELECTRICAL CIRCUIT BREAKERS WITH AN UNDERVOLTAGE TRIP FEATURE IN USE IN SAFETY-RELATED APPLICATIONS OTHER THAN THE REACTOR TRIP SYSTEM

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or construction permit (CP) for action.

Purpose:

The purpose of this bulletin is to assure proper operation of circuit breakers with undervoltage trip attachments (UVTAs) being used in safety-related applications other than as reactor trip breakers (RTBs). Toward this end, the bulletin describes recent findings involving such circuit breakers and asks holders of CPs and OLs to take certain actions. The subject breakers are similar to those identified in IE Bulletins (IEBs) 83-01 and 83-04. Holders of CPs and OLs are asked to: (1) identify the safety-related applications of the breakers and the systems in which they are used; (2) review the adequacy of the design, testing, and maintenance of the breakers in light of their operating experience and information conveyed in the bulletin; and (3) evaluate the need to take corrective measures to ensure proper operation of the breakers.

Description of Circumstances:

The reactor trip breaker failures experienced at Salem Unit 1 in February 1983, and RTB failures experienced in March at San Onofre Units 2 and 3 led to issuance of IEBs 83-01 and 83-04, respectively. An additional problem with RTBs having a UVTA was described in IE Information Notice 83-76.

Results of testing of RTBs required by IEBs 83-01 and 83-04 have been reported to the NRC. These results show that the reliability of certain RTBs may not be commensurate with their safety function. A review of reported breaker failures indicates that most failures can be attributed to the UVTAs and their associated linkages. Since the UVTA provides only a limited force to trip the breaker, problems of alignment and lubrication can result in a failure of the breaker to perform its intended function. Some examples of problems identified as causes for failure to trip of the circuit breakers include: (1) improper lubrication

of linkages and other moving parts within either the UVTA or the circuit breaker trip bar latch assembly, (2) inadequate adjustment of spring tension of the UVTA, (3) excessive torque required to trip the circuit breaker because of hardening and contamination of the grease in the trip shaft bearings, and (4) excessive wear of moving parts within either the UVTA or the trip bar latch assembly because of infrequent lubrication of these moving parts or improper adjustments of the spring tension of the UVTA. The only types of RTBs being used in licensed PWRs are either Westinghouse (W) type DB, W type DS, or General Electric (GE) type AK-2 circuit breakers. Subsequent investigation into the matter also revealed that some PWRs and BWRs also employ similar breakers with similar undervoltage (UV) features in other safety-related applications. Examples of other systems that may be using the circuit breaker with UV features are the engineered safety features systems (for load shedding of the essential busses) and the 120 VAC uninterruptible power source from the motor-generator (MG) sets in BWR plants. Circuit breakers supplied by manufacturers other than W or GE may be used in some plants for these non-RTB applications.

In addition to the failures discussed above, a common mode failure of the GE type AK-2 circuit breaker occurred at Oyster Creek on November 30, 1978, during a loss of offsite power test. Both service water pump circuit breakers failed to trip, as required. The UV relays which monitor voltage level on each emergency bus functioned properly but did not actuate the breaker trip bar via the UV trip device within each circuit breaker. Ultimately the cause of failure was attributed to binding of the trip bar bearing in the breaker trip shaft assembly. The problem was corrected by cleaning and relubricating the trip shaft mechanism within the circuit breaker.

Although binding within the UV device and out-of-adjustment conditions in the linkage mechanism of the UV device were not a problem at Oyster Creek, GE had also determined that these conditions were a continuing problem at other nuclear power plants. (See IE Bulletin 79-09.)

The temporary overload condition on each emergency bus did not present a problem at Oyster Creek because those units are capable of full bus load pickup. However, as stated above, the load shedding feature of the emergency busses during the above test conditions did not function as designed.

Another failure, similar in nature to the early failure at Oyster Creek, occurred again at that plant in March 1983. In this event the circuit breaker involved provides power to one of two control rod drive mechanism pumps. As in the case of the 1978 event, this problem was also corrected by cleaning and relubricating the trip shaft mechanism within the circuit breaker.

In addition to the above mentioned breaker failures, each being a failure to trip on demand, we are also concerned about breakers with UVTAs failing to close on demand.

Failures of breakers to close are described in Information Notice 83-50. After issuing that notice, the NRC became aware of a failure to close that occurred during life cycle demonstration tests conducted by W that was directly

related to the UVTA latching mechanism. This failure occurred on a new UVTA that was initially lubricated in accordance with the latest W recommendations but which, for test purposes, was not subsequently lubricated. (Note: W recommends relubricating the UVTA and its linkages after 200 operations.) This failure to close occurred after 571 trip and reclose operations, and was attributed by W to normal latch wear. As a result of the latch wear, the breaker mechanism was placed in a "trip free" condition such that the breaker could not be closed electrically or manually. This failure does not represent a safety concern in an RTB application (i.e., such failures block the withdrawing of control rods, thereby assuring that the reactor remains sub-critical). However, there is a concern that such failures could, in other applications, prevent the performance of a safety-related function.

Generic Letter 83-28 was issued to all holders of an OL or CP on July 8, 1983. Sections 2.2 and 3.2 of that letter require implementation of a program that ensures that all components of safety-related systems are correctly identified and classified, and that the appropriate procedures (including vendor recommendations) are used for maintenance, surveillance, parts replacement, qualification testing, and post-maintenance operability testing. That letter, of course, applies to circuit breakers in safety-related systems that use a UV trip feature. Any information requested by the action items of this bulletin that has been previously provided to the NRC in response to Generic Letter 83-28 may be referenced.

Actions To Be Taken by Holders of Construction Permits and Licensees for Operating Reactor Plants

1. Identify applications of W type DB, W type DS, or GE type AK-2 circuit breakers with the UV trip feature as discussed in IEB 83-01 or 83-04 in safety-related applications at your facility(ies), other than as RTBs. CP holders and licensees should also identify similar applications of other types of breakers by other manufacturers that use a UV trip feature. If such circuit breakers are used or planned for use, identify the system(s) involved.
2. For each circuit breaker type identified in Item 1, do the following:
 - a. Review the design of the UVTA and the connecting linkage. Using input from the breaker manufacturer, determine the design margin available to open the breaker. Evaluate whether or not this design margin is adequate in view of safety applications, considering possible problems of alignment, lubrication, adjustment of spring tension, etc., discussed in the "Description of Circumstances."
 - b. Describe the current breaker surveillance program, including details of test frequency, methodology, and response time measurement of UVTA device.
 - c. Review operating experience with the circuit breakers in your plant(s) identified in Item 1. Provide a list of all malfunctions (both failure to trip and failure to close on demand) associated with

the UVTA, including the connecting linkages and latching mechanisms. The list should include the date of each malfunction, and the operating time prior to failure or date of installation, and the date(s) of major maintenance. In general, when the circuit breaker UVTA is actuated on undervoltage and the breaker contacts do not open within the design time response value, the NRC considers the breaker to have failed.

- d. Describe any preventive or corrective measures you have taken, or intend to take, based on the results of Items 2a, 2b, and 2c. Include any revisions to the surveillance test program and methodology. Specifically, address the inherent reliability of the UV trip feature in view of its apparent heavy dependence on intensive maintenance and surveillance and whether a basic design change is warranted to correct the problem, e.g., using a voltage sensitive relay to sense loss of voltage and energize the shunt trip coil from an independent dc power source.
3. For facilities with an OL, submit a written report addressing the above action items, including the schedule for completion, within 90 days of receipt of this bulletin.
 4. For facilities holding a CP, submit a written report addressing the above action items, including the schedule for completion, within 90 days of receipt of this bulletin, or before receipt of an operating license, whichever is sooner.

If the above schedules result in an undue hardship, a licensee or CP holder may request an extension from the appropriate Regional Administrator.

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. Also, 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.

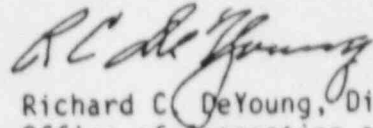
Licensees not using circuit breakers with a UVTA in safety-related applications (other than the reactor trip system) shall submit a negative declaration within 90 days of the receipt of this bulletin.

This request for information was approved by the Office of Management and Budget under a blanket clearance number 3150-00011 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.

Although no specific request or requirement is intended, the following information would help the NRC evaluate the cost of this bulletin:

1. Staff time to perform requested review.
2. Staff time spent to prepare requested documentation.

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



Richard C. DeYoung, Director
Office of Inspection and Enforcement

Technical Contact: V. D. Thomas, IE
301-492-4755

Attachment:
List of Recently Issued IE Bulletins

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 those 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.

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.

Richard C. DeYoung, Director
Office of Inspection and Enforcement

Technical Contact: I. Villalva, IE
301-492-9635

V. Thomas, IE
301-492-4755

J. T. Beard, NRR
301-492-7465

Attachment:

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

<i>I.V.</i> DEPER:IE IVillalva 2/25/83:jkr	<i>WRMills</i> DEPER:IE WRMills 2/25/83	<i>E. Jordan</i> DEPER:IE E. Jordan 2/25/83	<i>Appolito</i> NRR Appolito 2/25/83	<i>DeYoung</i> DEPER:IE DeYoung 2/25/83
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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 Date 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

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

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

March 11, 1983

IE BULLETIN NO. 83-04: FAILURE OF THE UNDERVOLTAGE TRIP FUNCTION OF REACTOR TRIP BREAKERS

Addressees:

All pressurized water nuclear power reactor facilities holding an operating license (OL) except those with Westinghouse DB type breakers 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 General Electric AX-2 type circuit breakers to trip open during testing of the undervoltage (UV) trip function and to require action of operating pressurized water reactors to assure proper operation of all reactor trip breakers in the future.

Description of Circumstances:

On March 11, 1983, Southern California Edison reported that during testing on March 3 and 8, 1983 of reactor protective system (RPS) breakers at San Onofre Nuclear Generating Station (SONGS) Units 2 and 3, three reactor trip breakers on Unit 2 and one reactor trip breaker on Unit 3 failed to open on activation of the undervoltage trip coil. Both units were shutdown at the time of the tests. The SONGS RPS systems are designed such that a reactor trip signal energizes the shunt trip coil and deenergizes the undervoltage trip coil. All tests of the reactor trip breakers using the shunt trip coil were satisfactory. A reactor scram would have occurred if an automatic or manual signal had been generated during operation from the redundant undervoltage and/or the shunt coils.

Background:

In some RPS designs, the automatic protection signals are fed only to the undervoltage (UV) trip attachment of the reactor trip breakers. Other plants may actuate both the UV device and the shunt trip coil on RPS trip.

As described above, four RPS breakers at the SONGS Units 2 and 3 failed to open during testing. Other failures involving the GE type UV trip attachment to the RPS have been reported to the NRC. These failures were due to either binding or

out-of-adjustment within the linkage mechanism of the UV trip device installed in General Electric (GE) type AK-2 (i.e., AK2A-15, 25, 50, 75, 100) circuit breakers. Failures have occurred at ANO-1, Crystal River-3, Oconee Units 1 and 3, TMI-1, and St. Lucie. As a result of these events, the NRC issued IE Bulletin No. 79-09 dated April 17, 1979 and IE Circular 81-12 dated July 20, 1981. Subsequently, failures have been reported at ANO-1 and Rancho Seco.

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

PWR licensees with other than W DB type breakers in Reactor Protective System applications are requested to:

1. Perform surveillance tests of undervoltage trip function independent of the shunt trip function within 5 days of receipt of this Bulletin unless equivalent testing has been performed within 10 days. Those plants currently shutdown should complete this item before resuming operation or within 10 days, whichever is sooner. Those plants for which on-line testability is not provided should complete this item at the next plant shutdown if currently operating.
2. Review the maintenance program for conformance to the latest manufacturer's recommendation, including frequency and lubrication. Verify actual implementation of the program.* If maintenance 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 (see IE Bulletin 83-01) and the testing failures at San Onofre Units 2 and 3 described above. Review the appropriate emergency operating procedures for the event of failure-to-trip with each operator upon his arrival on-shift.
4. Provide a written reply within 10 days of receipt of this bulletin:
 - a. Identify results of testing performed in response to item 1. Plants without on-line testability should report the date and results of the most recent test.
 - b. Identify conformance of the maintenance program to manufacturer's recommendation and describe results of maintenance performed directly as a result of this Bulletin in response to item 2.

*IE Bulletin 79-09, dated April 17, 1979, had as an attachment an extract of General Electric (GE) Service Advice Letter No. 175(CPDD)9.3 which is applicable to GE type AK-2 breakers.

- c. Provide a statement that provisions are in place to notify licensed operators of the Salem and San Onofre events and bring to their attention appropriate failure-to-trip emergency procedures upon their arrival on-shift.
 - d. Provide a description of all RPS breaker malfunctions not previously reported to the NRC.
 - e. Verify that procurement, testing and maintenance activities treat the RPS breaker and UV devices as safety related. Report the results of this verification to the NRC.
5. Any RPS breaker failure identified as a result of testing requested by this bulletin should be promptly reported to the NRC via the emergency notification system, regardless of the operating mode of the plant at the time of the failure.

The written report required shall be telefaxed to Richard C. DeYoung, Director, Office of Inspection and Enforcement within 10 days of receipt of this bulletin.** At the same time, the report 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
James H. Sniezek

Richard C. DeYoung, Director
Office of Inspection and Enforcement

Technical Contact: I. Villalva, IE W. Thomas, IE
301-492-9635 301-492-4755

Attachment:

1. List of Recently Issued IE Bulletins

**Rapidfax (301) 492-8187 or (301) 492-7376
3M Remote Copies (301) 492-7285

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

November 2, 1983

IE INFORMATION NOTICE NO. 83-76: REACTOR TRIP BREAKER MALFUNCTIONS
(UNDervOLTAGE TRIP DEVICES ON
GE TYPE AK-2-25 BREAKERS)

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or construction permit (CP).

Purpose:

To advise licensees of malfunctions of the undervoltage trip attachments in General Electric Type AK-2-25 breakers which are used in safety-related systems. Although no specific action is being required by the NRC at this time, it is expected that licensees will review the general problem described for applicability to their facilities and take appropriate action.

Description of Circumstances:

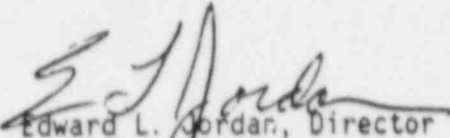
Five malfunctions of the undervoltage (UV) trip device used on General Electric Type AK-2-25 reactor trip breakers (RTB) occurred at the San Onofre Nuclear Generating Station, Units 2 and 3. On October 28, 1983, with Unit 3 in Mode 3 (Hot Standby), while routine monthly surveillance was being performed on the reactor protection system, the undervoltage armatures for RTBs #5 and #8 were observed to be in a midposition rather than fully down and in contact with the air gap adjusting screw (See Figure 1). The RTBs were reset, observed to operate properly, and the undervoltage armatures were observed to be properly positioned at that time.

On October 31, 1983, with both Units 2 and 3 in Mode 1 (Power Operation), the positions of all the undervoltage armatures of the RTBs were visually inspected. This inspection revealed that undervoltage armatures of RTB #4 on Unit 2 and RTBs #5 and #8 on Unit 3 were not properly positioned. It has been established that the Unit 3 breakers had been tripped and reset subsequent to the October 28, 1983 event without further UV armature position verification. These RTBs were reset, observed to operate properly and the undervoltage armatures remained properly positioned.

Southern California Edison Company, the licensee, has indicated that these malfunctions (i.e., the undervoltage armature in midposition rather than in contact with the air gap adjusting screw) could result in the RTB failing to trip within the specified criteria of the undervoltage trip device. Southern California Edison Company's preliminary conclusion is that the undervoltage armature can remain in a midposition as a result of interference (vertical)

between the undervoltage armature and the copper shading ring around the core of the coil (See Figure 1).

No action or written response to this notice is required; however, licensees using AK-2 type breakers with undervoltage trip devices may find it prudent to visually inspect each undervoltage armature to assure it is in its proper position after each operation. If the UV armature were to be found in an improper position, the NRC would consider the RTB to be inoperable. If you have any questions regarding this notice, please contact the Regional Administrator of the appropriate NRC Regional Office, or a Technical Contact listed below.


Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

Technical Contacts: I. Villalva, IE
(301) 492-9635

J. T. Beard, NRR
(301) 492-7465

Attachment:

1. Figure 1
2. List of Recently Issued IE Information Notices

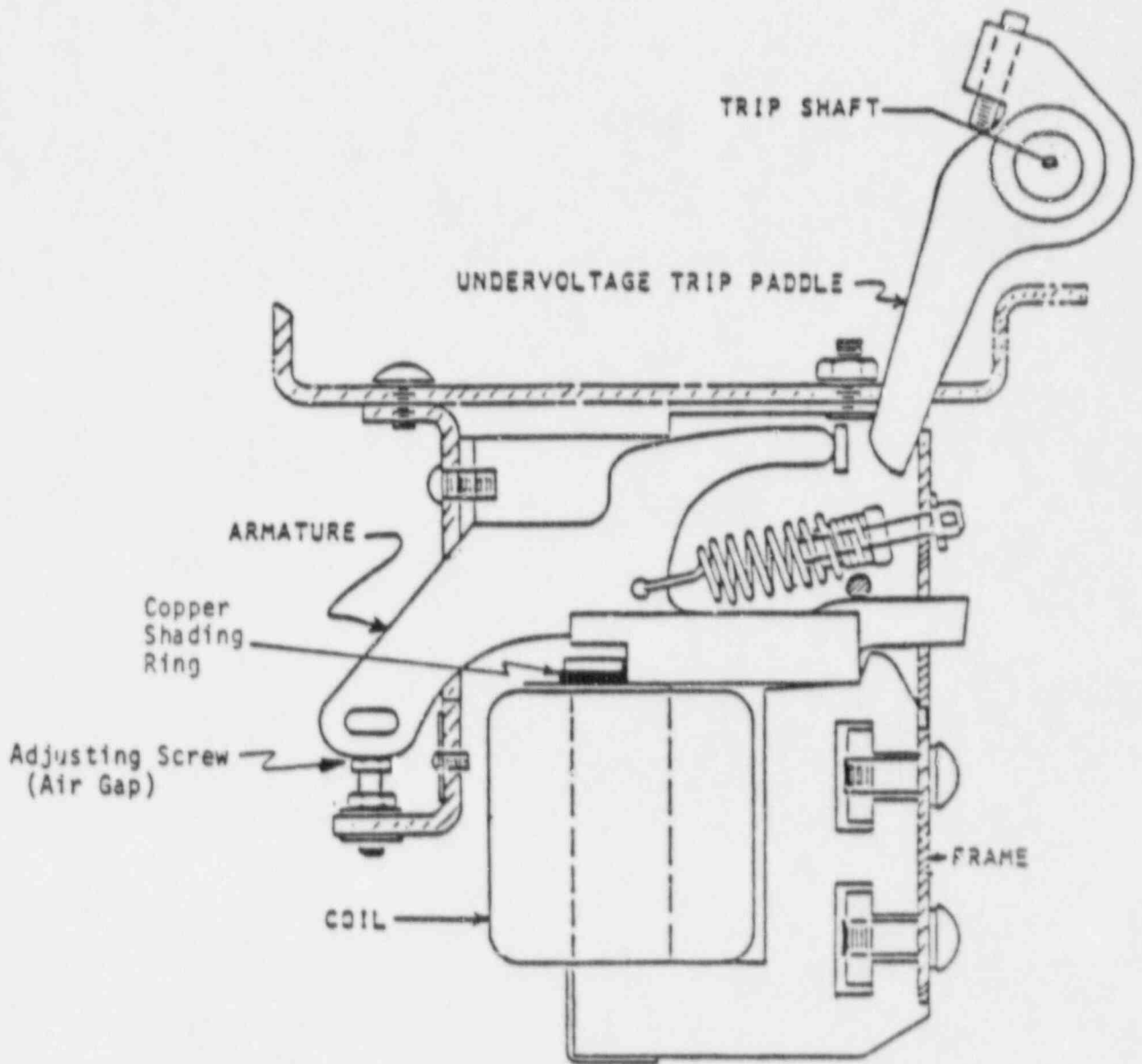


Figure 1. Undervoltage Trip Device, Coil Energized Position

APPENDIX B

Documentation of Bulletin Closeout

TABLE B.1 BULLETIN CLOSEOUT STATUS

Facility	Utility	Docket	Facility Status	NRC Region	NSSS	Utility Response Date	Inspection Report and Date	Closeout Status and Criterion
Arkansas 1	AP&L	50-313	OL	IV	B&W	02-23-84	85-04(03-20-85)	Closed 2
Arkansas 2	AP&L	50-368	OL	IV	C-E	02-23-84	85-04(03-20-85)	Closed 2
Beaver Valley 1	PLC	50-334	OL	I	<u>W</u>	03-19-84		Closed 2
Beaver Valley 2	DLC	50-412	OL	I	<u>W</u>	04-02-84	84-05(06-07-84)	Closed 2
Bellefonte 1	TVA	50-438	CP	II	B&W	03-29-84	86-04(06-11-86)	Closed 2
Bellefonte 2	TVA	50-439	CP	II	B&W	03-29-84	86-04(06-11-86)	Closed 2
Big Rock Point 1	CPC	50-155	OL	III	GE	04-03-84	84-02(04-27-84)	Closed 2
Braidwood 1	CECO	50-456	OL	III	<u>W</u>	04-04-84	84-13(08-06-84)	Closed 2
Braidwood 2	CECO	50-457	CP	III	<u>W</u>	04-04-84	84-13(08-06-84)	Closed 2
Browns Ferry 1	TVA	50-259	OL	II	GE	03-29-84		Closed 2 (Note 5)
Browns Ferry 2	TVA	50-260	OL	II	GE	03-29-84		Closed 2 (Note 5)
Browns Ferry 3	TVA	50-296	OL	II	GE	03-29-84		Closed 2 (Note 5)
Brunswick 1	CP&L	50-325	OL	II	GE	03-20-84	84-08(05-17-84)	Closed 2
Brunswick 2	CP&L	50-324	OL	II	GE	03-20-84	84-08(05-17-84)	Closed 2
Byron 1	CECO	50-454	OL	III	<u>W</u>	04-04-84	84-19(05-10-84)	Closed 2
Byron 2	CECO	50-455	OL	III	<u>W</u>	04-04-84	84-14(05-10-84)	Closed 2
Callaway 1	UE	50-483	OL	III	<u>W</u>	03-28-84	84-22(06-14-84)	Closed 2
Calvert Cliffs 1	BG&E	50-317	OL	I	C-E	03-21-84	84-11(06-29-84)	Closed 2
Calvert Cliffs 2	BG&E	50-318	OL	I	C-E	03-21-84	84-11(06-29-84)	Closed 2
Catawba 1	DUPCO	50-413	OL	II	<u>W</u>	02-24-84	84-33(05-10-84)	Closed 2
Catawba 2	DUPCO	50-414	OL	II	<u>W</u>	02-24-84	84-19(05-10-84)	Closed 2
Clinton 1	IP	50-461	OL	III	<u>GE</u>	03-22-84	84-11(07-03-84)	Closed 2
Comanche Peak 1	TUGCO	50-445	CP	IV	<u>W</u>	04-02-84	84-34(11-20-84)	Closed 2
Comanche Peak 2	TUGCO	50-446	CP	IV	<u>W</u>	04-02-84	84-13(11-20-84)	Closed 2
Cook 1	IMECO	50-315	OL	III	<u>W</u>	04-06-84	84-10(06-29-84)	Closed 2
Cook 2	IMECO	50-316	OL	III	<u>W</u>	04-06-84	84-11(06-29-84)	Closed 2

See notes at end of table.

TABLE B.1 (contd)

Facility	Utility	Docket	Facility Status	NRC Region	NSSS	Utility Response Date	Inspection Report and Date	Closeout Status and Criterion
Cooper Station	NPPD	50-298	OL	IV	GE	03-27-84	85-02(02-22-85)	Closed 3
Crystal River 3	FPC	50-302	OL	II	B&W	03-16-84 04-05-84	84-09(04-18-84)	Closed 2
Davis-Besse 1	TECO	50-346	OL	III	B&W	03-22-84	85-03(02-19-85)	Closed 2
Diablo Canyon 1	PG&E	50-275	OL	V	<u>W</u>	04-04-84 04-24-84		Closed 2
Diablo Canyon 2	PG&E	50-323	OL	V	<u>W</u>	04-04-84 04-24-84		Closed 2
Dresden 1	CECO	50-010	SDI	III	GE		84-01(05-25-84)	Closed 1
Dresden 2	CECO	50-237	OL	III	GE	04-04-84	84-06(05-25-84)	Closed 2
Dresden 3	CECO	50-249	OL	III	GE	04-04-84	84-05(05-25-84)	Closed 2
Duane Arnold	IELPCO	50-331	OL	III	GE	04-03-84	84-07(06-14-84)	Closed 2
Farley 1	APCO	50-348	OL	II	<u>W</u>	03-02-84	84-05(03-26-84)	Closed 2
Farley 2	APCO	50-364	OL	II	<u>W</u>	03-02-84	84-05(03-26-84)	Closed 2
Fermi 2	DECO	50-341	OL	III	<u>GE</u>	03-14-84	84-07(07-12-84)	Closed 2 (Note 5)
FitzPatrick	NYPA	50-333	OL	I	GE	01-17-84	84-18(11-09-84)	Closed 2 (Note 4)
Fort Calhoun 1	OPPD	50-285	OL	IV	C-E	02-28-84	84-26(12-28-84)	Closed 2
Fort St. Vrain	PSCC	50-267	OL	IV	GA	04-02-84	84-13(05-17-84)	Closed 2
Ginna	RG&E	50-244	OL	I	<u>W</u>	03-12-84	84-10(06-27-84)	Closed 2
Grand Gulf 1	MP&L	50-416	OL	II	<u>GE</u>	03-27-84 06-08-84 07-13-84	84-26(08-07-84)	Closed 2 (Note 5)
Haddam Neck	CYAPCO	50-213	OL	I	<u>W</u>	03-21-84	85-07(05-29-85)	Closed 3
Harris 1	CP&L	50-400	OL	II	<u>W</u>	03-30-84		Closed 2
Hatch 1	GPC	50-321	OL	II	<u>GE</u>	04-02-84 06-21-84 12-14-84	87-07(04-03-87)	Closed 3 (Note 5)
Hatch 2	GPC	50-366	OL	II	GE	04-02-84 06-21-84 12-14-84	87-07(04-03-87)	Closed 3 (Note 5)

See notes at end of table.

TABLE B.1 (contd)

Facility	Utility	Docket	Facility Status	NRC Region	NSSS	Utility Response Date	Inspection Report and Date	Closeout Status and Criterion
Hope Creek 1	PSE&G	50-354	OL	I	GE	03-28-84		Closed 2
Humboldt Bay 3	PG&E	50-133	SDI	V	GE	04-04-84		Closed 1
Indian Point 1	ConEd	50-003	SDI	I	B&W			Closed 1
Indian Point 2	ConEd	50-247	OL	I	W	04-06-84		Closed 2
Indian Point 3	NYPA	50-286	OL	I	W	03-19-84	84-13(06-28-84)	Closed 2
Kewaunee	WPS	50-305	OL	III	W	03-12-84	84-02(05-02-84)	Closed 2
La Crosse	DPC	50-409	SDI	III	Allis	02-09-84	84-02(05-28-84)	Closed 1
LaSalle 1	CECO	50-373	OL	III	GE	04-04-84		Closed 2
LaSalle 2	CECO	50-374	OL	III	GE	04-04-84		Closed 2
Limerick 1	PECO	50-352	OL	I	GE	04-06-84	84-33(08-15-84)	Closed 2 (Note 5)
Limerick 2	PECO	50-353	CP	I	GE	04-06-84		Closed 2 (Note 5)
Maine Yankee	MYAPCO	50-309	OL	I	C-E	03-06-84		Closed 2
McGuire 1	DUPCO	50-369	OL	II	W	02-10-84		Closed 2
						04-11-84		
McGuire 2	DUPCO	50-370	OL	II	W	07-10-84		Closed 2
						04-11-84		
Millstone 1	NNECO	50-245	OL	I	GE	03-21-84		Closed 2
Millstone 2	NNECO	50-336	OL	I	C-E	03-21-84		Closed 2
Millstone 3	NNECO	50-423	OL	I	W	03-21-84	85-35(08-29-85)	Closed 2
Monticello	NSP	50-263	OL	III	GE	03-21-84		Closed 2
Nine Mile Point 1	NMP	50-220	OL	I	GE	03-01-84	84-25(01-25-85)	Closed 2
Nine Mile Point 2	NMP	50-410	OL	I	GE	03-30-84	85-19(08-06-85)	Closed 2
North Anna 1	VEPCO	50-338	OL	II	W	03-02-84	84-06(02-01-85)	Closed 2
						03-29-84		
North Anna 2	VEPCO	50-339	OL	II	W	03-02-84	84-06(02-01-85)	Closed 2
						03-29-84		
Oconee 1	DUPCO	50-269	OL	II	B&W	03-28-84	84-08(05-07-84)	Closed 2
Oconee 2	DUPCO	50-270	OL	II	B&W	03-28-84	84-08(05-07-84)	Closed 2
Oconee 3	DUPCO	50-287	OL	II	B&W	03-28-84	84-08(05-07-84)	Closed 2

See notes at end of table.

TABLE B.1 (contd)

Facility	Utility	Docket	Facility Status	NRC Region	NSSS	Utility Response Date	Inspection Report and Date	Closeout Status and Criterion
Oyster Creek 1	GPUN	50-219	OL	I	GE	04-05-84		Open
Palisades	CPC	50-255	OL	III	C-E	03-05-84	84-08(04-16-84)	Closed 2
Palo Verde 1	APSCO	50-528	OL	V	C-E	03-09-84	84-19(09-25-84)	Closed 2
Palo Verde 2	APSCO	50-529	OL	V	C-E	03-09-84		Closed 2
Palo Verde 3	APSCO	50-530	OL	V	C-E	03-09-84		Closed 2
Peach Bottom 2	PECO	50-277	OL	I	GE	04-04-84	84-26(09-21-84)	Closed 2
						05-04-84	87-08(05-06-87)	(Note 5)
Peach Bottom 3	PECO	50-278	OL	I	GE	04-04-84	84-22(09-21-84)	Closed 2
						05-04-84	87-08(05-06-87)	(Note 5)
Perry 1	CEI	50-440	OL	III	GE	04-02-84	84-06(05-18-84)	Closed 2
Perry 2	CEI	50-441	CP	III	GE	04-02-84	84-06(05-18-84)	Closed 2
Pilgrim 1	BECO	50-293	OL	I	GE	03-30-84		Closed 2
								(Note 5)
Point Beach 1	WEPCO	50-266	OL	III	W	01-20-84	83-26(02-21-83)	Closed 2
Point Beach 2	WEPCO	50-301	OL	III	W	01-20-84	83-24(02-21-83)	Closed 2
Prairie Island 1	NSP	50-282	OL	III	W	02-10-84	84-03(04-26-84)	Closed 2
Prairie Island 2	NSP	50-306	OL	III	W	02-10-84	84-03(04-26-84)	Closed 2
Quad Cities 1	CECO	50-254	OL	III	GE	04-04-84	84-04(05-29-84)	Closed 2
Quad Cities 2	CECO	50-265	OL	III	GE	04-04-84	84-03(05-29-84)	Closed 2
Rancho Seco 1	SMUD	50-312	OL	V	B&W	03-22-84	85-17(07-22-85)	Closed 2
River Bend 1	GSU	50-458	OL	IV	GE	*	85-52(08-23-85)	Closed 2
								(Note 5)
Robinson 2	CP&L	50-261	OL	II	W	03-30-84	84-16(05-29-84)	Closed 2
Salem 1	PSE&G	50-272	OL	I	W	04-02-84		Closed 2
Salem 2	PSE&G	50-311	OL	I	W	04-02-84		Closed 2
San Onofre 1	SCE	50-206	OL	V	W	03-30-84	84-23(10-24-84)	Closed 2
San Onofre 2	SCE	50-361	OL	V	C-E	03-07-84	84-16(08-21-84)	Closed 2
San Onofre 3	SCE	50-362	OL	V	C-E	03-07-84	84-17(08-21-84)	Closed 2

* Response dates for River Bend 1: 03-29-84, 09-28-84, 11-30-84, 02-04-85, 04-05-85, 05-29-85, 07-03-85

See notes at end of table.

TABLE B.1 (contd)

Facility	Utility	Docket	Facility Status	NRC Region	NSSS	Utility Response Date	Inspection Report and Date	Closeout Status and Criterion
Seabrook 1	PSNH	50-443	CP	I	<u>W</u>	03-27-84	85-20(09-12-85)	Closed 2
Seabrook 2	PSNH	50-444	CP	I	<u>W</u>	03-27-84		Closed 2
Sequoyah 1	TVA	50-327	OL	II	<u>W</u>	03-29-84	84-13(06-20-84)	Closed 2
Sequoyah 2	TVA	50-328	OL	II	<u>W</u>	03-29-84	84-13(06-20-84)	Closed 2
Shoreham	LILCO	50-322	LPTL	I	GE	04-16-84	84-35(10-22-84)	Closed 2 (Note 5)
South Texas 1	HL&P	50-498	LPTL	IV	<u>W</u>	03-22-84		Closed 2
South Texas 2	HL&P	50-499	CP	IV	<u>W</u>	03-22-84		Closed 2
St. Lucie 1	FPL	50-335	OL	II	C-E	03-30-84	84-10(04-27-84)	Closed 2
St. Lucie 2	FPL	50-389	OL	II	C-E	03-30-84	84-25(08-17-84)	Closed 2
Summer 1	SCE&G	50-395	OL	II	<u>W</u>	07-02-84 03-19-84 04-10-84	84-11(05-18-84)	Closed 2
Surry 1	VEPCO	50-280	OL	II	<u>W</u>	03-02-84 03-29-84	84-10(02-01-85)	Closed 2
Surry 2	VEPCO	50-281	OL	II	<u>W</u>	03-02-84 03-29-84	84-10(02-01-85)	Closed 2
Susquehanna 1	PP&L	50-387	OL	I	GE	02-27-84	84-07(04-16-84)	Closed 2
Susquehanna 2	PP&L	50-388	OL	I	GE	02-27-84	84-08(04-16-84)	Closed 3
TMI 1	GPUN	50-289	OL	I	B&W	02-27-84	84-21(08-17-84)	Closed 2
TMI 2	GPUN	50-320	SDI	I	B&W	01-31-84		Closed 1
Trojan	PGE	50-344	OL	V	<u>W</u>	03-22-84	84-26(11-27-84)	Closed 2
Turkey Point 3	FPL	50-250	OL	II	<u>W</u>	03-29-84	85-06(05-06-85)	Closed 2
Turkey Point 4	FPL	50-251	OL	II	<u>W</u>	03-29-84	85-06(05-06-85)	Closed 2
Vermont Yankee 1	VYNP	50-271	OL	I	GE	03-30-84	87-02(03-02-87)	Closed 2
Vogtle 1	GPC	50-424	OL	II	<u>W</u>	03-27-84	84-15(07-10-84)	Closed 2
Vogtle 2	GPC	50-425	CP	II	<u>W</u>	03-27-84	84-15(07-10-84)	Closed 2
WNP 1	WPPSS	50-460	CP	V	B&W	02-10-84 02-28-84		Closed 2
WNP 2	WPPSS	50-397	OL	V	GE	02-28-84	84-12(06-12-84)	Closed 2
WNP 3	WPPSS	50-508	CP	V	C-E	01-11-84		Closed 4

See notes at end of table.

TABLE B.1 (contd)

Facility	Utility	Docket	Facility Status	NRC Region	NSSS	Utility Response Date	Inspection Report and Date	Closeout Status and Criterion
Waterford 3	LP&L	50-382	OL	IV	C-E	04-04-84	85-24(10-23-85)	Closed 2
Watts Bar 1	TVA	50-390	CP	II	W	03-29-84	84-28(05-11-84)	Closed 2
Watts Bar 2	TVA	50-391	CP	II	W	03-29-84	84-23(05-11-84)	Closed 2
Wolf Creek 1	KG&E	50-482	OL	IV	W	03-28-84	84-44(01-11-85)	Closed 2
Yankee-Rowe 1	YAECO	50-029	OL	I	W	05-25-84		Closed 2
Zion 1	CECO	50-295	OL	III	W	04-04-84	84-03(05-21-84)	Closed 2
Zion 2	CECO	50-304	OL	III	W	04-04-84	84-03(05-21-84)	Closed 2

Notes:

1. Facility status is based on references 1, 2 and 3, Page B-8.
2. The following abbreviations apply to facility status:
CP, construction permit; LPTL, low power testing license; OL, operating license; SDI, shut down indefinitely or permanently.
3. Refer to Page 4 for closeout criteria.
4. In judging the acceptability of the response of 01-17-84 for FitzPatrick, the referenced response of 05-18-79 (JAFFP-79-247) for IEB 79-09 was studied.
5. Refer to Table B.2 for comments about the facilities which reported molded-case breakers with UVTAs in safety-related systems other than the reactor trip system. These breakers are considered outside the scope of the bulletin (see Closeout Criterion 2, Page 4).

TABLE B.2 LIST OF FACILITIES REPORTING MOLDED-CASE BREAKERS WITH UVTAs

Facility	Comments
Browns Ferry 1,2,3	The response of 03-29-84 indicates that problems had been experienced in the past with GE molded-case circuit breakers with UVTAs. They were being replaced with GE Type TFK-236Y225 breakers (without UVTAs) and a combination of contactors and relays to provide undervoltage and overvoltage tripping.
Fermi 2	The response of 03-14-84 indicates that Brown Boveri (formerly ITE) 480V circuit breakers had been purchased with UVTAs. Initial tests of the UVTAs showed that adjustments for dropout voltage and time delay range were inadequate. The UVTAs were removed from the breakers and were replaced functionally with Brown Boveri Type 27-R UV relays.
Grand Gulf 1	The response of 06-08-84 indicates that GE Type TFJ-175A molded-case breakers with Type TFKUV7RS trip attachments were used. Adequate design margins and service without malfunctions were reported. The molded case houses a thermal-magnetic trip element and operating mechanism with contacts and interrupting means.
Hatch 1,2	The response of 06-21-84 indicates that GE F225 Line molded-case circuit breakers with UVTAs were used. Adequate design margins and service without malfunctions were reported.
Limerick 1,2	The response of 04-06-84 indicates that ITE (now Brown Boveri) Type K-600 circuit breakers with UVTAs were used. The ITE UVTA differs from the GE and <u>W</u> designs in that it has no latching mechanism. The 3" x 4" x 2" ITE device consists of a clapper type armature that is picked up by current in a coil. UV coil dropout completes a trip circuit which opens the breaker.
Peach Bottom 2,3	The response of 04-04-84 indicates that ITE Type K-600 circuit breakers were used in one application. Design margins of the UVTAs were adequate. According to the response of 05-04-84, no failures of these UVTAs had occurred.

TABLE B.2 (contd)

Facility	Comments
Pilgrim 1	The response of 03-30-84 indicates that six GE Type TFJ molded-case circuit breakers with UV trip release devices were being installed.
River Bend 1	The response of 04-05-84 indicates that GE Type TFJ-175A molded-case circuit breakers were used. The breaker consisted of a thermal-magnetic trip element and operating mechanism with contacts and interrupting means in the molded case. Design margins were considered to be adequate.
Shoreham	The response of 04-16-84 indicates that eight GE molded-case circuit breakers were used. Design margins were considered to be adequate. One breaker was found to be defective and was replaced.
St. Lucie 2	The response of 07-02-84 indicates that Brown Boveri Type K-600 circuit breakers having UVTAs were used. Design margins were considered to be adequate. No failures were experienced. Brown Boveri claims that no significant problems with this UVTA design have been reported in nearly 20 years of service.

Note: Except for Hatch units 1 and 2, these facilities had only molded-case breakers with UVTAs in subject applications. See Criterion 2, Page 4.

REFERENCES

1. United States Nuclear Regulatory Commission, Licensed Operating Reactors, Status Summary Report, Data as of 11-30-87, NUREG-0020, Volume 11, Number 12, December 1987.
2. United States Nuclear Regulatory Commission, Nuclear Power Plants, Construction Status Report, Data as of 06-30-82, NUREG-0030, Volume 6, Number 2, October 1982.
3. United States Nuclear Regulatory Commission, Listing of Inactive Current Holders of Construction Permits, Letter dated May 29, 1985, to Richard A. Lofy (Parameter, Inc.) from Robert L. Baer (NRC/IE HQ).
4. United States Nuclear Regulatory Commission, Code of Federal Regulation, Energy, Title 10, Chapter 1, January 1, 1987, cited as 10CFR 0.735-1.

APPENDIX C

Proposed Followup Item

Region I

Oyster Creek 1

The licensee reported in the response of April 5, 1984, that (1) GE Type AK-2 breakers with UVTAs were used, (2) response time measurements of the UVTAs had not been made, and (3) corrective actions planned were increased surveillance of UV devices and consideration of revisions in control circuits.

An inspection to verify that either response time measurements are planned or that corrective actions were completed satisfactorily is scheduled in the near future. This action will close out the bulletin for this facility.

APPENDIX D

Utility Manhours Expended on IEB 83-08

TABLE D.1

Facility	Perform Review	Prepare Documentation	Total	Closeout Status and Criterion
Beaver Valley 1	56	3	59	Closed 2
Big Rock Point 1	10	3	13	Closed 2
Comanche Peak 1,2	42	6	48	Closed 2
Duane Arnold	43	14	57	Closed 2
Fort St. Vrain	NR	NR	30	Closed 2
Ginna	2	1	3	Closed 2
Grand Gulf 1	220	80	300	Closed 2
Haddam Neck	18	5	23	Closed 3
Harris 1	NR	NR	160	Closed 2
Kewaunee	NR	NR	12	Closed 2
Millstone 1,2,3	45	12	57	Closed 2
Nine Mile Point 2	10	5	15	Closed 2
North Anna 1,2	40	4	44	Closed 2
Point Beach 1,2	NR	NR	10	Closed 2
River Bend 1	NR	NR	120	Closed 2
Robinson 2	NR	NR	100	Closed 2
Shoreham	120	24	144	Closed 2
Trojan	NR	NR	40	Closed 2
Vermont Yankee 1	4	1	5	Closed 2
Total			1230	

*NR signifies "not reported"

APPENDIX E

Abbreviations

AEPCO	American Electric Power Services Corporation
AFW	Auxiliary Feedwater
APCO	Alabama Power Company
AP&L	Arkansas Power and Light Company
APSCO	Arizona Public Service Company
BECO	Boston Edison Company
BG&E	Baltimore Gas and Electric Company
B&W	Babcock & Wilcox Company
BWR	Boiling Water Reactor
C-E	Combustion Engineering Incorporated
CECO	Commonwealth Edison Company
CEI	Cleveland Electric Illuminating Company
CFR	Code of Federal Regulations
ConEd	Consolidated Edison Company of New York, Inc.
CP	Construction Permit
CPC	Consumers Power Company
CP&L	Carolina Power and Light Company
CR	Contractor Report
CYAPCO	Connecticut Yankee Atomic Power Company
DECO	Detroit Edison Company
DLC	Duquesne Light Company
DPC	Dairyland Power Cooperative
DUPCO	Duke Power Company
EPA	Electrical Protection Assembly
FPC	Florida Power Corporation
FPL	Florida Power & Light Company
GA	General Atomic
GAO	Government Accounting Office
GE	General Electric Company
GPC	Georgia Power Company
GPUN	GPU Nuclear Corporation
GSU	Gulf States Utilities Company
HL&P	Houston Lighting and Power Company
IE	(See NRC/IE)
IEB	Inspection and Enforcement Bulletin (NRC)
IELPCO	Iowa Electric Light and Power Company
IMECO	Indiana and Michigan Electric Company
IP	Illinois Power Company
IR	Inspection Report (NRC/Region)
KG&E	Kansas Gas and Electric Company
LER	Licensee Event Report

LILCO	Long Island Lighting Company
LP&L	Louisiana Power and Light Company
LPTL	Low Power Testing License
MCC	Motor Control Center
MG	Motor Generator
MP&L	Mississippi Power and Light Company
MYAPCO	Maine Yankee Atomic Power Company
NIPSCO	Northern Indiana Public Service Company
NMP	Niagara Mohawk Power Company
NNECO	Northeast Nuclear Energy Company
NPPD	Nebraska Public Power District
NRC/IE	Nuclear Regulatory Commission/ Office of Inspection & Enforcement
NRR	Office of Nuclear Reactor Regulation (NRC)
NSP	Northern States Power Company
NSSS	Nuclear Steam Supply System
NU	Northeast Utilities
NYP&A	New York Power Authority
OL	Operating License
OPPD	Omaha Public Power District
PECO	Philadelphia Electric Company
PGE	Portland General Electric Company
PG&E	Pacific Gas and Electric Company
PP&L	Pennsylvania Power and Light Company
PSCC	Public Service Company of Colorado
PSE&G	Public Service Electric and Gas Company
PSNH	Public Service Company of New Hampshire
PWR	Pressurized Water Reactor
R	Region (NRC)
RG&E	Rochester Gas and Electric Corporation
RPS	Reactor Protection System
RTB	Reactor Trip Breaker
RTS	Reactor Trip System
SCE	Southern California Edison Company
SCE&G	South Carolina Electric and Gas Company
SDI	Shut Down Indefinitely
SMUD	Sacramento Municipal Utility District
SNUPPS	Standardized Nuclear Unit Power Plant Systems
STP	Surveillance Test Procedure
TECO	Toledo Edison Company
TMI	Three Mile Island
TUGCO	Texas Utilities Generating Company
TVA	Tennessee Valley Authority
UE	Union Electric Company
UVTA	Undervoltage Trip Attachment
VEPCO	Virginia Electric and Power Company
VYNP	Vermont Yankee Nuclear Power Corporation
W	Westinghouse Electric Corporation
WEPCO	Wisconsin Electric Power Company
WNP	Washington Nuclear Project
WNSD	Westinghouse Nuclear Service Division
WPPSS	Washington Public Power Supply System
WPS	Wisconsin Public Service Corporation
YAECO	Yankee Atomic Electric Company

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2 TITLE AND SUBTITLE Closeout of IE Bulletin 83-08: Electrical Circuit Breakers with an Undervoltage Trip Feature in Use in Safety-Related Applications Other Than the Reactor Trip System	4 DATE REPORT COMPLETED MONTH: February YEAR: 1988	
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13 ABSTRACT (200 words or less) The NRC/IE issued Bulletin 83-08 December 28, 1983 because of concern about circuit breaker deficiencies reported per previous bulletins 83-01 and 83-04. The object of IEB 83-08 was to assure proper operation of circuit breakers with undervoltage trip attachments (UVTAs) in all safety-related applications other than use as reactor trip breakers (RTBs). The bulletin was issued for action to all licensees and holders of construction permits of power reactors. Evaluation of utility responses and NRC/Region inspection reports shows that the bulletin can be closed out per specific criteria for 123 (99%) of the 124 facilities to which it was issued. A followup item is proposed for use by the NRC to assure completion of required actions at the remaining facility. Circuit breakers with UVTAs were used in safety-related applications other than the reactor trip system in six (6) facilities. Malfunctions of the UVTAs were reported only for the facility for which followup is proposed.		
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APRIL 1988