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Closeout of IE Bulletin 79-11: Faulty Overcurrent Trip Device in Circuit Breakers for Engineered Safety Systems

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PARAMETER, Inc.

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U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
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ABSTRACT

IE Bulletin 79-11 was issued May 22, 1979 as a result of information received in April 1979 from Westinghouse and an NRC licensee relating to the potential failure of a circuit breaker in an engineered safety system of a nuclear power plant. The defect of concern was a small hairline crack in the dashpot end cap of one of the three overcurrent trip devices of a Type DB-75 breaker. The Bulletin was also applicable to Type DB-50 breakers, because they use the same type of dashpot end cap. The defective end cap had been installed in 1973 as a replacement, in compliance with IE Bulletin 73-1. Westinghouse Technical Bulletin NSD-TB-79-02 was issued April 17, 1979 to alert utilities to the potential problem, to provide background information, to recommend review of calibration test data and retesting of erratic breakers, to advise visual examination of end caps for cracks and to call for replacement of cracked end caps. Evaluation of utility responses and NRC/IE inspection reports shows that 114 of the 129 current facilities do not use the affected breakers in safety-related systems. Followup items for the five facilities with open status are proposed. The Bulletin has been closed out for the remaining ten facilities with safety-related Westinghouse DB-50 and DB-75 breakers having dashpots, on the basis of acceptable utility responses and NRC/IE regional inspection reports. Erratic performance of three DB-50 breakers with worn seals at one facility is identified as a Remaining Area of Concern because the worn seals had essentially the same effect on performance as cracked end caps. The recommendation is made that preventive maintenance programs of licensees be reviewed to make sure that breakers are kept clean to avoid plugging dashpot orifices. The Bulletin has served its purpose by resulting in identification of the potential problem at a limited number (15) of facilities and of the need for corrective actions at only five facilities.

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CLOSEOUT OF IE BULLETIN 79-11: FAULTY OVERCURRENT TRIP DEVICE IN CIRCUIT BREAKERS FOR ENGINEERED SAFETY SYSTEMS

Introduction

In accordance with the Statement of Work in Task Order 49 under Contract NRC 05-82-249, this report provides documentation for the closeout status of IE Bulletin 79-11. The following documentation is based on the records obtained from the IE File, the NRC Document Control System and the Cognizant Engineer's File.

IE Bulletin 79-11 was issued May 22, 1979 as a result of information received in April 1979 from Westinghouse and an NRC licensee relating to the potential failure of a circuit breaker in an engineered safety system of a nuclear power plant. The defect of concern was a small hairline crack in the dashpot end cap of one of the three overcurrent trip devices of a Type DB-75 breaker. Bulletin 79-11 was was also applicable to Type DB-50 breakers, because they use the same type of dashpot and end cap. The defective end cap had been installed as a replacement in accordance with previous IE Bulletin 73-1.

For background information, IE Bulletin 79-11, Westinghouse Technical Bulletin NSD-TB-79-02 and IE Bulletin 73-1 are included in Appendix A. Documentation of Bulletin closeout is presented in Appendix B. Proposed followup items are presented in Appendix C for use by NRC/IE. Compilations of pertinent information requested by means of Task Order 49 are presented in tabular form in Appendix D. Abbreviations used in this report and associated documents are provided in Appendix E.

Summary

1. The Bulletin has been closed out automatically for 36 non-current facilities, per Criterion 1.

2. The Bulletin has been closed out for 114 current facilities which have no affected breakers, per Criterion 2.

3. The Bulletin has been closed out for ten current facilities for which NRC/IE inspection reports verify that corrective actions have been completed satisfactorily, per Criterion 4.

4. The Bulletin is being held open for the five facilities which are listed in the following table.

Facility	Utility	Docket Number	Facility Status	NRC Region
Cook 1	IMECO	50-315	OL	III
Cook 2	IMECO	50-316	OL	III
Cooper Station	NPPD	50-298	OL	IV
Haddam Neck	CYAPCO	50-213	OL	I
Robinson 2	CP&L	50-261	OL	II

Conclusion

Evaluation of utility responses and NRC/IE inspection reports has led to the determination that only a limited number (15) of nuclear facilities have the subject Westinghouse circuit breakers in safety-related systems and that corrective actions are needed at only five of these facilities.

Remaining Areas of Concern

1. The Bulletin is being held open for the five facilities identified in preceding Summary Item 4. Proposed followup items for these facilities are presented in Appendix C for use by NRC/IE.

2. Per the CP&L response of July 10, 1979 for Robinson 2, three Type DB-50 breakers performed erratically because of accumulated dust and air leakage past worn or cracked seals. Examination with a 3x lens and a light source showed that the dashpot end caps were not cracked. These breakers were rebuilt with new seals, cleaned, tested satisfactorily and returned to service. It appears that worn seals have essentially the same effect as cracked end caps on circuit breaker performance. Further, it appears possible that incidental and unreported replacement of seals during reassembly of some erratic circuit breakers may have affected the cure as much as reported replacement of cracked end caps. It is interesting to observe that some doubt about cracked end caps being the "proximate cause" of faulty performance was expressed during the meeting of May 2, 1979 among NRC, Westinghouse and WEPCO personnel (Reference 1). The meeting summary included the observations that "air in-leakage (through a cracked end cap) would not logically explain a variance between tests" and that "breaker disassembly might also have corrected the problem in an unknown way."

Recommendations

1. The preventive maintenance programs of licensees should be examined to insure that seals are examined periodically and replaced when needed, and that an ongoing cleaning effort of circuit breakers is being implemented to preclude a buildup of dirt or dust which can plug the orifice of the overcurrent time delay relay dashpot. Plugging of this orifice can have a detrimental effect on the response time of the protective relay in a manner which could result in equipment damage and/or an unstable electrical system (that is, coordination of the associated circuit breakers in the plant is not reliable).

2. Westinghouse should be made aware of the possible difficulities described in Item 2 of Remaining Areas of Concern.

Definitions Used with Closeout Criteria

1. An affected breaker is a Westinghouse Type DB-50 or DB-75 circuit breaker which has overcurrent trip devices with dashpots and is used or planned for use in safety-related Class IE service.

2. An acceptable response is a clear, written reply by utility personnel which indicates compliance with actions required by the Bulletin.

3. An adequate corrective action is one which complies with testing, inspection and replacement recommendations of the Bulletin.

Criteria for Closeout of Bulletin

The Bulletin is to be closed out for a facility to which one of the following criteria applies:

1. The facility has been cancelled, deferred indefinitely or shut down indefinitely.

2. An acceptable response has been submitted for the facility indicating that it has no affected breakers.

3. An acceptable response has been submitted for the facility indicating that adequate corrective actions for affected breakers will be implemented or have been completed; and it is known that corrective actions will be tracked by NRC/IE on a separate system.

4. An acceptable response has been submitted for the facility indicating that adequate corrective actions for affected breakers will be implemented or have been completed; and an NRC/IE inspection report has been received verifying that corrective actions have been completed satisfactorily.

Reference

1. United States Nuclear Regulatory Commission, Summary of Meeting Held on April 24, 1979 Regarding Dash Pot End Cap Cracks on Westinghouse DB-50 and DB-75 Air Circuit Breakers, May 2, 1979, Pertaining to Point Beach 1 and 2 of WEPCO

APPENDIX A

Background Information

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

May 22, 1979

IE Bulletin No. 79-11

FAULTY OVERCURRENT TRIP DEVICE IN CIRCUIT BREAKERS FOR ENGINEERED SAFETY SYSTEMS

Discussion:

We have received information from Westinghouse and an NRC licensee relating to the potential failure of a circuit breaker in an engineered safety system of a nuclear power plant. This circuit breaker had a defect in one of its three time delay dashpots which resulted in a reduced time delay for overcurrent protection. The defect was a small hairline crack in the end cap of the dashpot. Further investigation by this licensee disclosed that 7 out of 17 spare dashpot end caps and 2 non-engineered safety feature breakers also had similar defects. The circuit breaker is a Westinghouse type DB-75. Westinghouse type DB-50 breakers also use the same type of dashpot and end cap. DB-50 and -75 breakers are used extensively in PWR's, and some BWR's may also have the same breakers.

Similar make and model circuit breakers, when used for scram purposes, do not require the overcurrent trip feature and thus are not of concern. The end cap crack defect, if severe enough, could result in premature tripping of the circuit breaker because of insufficient time delay in overcurrent protection; i.e., the motor starting (inrush) current could cause the breaker to trip inadvertently and thus prevent the motor start.

The defects reported by the licensee in April 1979, occurred in the replacement end caps which were provided to solve the problem described in IE Bulletin 73-1. The subject of Bulletin 73-1 was end caps made of a black phenolic material. As a result of that Bulletin, the black end caps were replaced with a new type made of fibre-filled polyester material called "navy-gray". Prior to the April 1979 report, there have been no reports of suspect "navy-gray" end caps either from scheduled testing or unusual behavior in service. The manufacturer of the "navy-gray" end caps believes the crack defects may be linked to a raw material batch problem. That is, the molding ingredient materials used may have neared the end of their shelf life before use. It is not believed the end caps, after fabrication, have a significant shelf life limit, due to the low residual stress and low crack propagation probabilities.

Description of Event:

The following information was obtained from the Licensee Event Report dated April 12, 1979 and a subsequent meeting with Westinghouse, the NRC staff and the licensee.

During the 1979 surveillance tests, and a review of the previous refueling surveillance test results on a Westinghouse type DB-75 breaker (used as a 480v ESF bus supply breaker) a drift in the overcurrent trip time from the manufacturer's design minimum value of 6 seconds to 5.50 and 5.12 seconds was observed. The 1979 test results showed a deviation and inconsistency in the delayed trip timings among three consecutive tests.

The overcurrent devices were removed from each of the three phases and a visual inspection indicated a hairline crack in the end cap of one of the devices. That cap was replaced (without checking for a possible crack in the replacement cap), and the breaker was again tested. This test also showed deviations and inconsistency in the delayed trip timings. The subsequent inspection of the devices revealed a hairline crack in the end cap which had just been installed. This prompted an inspection of the in-stock spare caps. Seven out of 17 caps were found to have similar cracks.

Action Required of all Holders of an Operating License or Construction Permit:

1. Determine whether circuit breakers of the above described manufacturer and type with overcurrent trip devices are in safety-related Class IE service or in spares at your facilities.

2. If the subject breakers are in service in safety-related systems: within 30 days, review the existing test data for all overcurrent trip device calibrations since plant startup or since replacement caps were installed and tested in response to Bulletin 73-1, whichever is most recent. Determine if any delay times are: (1) outside of the acceptance band; (2) marginally acceptable - on the low side of the acceptance band; or (3) if any significant change in delay time performance has been observed. These breakers should be retested and end caps replaced as necessary to assure no loss of safety function.

3. Inspect all end caps in spares for cracks using at least a 3x magnifying glass. Caps having visible flaws should be discarded, or prevented from use in Class IE applications.

4. Review test procedures and test schedules for all safety-related circuit breakers to assure that all such breakers are tested at least each refueling outage to confirm overcurrent time delay protection.

For facilities with an operating license, a written report of the above actions, including the date(s) when they will be completed shall be submitted within 45 days of receipt of this Bulletin.

For facilities with a construction permit, a written report of the above actions, including the date(s) when they will be completed shall be submitted within 60 days of receipt of this Bulletin.

Approved by GAO, B180225 (R0072), clearance expires 7/31/80. Approval was given under a blanket clearance specifically for identified generic problems.

Westinghouse Nuclear Service Division

Technical Bulletin

An advisory notice of a recent technical development pertaining to the installation or operation of Westinghouse-supplied Nuclear Plant equipment. Recipients should evaluate the information and recommendation, and initiate action where appropriate.

P.O. Box 3728, Pittsburgh, PA 15230

Subject: Westinghouse DB Breakers - Overcurrent Devices	Number: NSD-TB-79-02
System(s): Electrical Power - Lo Voltage Switchgear	Date: April 17, 1979
Affected Plants: All with DB-50 or DB-75 Breakers (Probably excludes all current in-construction W Plants except Diablo Canyon, Salem, and Sequoyah)	S.O.(s): 380-385
References: Various	Sheet: 1 Of 2

BACKGROUND INFORMATION

An operating plant recently advised that periodic overcurrent tests of DB Breakers revealed three breakers with abnormal overcurrent trip characteristics. One of the breakers was in a safeguards application, while the other two were not safety related.

Inspections of the overcurrent trip units revealed hairline cracks in the end caps of the overcurrent dashpot airchamber which provides the time delay function of the overcurrent trip. Inspection of 17 in-stock spare end caps at the same plant revealed seven with similar hairline cracks. All of the end caps involved here, both from the operating breakers and from spares, had been procurred in 1977-1978 period, and all were of fibre-filled polyester material commonly called "navy gray."

This matter relates back to a late 1972 event when similar experiences occurred at two plants (as documented in the AEC (NRC) Operation Bulletin 73-01). Up to that time the end caps were of a black phenolic material and a Westinghouse recommendation was issued for replacement of the black end caps with the "navy gray." It was, and remains, our opinion that the "navy gray" provides improved reliability over the black phenolic material due to lower residual stresses, lower crack propagation probability, and increased overall strength.

The manufacturer of the end caps believes the end cap cracking may be related to a batch problem, when ingredient materials used have neared the end of their shelf life. It is not believed the end caps, after fabrication, have a significant shelf life limit, due to the low residual stress and low crack propagation probabilities stated earlier.

Additional Information, if Required, may be Obtained from the Originator. Telephone 412 - 256-5493 or (WIN) 236 -5493

Originator: W H Furfari
W. H. Furfari
Electric Service

Approved: Sidney G. Caslake
S. G. Caslake, Mgr.
Electric Service

There have been no other reports of premature tripping of breakers which have the replacement caps. The periodic functional testing performed in accordance with Technical Specifications should reveal significant changes in breaker timing characteristics, and periodic current injection type overcurrent testing (Multi-amp or equivalent), will reveal marginal trends in time delay reductions.

The only Westinghouse breakers potentially affected are types DB-50 and DB-75 having series overcurrent trip devices. Reactor trip breakers do not have overcurrent trip devices, and thus, are not affected. Furthermore, the Westinghouse type DS breakers, as used on many of the more recent plants, are not involved as they utilized a totally different overcurrent device.

RECOMMENDATION:

Although we are not aware of any premature tripping of motors in the field, we recommended that affected plants take the following actions with respect to safety related DB breakers.

1. Review the most recent overcurrent trip device calibration test data for the safeguards breakers. If any individual readings are marginally acceptable on the low side of the acceptance band, or indicate any significant reduction in delay time from previous results, retests should be performed within 30 days. If any individual reading from the retest is below the acceptable band or marginal, the end cap on the trip device should be removed and replaced if inspection under a minimum 3X magnification reveals any cracks. The trip device after assembly should then be recalibrated.
2. All end caps in storage should be inspected for cracks using a minimum 3X magnifying glass. Do not use any end caps having evidence of cracking in safeguards applications.
3. The safeguards breakers not retested under item 1 above should be tested in the same manner during the current or next planned outage.

Any personnel involved in service or replacement of the overcurrent device should be cautioned to be certain that the instantaneous overcurrent spring is properly attached after reassembly of the unit. Refer to our Technical Bulletin NSD-TB-73-18.

Date: February 26, 1973
Directorate of Regulatory
Operations Bulletin 73-1

FAULTY OVERCURRENT TRIP DELAY DEVICE IN CIRCUIT BREAKERS FOR ENGINEERED SAFETY SYSTEMS

We have received information from two licensees relating to the failure of circuit breakers in engineered safety systems. These circuit breakers, Westinghouse Models DB-25, DB-50 and DB-75, are used extensively at both PWR and BWR facilities. These failures, which could negate operation of engineered safety system components, were attributed to faulty overcurrent trip delay devices. Westinghouse has formulated an on-site testing program to determine if the time delay devices are faulty and is developing a new end cap for the dashpot used in the time delay devices. Similar make and model circuit breakers, when used for scram purposes, do not require the overcurrent trip feature and, therefore, are not included in this problem. Pertinent details relating to this problem are contained in Section A below. Action requested by this Bulletin is contained in Section B.

A. Description of Circumstances

Plant A

During the performance of the routine monthly surveillance test of the Safety Injection System, the pump motor tripped as it approached operating speed. A second attempt to start the pump produced the same result. The cause of the pump trip was attributed to malfunction of an overcurrent trip device. This device, which has an adjustable time delay, tripped out the pump motor on starting current because of leakage in the time delay dashpot. Subsequent examination of the dashpot disclosed a crack in the end cap of the air chamber. The crack permitted air to leak into the chamber at an excessive rate, reducing the time delay from approximately 45 seconds to 5 seconds. Testing of similar model breakers equipped with the overcurrent trip delay feature revealed four additional units with low trip delay times caused by cracks in the end caps. Approximately 25 circuit breakers of the type described are utilized to energize components of engineered safety feature systems at this facility.

Plant B

A 480 volt AC bus circuit breaker tripped open when the auxiliary building supply and exhaust fans were started simultaneously. The cause of the failure was attributed to a crack in the end cap of the time delay dashpot in the overcurrent trip device. The trip delay unit and the circuit breaker in question are similar to the units which failed at Plant A.

The cracks found in the end caps of the time delay dashpots are considered a common mode of failure.

B. Action Requested of the Licensee

It is requested that you determine whether safety related (Class IE) circuit breakers of the described make and models utilizing overcurrent trip time delay features are installed, or will be installed, at your facilities and provide this office with your findings.

If the subject breakers are installed, please include in your response a description and the results of your program to determine if you have any faulty overcurrent trip time delay devices installed and the scheduled completion date of your corrective actions. For facilities currently under construction please inform us of your plans to assure that the appropriate modification has been incorporated in all safety related circuit breakers of the type described that have been or will be installed at your facility.

APPENDIX B

Documentation of Bulletin Closeout

Table B.1 Bulletin Closeout Status

Facility	Utility	Docket Number	Facility Status	NRC Region	Utility Response Date	Closeout Status and Criterion
Arkansas 1	AP&L	50-313	OL	IV	06-14-79	Closed (2)
Arkansas 2	AP&L	50-368	OL	IV	06-14-79	Closed (2)
Bailly 1	NIPSCO	50-367	CD	III	06-29-79	Closed (1)
Beaver Valley 1	DL	50-334	OL	I	07-05-79	Closed (2)
Beaver Valley 2	DL	50-412	CP	I	07-20-79	Closed (2)
Bellefonte 1	TVA	50-438	CP	II	07-20-79	Closed (2)
Bellefonte 2	TVA	50-439	CP	II	07-20-79	Closed (2)
Big Rock Point 1	CPC	50-155	OL	III	07-12-79	Closed (2)
Braidwood 1	CECO	50-456	CP	III	07-19-79	Closed (2)
Braidwood 2	CECO	50-457	CP	III	07-19-79	Closed (2)
Browns Ferry 1	TVA	50-259	OL	II	07-06-79	Closed (2)
Browns Ferry 2	TVA	50-260	OL	II	07-06-79	Closed (2)
Browns Ferry 3	TVA	50-296	OL	II	07-06-79	Closed (2)
Brunswick 1	CP&L	50-325	OL	II	07-12-79	Closed (2)
Brunswick 2	CP&L	50-324	OL	II	07-12-79	Closed (2)
Byron 1	CECO	50-454	CP	III	07-19-79	Closed (2)
Byron 2	CECO	50-455	CP	III	07-19-79	Closed (2)
Callaway 1	UE	50-483	CP	III	07-24-79	Closed (2)
Callaway 2	UE	50-486	CD	III	07-24-79	Closed (1)
Calvert Cliffs 1	BG&E	50-317	OL	I	06-08-79	Closed (2)
Calvert Cliffs 2	BG&E	50-318	OL	I	06-08-79	Closed (2)
Catawba 1	DUPCO	50-413	CP	II	07-19-79	Closed (2)
Catawba 2	DUPCO	50-414	CP	II	07-19-79	Closed (2)
Cherokee 1	DUPCO	50-491	CHI	II	07-19-79	Closed (1)
Cherokee 2	DUPCO	50-492	CHI	II	07-19-79	Closed (1)
Cherokee 3	DUPCO	50-493	CHI	II	07-19-79	Closed (1)
Clinton 1	IP	50-461	CP	III	07-26-79	Closed (2)
Clinton 2	IP	50-462	CHI	III	07-26-79	Closed (1)
Comanche Peak 1	TUGCO	50-445	CP	IV	07-16-79	Closed (2)
Comanche Peak 2	TUGCO	50-446	CP	IV	07-16-79	Closed (2)
Cook 1	IMECO	50-315	OL	III	07-05-79	Open
Cook 2	IMECO	50-316	OL	III	07-05-79	Open

See notes at end of table.

Table B.1 (contd.)

Facility	Utility	Docket Number	Facility Status	NRC Region	Utility Response Date	Closeout Status and Criterion
Cooper Station	NPPD	50-298	OL	IV	06-27-79	Open
Crystal River 3	FP	50-302	OL	II	06-06-79	Closed (2)
Davis-Besse 1	TECO	50-346	OL	III	07-03-79	Closed (2)
Diablo Canyon 1	PG&E	50-275	CP	V	07-18-79	Closed (2)
Diablo Canyon 2	PG&E	50-323	CP	V	07-18-79	Closed (2)
Dresden 1	CECO	50-010	SDI	III	07-02-79 07-12-79	Closed (1)
Dresden 2	CECO	50-237	OL	III	07-02-79 07-12-79	Closed (2)
Dresden 3	CECO	50-249	OL	III	07-02-79 07-12-79	Closed (2)
Duane Arnold	IELPCO	50-331	OL	III	07-02-79 08-10-79	Closed (2)
Farley 1	APCO	50-348	OL	II	05-29-79	Closed (2)
Farley 2	APCO	50-364	OL	II	05-29-79	Closed (2)
Fermi 2	DECO	50-341	CP	III	06-08-79	Closed (2)
FitzPatrick	PASNY	50-333	OL	I	05-29-79	Closed (2)
Forked River	JCP&L	50-363	CD	I	06-25-79	Closed (1)
Fort Calhoun 1	OPPD	50-285	OL	IV	06-26-79	Closed (2)
Fort St. Vrain	PSCC	50-267	OL	IV	06-01-79	Closed (2)
Ginna	RG&E	50-244	OL	I	06-25-79	Closed (4)
Grand Gulf 1	MP&L	50-416	LPTL	II	07-20-79	Closed (2)
Grand Gulf 2	MP&L	50-417	CHI	II	07-20-79	Closed (1)
Haddam Neck	CYAPCO	50-213	OL	I	07-06-79 08-08-79	Open
Harris 1	CP&L	50-400	CP	II	07-27-79	Closed (2)
Harris 2	CP&L	50-401	CP	II	07-27-79	Closed (2)
Harris 3	CP&L	50-402	CD	II	07-27-79	Closed (1)
Harris 4	CP&L	50-403	CD	II	07-27-79	Closed (1)
Hartsville A-1	TVA	50-518	CHI	II	07-20-79	Closed (1)
Hartsville A-2	TVA	50-519	CHI	II	07-20-79	Closed (1)
Hartsville B-1	TVA	50-520	CHI	II	07-20-79	Closed (1)
Hartsville B-2	TVA	50-521	CHI	II	07-20-79	Closed (1)

See notes at end of table.

Table B.1 (contd.)

Facility	Utility	Docket Number	Facility Status	NRC Region	Utility Response Date	Closeout Status and Criterion
Hatch 1	GP	50-321	OL	II	06-19-79	Closed (2)
Hatch 2	GP	50-366	OL	II	06-19-79	Closed (2)
Hope Creek 1	PSE&G	50-354	CP	I	07-25-79	Closed (2)
Hope Creek 2	PSE&G	50-355	CD	I	07-25-79	Closed (1)
Humboldt Bay 3	PG&E	50-133	SDI	V	06-22-79	Closed (1)
Indian Point 1	ConEd	50-003	SDI	I	07-09-79	Closed (1)
Indian Point 2	ConEd	50-247	OL	I	07-09-79	Closed (4)
Indian Point 3	PASNY	50-286	OL	I	05-31-79	Closed (2)
Jamesport 1	LILCO	50-516	CD	I	07-20-79	Closed (1)
Jamesport 2	LILCO	50-517	CD	I	07-20-79	Closed (1)
Kewaunee	WPS	50-305	OL	III	06-26-79	Closed (2)
LaCrosse	DPC	50-409	OL	III	05-05-79	Closed (2)
LaSalle 1	CECO	50-373	OL	III	07-19-79	Closed (2)
LaSalle 2	CECO	50-374	CP	III	07-19-79	Closed (2)
Limerick 1	PECO	50-352	CP	I	07-19-79	Closed (2)
Limerick 2	PECO	50-353	CP	I	07-19-79	Closed (2)
Maine Yankee	MYAPCO	50-309	OL	I	07-03-79	Closed (2)
Marble Hill 1	PSI	50-546	CP	III	07-20-79	Closed (2)
Marble Hill 2	PSI	50-547	CP	III	07-20-79	Closed (2)
McGuire 1	DUPCO	50-369	OL	II	06-25-79	Closed (2)
McGuire 2	DUPCO	50-370	OL	II	06-25-79	Closed (2)
Midland 1	CPC	50-329	CP	III	06-21-79	Closed (2)
Midland 2	CPC	50-330	CP	III	06-21-79	Closed (2)
Millstone 1	NU	50-245	OL	I	Not Dated	Closed (2)
Millstone 2	NU	50-336	OL	I	07-06-79	Closed (2)
Millstone 3	NU	50-423	CP	I	06-15-79	Closed (2)
Monticello	NSP	50-263	OL	III	07-06-79	Closed (2)
Nine Mile Point 1	NMP	50-220	OL	I	07-09-79	Closed (2)
Nine Mile Point 2	NMP	50-410	CP	I	07-25-79	Closed (2)
North Anna 1	VEPCO	50-338	OL	II	07-13-79 08-07-79 09-07-83	Closed (2)
North Anna 2	VEPCO	50-339	OL	II	07-13-79 08-07-79 09-07-83	Closed (2)
North Anna 3	VEPCO	50-404	CD	II	10-30-79	Closed (1)
North Anna 4	VEPCO	50-405	CD	II	10-30-79	Closed (1)

See notes at end of table.

Table B.1 (contd.)

Facility	Utility	Docket Number	Facility Status	NRC Region	Utility Response Date	Closeout Status and Criterion
Oconee 1	DUPCO	50-269	OL	II	07-13-79 07-24-79 08-15-79	Closed (4)
Oconee 2	DUPCO	50-270	OL	II	07-13-79 07-24-79 08-15-79	Closed (4)
Oconee 3	DUPCO	50-287	OL	II	07-13-79 07-24-79 08-15-79	Closed (4)
Oyster Creek 1	JCP&L	50-219	OL	I	07-03-79	Closed (2)
Palisades	CPC	50-255	OL	III	07-03-79	Closed (2)
Palo Verde 1	APSCO	50-528	CP	V	07-27-79	Closed (2)
Palo Verde 2	APSCO	50-529	CP	V	07-27-79	Closed (2)
Palo Verde 3	APSCO	50-530	CP	V	07-27-79	Closed (2)
Peach Bottom 2	PECO	50-277	OL	I	07-03-79	Closed (2)
Peach Bottom 3	PECO	50-278	OL	I	07-03-79	Closed (2)
Perkins 1	DUPCO	50-488	CD	II	07-19-79	Closed (1)
Perkins 2	DUPCO	50-489	CD	II	07-19-79	Closed (1)
Perkins 3	DUPCO	50-490	CD	II	07-19-79	Closed (1)
Perry 1	CEI	50-440	CP	III	07-11-79	Closed (2)
Perry 2	CEI	50-441	CP	III	07-11-79	Closed (2)
Phipps Bend 1	TVA	50-553	CHI	II	07-20-79	Closed (1)
Phipps Bend 2	TVA	50-554	CHI	II	07-20-79	Closed (1)
Pilgrim 1	BECO	50-293	OL	I	07-09-79	Closed (2)
Point Beach 1	WEPCO	50-266	OL	III	06-29-79	Closed (4)
Point Beach 2	WEPCO	50-301	OL	III	06-29-79	Closed (4)
Prairie Island 1	NSP	50-282	OL	III	06-04-79	Closed (2)
Prairie Island 2	NSP	50-306	OL	III	06-04-79	Closed (2)
Quad Cities 1	CECO	50-254	OL	III	07-02-79 07-12-79	Closed (2)
Quad Cities 2	CECO	50-265	OL	III	07-02-79 07-12-79	Closed (2)
Rancho Seco 1	SMUD	50-312	OL	V	06-20-79	Closed (2)

See notes at end of table.

Table B.1 (contd.)

Facility	Utility	Docket Number	Facility Status	NPC Region	Utility Response Date	Closeout Status and Criterion
River Bend 1	GSU	50-458	CP	IV	10-04-79	Closed (2)
River Bend 2	GSU	50-459	CHI	IV	10-04-79	Closed (1)
Robinson 2	CP&L	50-261	OL	II	07-10-79	Open
Salem 1	PSE&G	50-272	OL	I	07-03-79 12-29-80	Closed (2)
Salem 2	PSE&G	50-311	OL	I	07-03-79 12-29-80	Closed (2)
San Onofre 1	SCE	50-206	OL	V	07-02-79	Closed (4)
San Onofre 2	SCE	50-361	OL	V	06-29-79	Closed (2)
San Onofre 3	SCE	50-362	OL	V	06-29-79	Closed (2)
Seabrook 1	PSNH	50-443	CP	I	07-12-79	Closed (2)
Seabrook 2	PSNH	50-444	CP	I	07-12-79	Closed (2)
Sequoyah 1	TVA	50-327	OL	II	07-20-79	Closed (2)
Sequoyah 2	TVA	50-328	OL	II	07-20-79	Closed (2)
Shoreham	LILCO	50-322	CP	I	07-27-79	Closed (2)
South Texas 1	HL&P	50-498	CP	IV	07-10-79	Closed (2)
South Texas 2	HL&P	50-499	CP	IV	07-10-79	Closed (2)
St. Lucie 1	FPL	50-335	OL	II	07-09-79	Closed (2)
St. Lucie 2	FPL	50-389	CP	II	07-31-79	Closed (2)
Sterling	RG&E	50-485	CD	I	07-24-79	Closed (1)
Summer 1	SCE&G	50-395	OL	II	07-12-79	Closed (2)
Surry 1	VEPCO	50-280	OL	II	07-13-79 09-07-83	Closed (2)
Surry 2	VEPCO	50-281	OL	II	07-13-79 09-07-83	Closed (2)
Susquehanna 1	PP&L	50-387	OL	I	07-19-79	Closed (2)
Susquehanna 2	PP&L	50-388	CP	I	07-19-79	Closed (2)
TMI 1	Met-Ed	50-289	OL	I	07-06-79	Closed (4)
TMI 2	Met-Ed	50-320	SDI	I		Closed (1)
Trojan	PGE	50-344	OL	V	07-23-79	Closed (2)
Turkey Point 3	FPL	50-250	OL	II	07-09-79	Closed (2)
Turkey Point 4	FPL	50-251	OL	II	07-09-79	Closed (2)
Tyrone	NSP	50-484	CD	III	07-24-79	Closed (1)
Vermont Yankee 1	VYNP	50-271	OL	I	07-06-79 09-21-79 11-13-79	Closed (4)

See notes at end of table.

Table B.1 (contd.)

Facility	Utility	Docket Number	Facility Status	NRC Region	Utility Response Date	Closeout Status and Criterion
Vogtle 1	GP	50-424	CP	II	07-30-79	Closed (2)
Vogtle 2	GP	50-425	CP	II	07-30-79	Closed (2)
WNP 1	WPPSS	50-460	CP	V	08-06-79	Closed (2)
WNP 2	WPPSS	50-397	CP	V	08-06-79	Closed (2)
WNP 3	WPPSS	50-508	CP	V	08-06-79	Closed (2)
WNP 4	WPPSS	50-513	CD	V	08-06-79	Closed (1)
WNP 5	WPPSS	50-509	CD	V	08-06-79	Closed (1)
Waterford 3	LP&L	50-382	CP	IV	07-12-79	Closed (2)
Watts Bar 1	TVA	50-390	CP	II	07-20-79	Closed (2)
Watts Bar 2	TVA	50-391	CP	II	07-20-79	Closed (2)
Wolf Creek 1	KG&E	50-482	CP	IV	07-24-79	Closed (2)
Yankee-Rowe 1	YAECO	50-029	OL	I	07-07-79	Closed (2)
Yellow Creek 1	TVA	50-566	CHI	II	07-20-79	Closed (1)
Yellow Creek 2	TVA	50-567	CHI	II	07-20-79	Closed (1)
Zimmer 1	CG&E	50-358	CD	III	07-03-79	Closed (1)
Zion 1	CECO	50-295	OL	III	07-02-79 07-12-79	Closed (2)
Zion 2	CECO	50-304	OL	III	07-02-79 07-12-79	Closed (2)

Notes:
1. Facility status is based on References 1 and 2, Page B-8.
2. The following abbreviations apply to facility status:
   CD, Cancelled
   CHI, Construction Halted Indefinitely
   CP, Construction Permit
   LPTL, Low Power Testing License
   OL, Operating License
   SDI, Shut Down Indefinitely
3. Refer to Page 3 of this report for Bulletin Closeout Criteria.

Table B.2 List of NRC/IE Inspection Reports Used for Bulletin Closeout

Facility	Inspection Report Number and Approval Date	
Ginna	50-244/79-15	11-01-79
Indian Point 2	50-247/83-10	04-19-83
Oconee 1,2&3	50-269/80-32 50-270/80-28 50-287/80-25	11-03-80
Point Beach 1&2	50-266/79-19 50-301/79-21	01-25-80
San Onofre 1	50-206/79-12	09-21-79
TMI 1	50-289/80-29	05-12-81
Vermont Yankee 1	50-271/81-13	08-13-81

Note:

1. The Bulletin has been closed out for these facilities per Criterion 4 (Page 4).

2. During the 1982 refueling outage at Indian Point 2, overcurrent trip devices with dashpots were replaced with solid state trip devices on all safety-related Type DB-50 and DB-75 breakers. The solid state trip devices do not employ dashpots and are not of Bulletin concern.

References

1. United States Nuclear Regulatory Commission, Licensed Operating Reactors, Status Summary Report, Data as of 11-30-83, NUREG-0020, Volume 7, Number 12, December 1983

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

APPENDIX C

Proposed Followup Items

APPENDIX C

Proposed Followup Items

Region I

Haddam Neck
Utility personnel responded acceptably July 6 and August 8, 1979, indicating that (a) all affected Type DB-50 and DB-75 breakers had been recalibrated to new more conservative bands as suggested by the manufacturer and (b) the test procedures would be revised to incorporate these new tighter bands for all future testing of these breakers.

Verification that testing and inspection were completed per recommendations of the Bulletin and that test procedures were revised as noted above is incomplete or not fully documented.

Region II

Robinson 2
Utility personnel responded acceptably July 10, 1979, indicating that (a) three erratic Type DB-50 breakers were repaired successfully by replacing seals and cleaning, (b) there were no cracked end caps and (c) testing at refueling outages would be incorporated in the plant operating manual.

Verification that testing, inspection and repairs were completed satisfactorily and that the plant operating manual was revised appropriately is incomplete or not fully documented.

Region III

Cook 1,2
Utility personnel responded partially July 5, 1979, indicating that Type DB-75 breakers were not used but omitting any mention of whether or not Type DB-50 breakers were used.

Verification that Type DB-50 breakers with time-delay dashpots are not used or planned for use in safety-related Class IE service is incomplete or not fully documented.

Region IV

Cooper Station

Utility personnel responded acceptably June 27, 1979, indicating that (a) the dashpots of Type DB-50 breakers used in 480V AC systems had been replaced with static solid state trip devices as recommended by Westinghouse, and these modified breakers had been tested satisfactorily, (b) four Type DB-50 breakers used in 125V and 250V DC systems, and having dashpots and end caps, had been tested and found to be acceptable, (c) no cracks were found in spare end caps, (d) the four Type DB-50 breakers with dashpots would be tested during each refueling outage per the Preventative Maintenance Program and (e) the modified breakers would be tested each refueling outage unless justification could be obtained to extend the testing interval to two years.

Verification that the replacements, tests and inspections described above were completed satisfactorily, and that test procedures and schedules comply with the Bulletin is incomplete or not fully documented.

APPENDIX D

Compilations Requested per Tasks 3.c, 3.d and 3.f
of Task Order 49

APPENDIX D

Compilations Requested per Tasks 3.c, 3.d and 3.f of Task Order 49

Table D.1 (Task 3.c) List of Facilities That Have Replaced or Plan to Replace Overcurrent Trip Device End Caps

Note: For additional information, 15 facilities with open status or closed per Criterion 4 are included in this table even though replacements may not be needed.

Facility	Closeout Status and Criterion	Number of End Caps Identified for Replacement Total	Replaced	Planned
Cook 1&2	Open	?	?	?

Type DB-50 breakers were not mentioned in the utility response of 07-05-79. No Type DB-75 breakers were used in safety-related systems.

Cooper Station	Open	?	?	0

Type DB-50 breakers used in 480V AC systems were modified by replacing dash pots with static solid state trip devices recommended by Westinghouse. The number of these modified breakers was not stated in the utility response of 06-27-79. The end caps in other breakers did not need to be replaced.

Ginna	Closed(4)	0	0	0

Numerous breakers were tested and found to be acceptable, per the utility response of 06-25-79 and Inspection Report 50-244/79-15 of 11-01-79.

Haddam Neck	Open	0	0	0

Per the utility response of 08-08-79, all Type DB-50 and DB-75 breakers had been recalibrated to more conservative bands as suggested by the manufacturer. No end caps needed to be replaced.

Indian Point 2	Closed(4)	?	?	?

Per the utility response of 07-09-79, no indication of cracked end caps was observed during tension and functional tests of Type DB-50 and DB-75 breakers. Spare end caps had not been

Table D.1 (contd.)

Facility	Closeout Status and Criterion	Number of End Caps Identified for Replacement Total	Replaced	Planned
inspected as yet. Per Inspection Report 50-247/83-10 of 04-19-83, the trip devices with dashpots of Bulletin concern were replaced in 1982 with solid state trip devices on all (about 70) Type DB-50 and Type DB-75 safety-related breakers.				
Oconee 1,2&3	Closed(4)	0	0	0
Per the utility response of 08-15-79, there were four operational and two spare Type DB-50 breakers. One inconsistent trip unit with an uncracked end cap was sent back to Westinghouse for evaluation and repair, and was tested satisfactorily. Two breakers were recalibrated to correct out-of-tolerance on the low end. The spares had not been inspected as yet.				
Point Beach 1&2	Closed(4)	Several	Several	0
Per the utility response of 06-29-79, one functional end cap with cracks has been replaced, and several spare end caps with cracks would not be used. A total of 108 safety-related Type DB-50 and DB-75 breakers were fitted previously with replacement end caps per IE Bulletin 73-01. Since then, 27 instances of recalibration to correct out-of-tolerance or marginally low readings were recorded. None of these 27 out-of-tolerance conditions were caused by cracked end caps.				
Robinson 2	Open	0	0	0
Per the utility response of 07-10-79, three of the 24 Type DB-50 breakers tested during 1979 were erratic. Malfunction was corrected by replacing seals and cleaning. No cracked end caps were found. Occasional malfunctions had been corrected similarly between 1974 and 1979.				
San Onofre 1	Closed(4)	0	0	0
Per the utility response of 07-02-79, test data for the eleven Type DB-50 breakers were acceptable, and no cracked end caps were found.				

Table D.1 (contd.)

Facility	Closeout Status and Criterion	Number of End Caps Identified for Replacement Total	Replaced	Planned
TMI-1	Closed(4)	0	0	0

Per the utility response of 07-06-79, the Type DB-50 safety-related breakers were to be tested before startup. Although no cracked end caps had been found, ten spare end caps with minor flaws were set aside for evaluation.

Vermont Yankee 1	Closed(4)	4	0	4

Per the utility response of 07-06-79, the black end caps in four safety-related Type DB-50 breakers were to be replaced with navy gray caps. The overcurrent devices had been checked indirectly since plant startup by performing the integrated ECCS test during refueling. Per Inspection Report 50-271/81-13 of 08-13-81, calibration tests were begun in 1979 at regular intervals.

Table D.2 List of Circuit Breakers Affected by the Replacement Program, Including Quantities of Breakers, Quantities of Cracked End Caps and Service Applications (Task 3.d)

Facility (Note, at end of Table)	Closeout Status and Criterion	Type DB-50 Quantity Breakers				Type DB-50 Service Application	Type DB-75 Quantity Breakers				Type DB-75 Service Application
Cook 1&2 (2)	Open	?	?	?	?	?	0	0	0	0	None Used
Cooper Station (3)	Open	>4	?	?	0	480V-AC, 125V-DC, 250V-DC	0	0	0	0	None Used
Ginna	Closed(4)	Numerous			0	?	Numerous			0	?
Haddam Neck	Open	?	?	?	0	?	?	?	?	0	?
Indian Point 2	Closed(4)	?	?	?	?	?	?	?	?	?	?
Oconee 1,2&3 (4)	Closed(4)	4	2	6	?	600V Centers 1X & 2X	0	0	0	0	None Used
Point Beach 1&2 (5)	Closed(4)	108 End Caps	17	125	8	?	?	?	?	?	Only the 480V 2B03 safeguards supply bus breaker in Unit 2 is identified.
Robinson 2 (6)	Open	24	10	34	0	300, 400, 600 and 800 ampere systems	0	0	0	0	None Used
San Onofre 1	Closed(4)	11	0	11	0	?	0	0	0	0	None Used
TMI-1 (7)	Closed(4)	? End Caps	39	?	10	?	0	0	0	0	None Used
Vermont Yankee 1 (8)	Closed(4)	4	0	4	0	Two are used with station batteries; two are used in a maintenance bus tie between the two DC distribution switchgear.	0	0	0	0	None Used

Notes

1. "?" signifies "Not Stated in Utility Response".

2. Type DB-50 breakers are not mentioned in the utility response.

3. The dash pots of Type DB-50 breakers used in 480V AC Systems were removed and replaced with static solid state trip devices recommended by Westinghouse.

4. One trip unit with inconsistent test readings and uncracked end cap was sent to Westinghouse for repair. End caps in spares had not been checked for cracks.

5. An unreported quantity of DB-75's is included in the quantities tabulated for DB-50's. All quantities apply to trip devices, not to breaker assemblies.

6. Twenty spare end caps are reported; two end caps per breaker are assumed.

7. The 10 end caps tabulated were chipped, not cracked; they would not be used unless shown to be satisfactory. All quantities apply to end caps.

8. All end caps were black; they were to be replaced with navy gray end caps.

Table D.3 List of Utility Actions Related to Westinghouse Recommendations
(Task 3.f) in Technical Bulletin NSD-TB-79-02

Note: A copy of NSD-TB-79-02 appears in Appendix A.

Facility	Closeout Status and Criterion	Westinghouse Recommendation Number 1	2	3
Cook 1&2	Open	Type DB-50 breakers are not mentioned in the utility response of 07-05-79; if any are found, they must be tested per this recommendation. No Type DB-75 breakers are used in safety-related systems.	Unless Type DB-50 breakers are found, inspection of spare end caps for cracks does not apply.	Unless Type DB-50 breakers are found, testing subsequent to the initial period does not apply.
Cooper Station	Open	Four Type DB-50 breakers with dash pots were tested and found to be acceptable. Remaining Type DB-50 breakers were modified by replacing the dash pots with static solid state trip devices as recommended by Westinghouse and were tested satisfactorily.	No cracks were found in spare end caps.	Because all testing was completed during the initial period, this recommended action does not apply.
Ginna	Closed(4)	Test data of Types DB-50 and DB-75 breakers for the years 1973 to 1979 were reviewed and found to be acceptable.	No cracked spare end caps were found.	Because all test data were acceptable, no retesting was necessary.
Haddam Neck	Open	All Type DB-50 and DB-75 breakers were recalibrated to new more conservative bands as suggested by the manufacturer. No cracked end caps were found.	No cracked spare end caps were found.	Because all testing was completed during the initial period, this recommended action does not apply.
Indian Point 2	Closed(4)	Tension tests and functional tests were performed. Calibration tests recommended by Westinghouse were not made. In 1982, all safety-related trip devices with dashpots were replaced with solid state trip devices.	The utility planned to inspect spare end caps for cracks or load test associated breakers before use.	No plans to make calibration tests were mentioned in the 1979 response.

Table D.3 (contd.)

Facility	Closeout Status and Criterion	Westinghouse Recommendation Number 1	2	3
Oconee 1,2&3	Closed(4)	All four breakers in service (Type DB-50) were retested. A new trip unit was installed on one breaker to correct inconsistencies. A breaker out-of-tolerance on the low side was recalibrated. No cracked end caps were found.	As an alternative to visual inspection of spare end caps, breakers were to be tested prior to use. Although this plan may be acceptable to Westinghouse, it does not comply literally with the recommendation.	Because testing was completed during the initial period, this recommended action does not apply.
Point Beach 1&2	Closed(4)	Between 1973 and 1979, 27 recalibrations had been performed to correct out-of-tolerances found in periodic testing of Types DB-50 and DB-75 breakers. A cracked end cap was found and discarded on one erratic breaker in 1979.	Several spare end caps were discarded because of cracks.	Because the testing program was thorough, this recommended action does not apply.
Robinson 2	Open	Twenty-four Type DB-50 breakers were tested in May and June of 1979. Three of these breakers were out-of-tolerance. This problem was corrected by replacing seals and removing dust. No cracked end caps were found.	No defects were found in 20 spare end caps.	Because testing was completed during the inital period, this recommended action does not apply.
San Onofre 1	Closed(4)	Eleven Type DB-50 breakers reviewed for test data were found to be within the acceptance band. No cracked end caps were found.	There were no spare end caps.	Because test date was acceptable, this recommended action does not apply.
TMI-1	Closed(4)	Review of test data showed that some of the Type DB-50 breakers were on the low side of the trip band. They were to be tested before startup. Visual inspection of end caps for cracks was not mentioned.	Ten of 39 spare end caps were chipped, but not cracked. These caps were to be checked before use.	The Type DB-50 breakers on the low side of the trip band were to be tested before startup.

Table D.3 (contd.)

Facility	Closeout Status and Criterion	Westinghouse Recommendation Number 1	2	3
Vermont Yankee 1	Closed(4)	The 4 Type DB-50 breakers were checked indirectly by means of the integrated ECCS test. The black end caps were to be replaced with navy gray caps. Calibration testing recommended by Westinghouse was not performed initially.	There were no spare Type DB-50 or DB-75 breakers or end caps.	Per NRC/IE Inspection Report 50-271/81-13 of 08-13-81, testing and calibration were completed satisfactorily and were documented in a Westinghouse Report of 01-27-81.

APPENDIX E

Abbreviations

APPENDIX E

Abbreviations

AC	Alternating Current
AEC	Atomic Energy Commission
AMP	Ampere
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
BWR	Boiling Water Reactor
CD	Cancelled
CECO	Commonwealth Edison Company
CEI	Cleveland Electric Illuminating Company
CG&E	Cincinnati Gas and Electric Company
CHI	Construction Halted Indefinitely
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
DC	Direct Current
DECO	Detroit Edison Company
DL	Duquesne Light Company
DPC	Dairyland Power Cooperative
DRO	Directorate of Regulatory Operations (NRC)
DUPCO	Duke Power Company
ECCS	Emergency Core Cooling System
ESF	Engineered Safety Feature
FP	Florida Power Corporation
FPL	Florida Power & Light Company
GAO	Government Accounting Office
GP	Georgia Power Company
GSU	Gulf States Utilities Company
HL&P	Houston Lighting and Power Company
HQ	Headquarters
IE	Service Class Standardized by the Institute of Electrical and Electronics Engineers, Inc.
IEB	Inspection/Enforcement Bulletin (NRC)
IELPCO	Iowa Electric Light and Power Company
IMECO	Indiana and Michigan Electric Company
IP	Illinois Power Company
JCP&L	Jersey Central Power and Light Company

KG&E	Kansas Gas and Electric Company
LER	Licensee Event Report
LILCO	Long Island Lighting Company
LOCA	Loss of Cooling Accident
LP&L	Louisana Power and Light Company
LPTL	Low Power Testing License
Met-Ed	Metropolitan Edison Company
MP&L	Mississippi Power and Light Company
MYAPCO	Maine Yankee Atomic Power Company
NIPSCO	Northern Indiana Public Service Company
NMP	Niagara Mohawk Power Company
NPPD	Nebraska Public Power District
NRC/IE	Nuclear Regulatory Commission/ Office of Inspection and Enforcement
NSD-TB	Nuclear Service Division-Technical Bulletin (W)
NSP	Northern States Power Company
NU	Northeast Nuclear Energy Company Northeast Utilities
OL	Operating License
OPPD	Omaha Public Power District
PASNY	Power Authority of the State of New York
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
PSCO	Public Service Company of Oklahoma
PSE&G	Public Service Electric and Gas Company
PSI	Public Service Indiana
PSNH	Public Service Company of New Hampshire
PWR	Pressurized Water Reactor
RG&E	Rochester Gas and Electric Corporation
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
TECO	Toledo Edison Company
TMI	Three Mile Island
TUGCO	Texas Utilities Generating Company
TVA	Tennessee Valley Authority
UE	Union Electric Company
V	Volts
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

NRC FORM 335 (11-81)

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16. ABSTRACT (200 words or less)

IE Bulletin 79-11 was issued May 22, 1979 as a result of information received in April 1979 from Westinghouse and an NRC licensee relating to the potential failure of a circuit breaker in an engineered safety system of a nuclear power plant. The defect of concern was a small hairline crack in the dashpot end cap of one of the three overcurrent trip devices of a Type DB-75 breaker. The Bulletin was also applicable to Type DB-50 breakers, because they use the same type of dashpot end cap. The defective end cap had been installed in 1973 as a replacement, in compliance with IE Bulletin 73-1. Westinghouse Technical Bulletin NSD-18-79-02 was issued April 17, 1979 to alert utilities to the potential problem, to provide background information, to recommend review of calibration test data and retesting of erratic breakers, to advise visual examination of end caps for cracks and to call for replacement of cracked end caps. Evaluation of utility responses and NRC/IE inspection reports shows that 114 of the 129 current facilities do not use the affected breakers in safety-related systems. Followup items for the five facilities with open status are proposed. The Bulletin has been closed out for the remaining ten facilities with safety-related Westinghouse DB-50 and DB-75 breakers having dashpots, on the basis of acceptable utility responses and NRC/IE regional inspection reports. Erratic performance of three DB-50 breakers with worn seals at one facility is identified as a Remaining Area of Concern because the worn seals had essentially the same effect on performance as cracked end caps. The recommendation is made that preventive maintenance programs of licensees be revised to make sure that breakers are kept clean to avoid plugging dashpot orifices. The Bulletin has served its purpose by resulting in identification of the potential problem at a limited number (15) of facilities and of the need for corrective actions at only five facilities.

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AUGUST 1984