

MAR 22 1983

Docket Nos.: 50-275, 50-323, 50-361, 50-362, 50-370, 50-389
and 50-395, 50-437, 50-483, 50-528, 50-529, 50-530

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

FROM: Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation

SUBJECT: FAILURE OF GE AK-2 REACTOR TRIP BREAKERS
(Board Notification No. 83-38)

In accordance with the procedures for Board notification, the enclosed information is being transmitted directly to the Commission. This information is significant since it may affect the NRC staff's conclusions related to the probability/corrective measures for anticipated transient without scram (ATWS) events (Unresolved Safety Issue A-9) which is discussed in the NRC safety evaluations for power reactors. In addition, it may affect the staff's evaluation concerning quality assurance measures as they are applied to specific components. This information is applicable to all PWR's.

As a result of the recent problems with Westinghouse DB-50 trip breakers, the Southern California Edison Company (SCE) tested the reactor trip breakers at San Onofre. On March 11, 1983, SCE notified the NRC staff that three of eight reactor trip breakers (RTBs) at Unit 2, and one of eight RTBs at Unit 3, had failed to open during surveillance testing of the RTB undervoltage coils. A preliminary notification (PNO-V-83-11) was issued on March 11, 1983. See Enclosure 1. As a result of these RTB failures, an IE Bulletin (IEB-83-04) was prepared and issued on March 11, 1983 to all PWR's with OL's except those with Westinghouse DB type reactor trip breakers. See Enclosure 2.

On March 12 and 13, 1983, an NRC staff team visited the San Onofre site to investigate the RTB failures. The preliminary results of investigation of one of the defective RTB's at San Onofre confirmed that it is slow to trip, taking between one and five seconds to trip after the undervoltage (UV) coil is de-energized. The apparent cause of the slow trip is lack of adequate preventive maintenance of the breaker, i.e., inadequate lubrication and adjustment. See Enclosure 3, Preliminary Notification PNO-V-83-11A, dated March 14, 1983.

NO05

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The Commissioners

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At this time an investigative program is currently being conducted by the San Onofre 2 and 3 licensee to confirm the causes of the failures, to determine corrective actions, and to provide a basis for plant restart. The NRC staff is reviewing this matter as part of the review of the reactor trip breaker issue for all pressurized water reactors. This review is scheduled for completion by April 18, 1983. The results of the staff review will be provided when available.

The results of some responses to IEB 83-04 are described in PNO-HQ-83-05, dated March 18, 1983 (See Enclosure 4). As is discussed therein, CE and B&W plants are the only ones that use GE AK-2 breakers in their reactor trip circuits. Because the breaker problems uncovered to date in testing are apparently remedied by lubrication and adjustment and because of the diversity and redundancy afforded in the RPS designs of CE and B&W plants, there is no immediate safety concern at either CE or B&W plants.

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Enclosures:
As stated

cc: See next page

*See previous concurrence.

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*2/11/83
3/21*

The Commissioners

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With regard to IE Bulletin 83-04, the results of the required tests on the operating reactors covered by this Bulletin will be provided when available. In the interim, the basis for continued operation of the affected plants is given in an NRC Memorandum from R. Mattson to D. Eisenhut dated March 17, 1983 (see Enclosure 4).

In accordance with the procedures for Board notification, the enclosed information is being transmitted directly to the Commission. This information is significant since it may affect the NRC staff's conclusions related to the probability/corrective measures for anticipated transient without scram (ATWS) events (Unresolved Safety Issue A-9) which is discussed in the NRC safety evaluations for power reactors. In addition, it may affect the staff's evaluation concerning quality assurance measures as they are applied to specific components.

We will inform the Commission and/or appropriate Boards of further information which would result in a change in the existing staff conclusions concerning the adequacy of the present ATWS and QA procedures.

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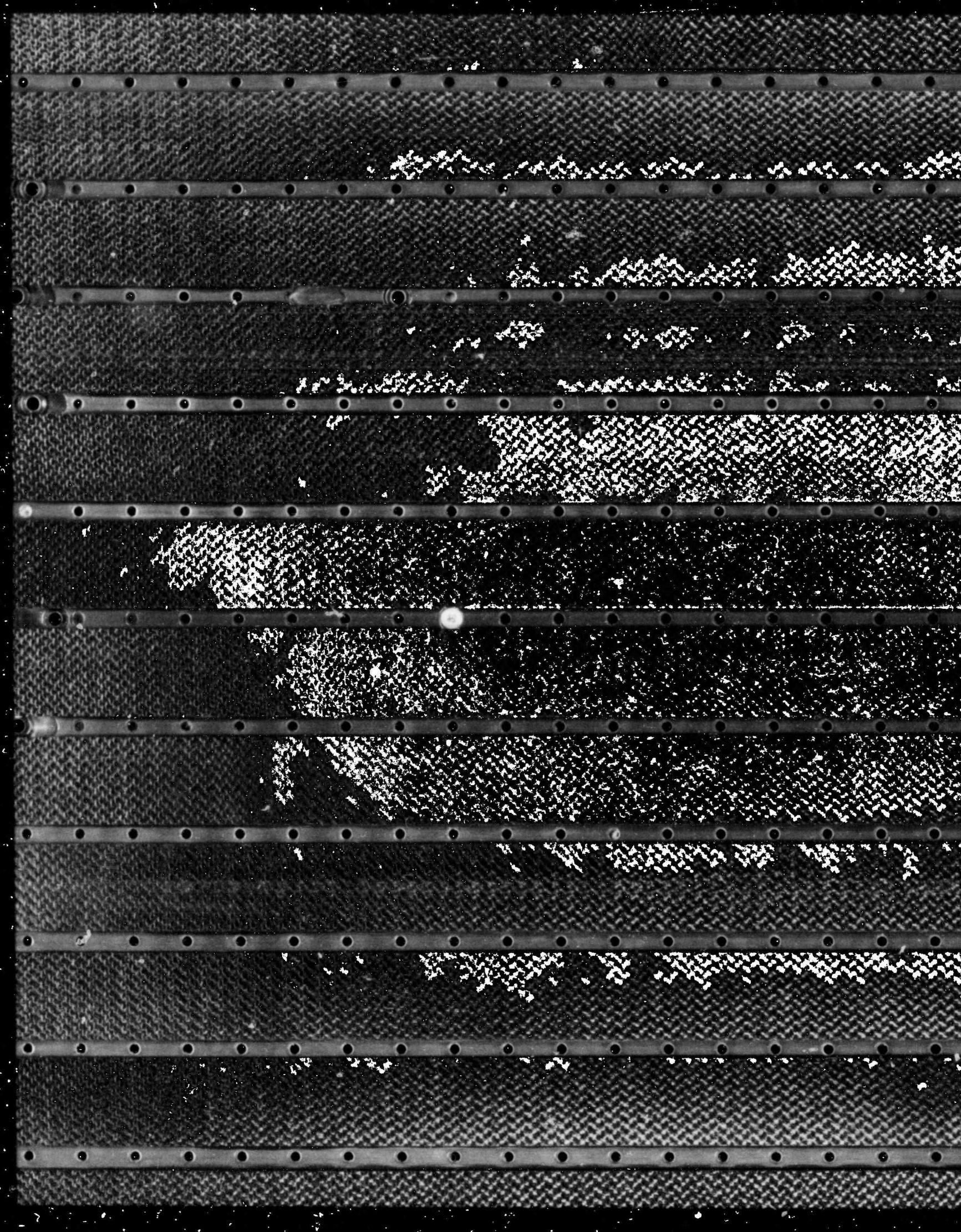
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PRELIMINARY NOTIFICATION OF EVENT OR UNUSUAL OCCURRENCE--PNO-V- 83-11 Date: 3/11/83 DMS

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

FACILITY: Southern California Edison Company
San Onofre Nuclear Generating Station Units 2 & 3
San Clemente, California
Docket No. 50-361/362

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

SUBJECT: PROMPT REPORT - FAILURE OF REACTOR TRIP
BREAKERS TO OPEN WHEN TESTED USING THE
UNDER-VOLTAGE COIL

The licensee reported that three reactor trip breakers (RTB) on Unit 2 and one RTB on Unit 3 failed to open during surveillance testing of the RTB under-voltage coils. This is a condition similar to that recently experienced at Salem Unit 1, involving a different manufacturer's breaker, PNO-I-83-11A. Both units were shutdown when the surveillance test was performed. A vendor representative will be on site March 11, 1983 to evaluate the situation. All tests of the RTBs using only the shunt trip coil were satisfactory. The plant protection system is designed such that a reactor trip signal activates both the under-voltage and shunt trip functions. The discrepancies were identified on March 3, 1983, for Unit 3, and on March 8, 1983, for Unit 2. Units 2 and 3 utilize General Electric type AK-2-25 reactor trip breakers. No similar failures have been observed to date.

Both Units are shutdown (in Mode 5) and will remain shutdown until the breaker concerns have been resolved to the satisfaction of the NRC staff. This action is being assured by the issuance of a Confirmation of Action Letter by Region V. All other Regions have been informed, by telephone, of this condition.

Media interest is expected. Neither the licensee nor the NRC plans to issue a news release. Region V (San Francisco) received notification of this occurrence from the Senior Resident Inspector at 2:40 p.m. on March 10, 1983. This information is current as of 8:00 a.m. on March 11, 1983.

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REGION V: FORM 211
(revised 11/24/83)

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 AK-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

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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.

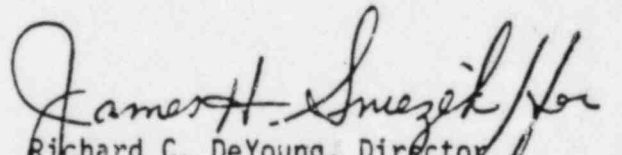
*IE Bulletin 79-09, dated April 17, 1979, had as an attachment an extract of General Electric (GE) Service Advice Letter No. 175(CPDD)9.3 which is applicable to GE type AK-2 breakers.

- 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 282a, 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

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Attachment:

1. List of Recently Issued IE Bulletins

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LIST OF RECENTLY ISSUED IE BULLETINS

Bulletin No.	Subject	Date of Issue	Issued to
83-03	Check Valve Failures in Raw Water Cooling Systems of Diesel Generators	03/11/83	All power reactor facilities holding an OL or CP
83-02	Stress Corrosion Cracking in Large-Diameter Stainless Steel Recirculation System Piping at BWR Plants	03/04/83	Table 1 BWRs and for action and all other licensees and holders of a CP
83-01	Failure of Reactor Trip Breakers (Westinghouse DB-50) to Open on Automatic Trip Signal	02/25/83	All PWR facilities holding an OL and other power reactor facilities for information
82-04	Deficiencies in Primary Containment Electrical Penetration Assemblies	12/03/82	All power reactor facilities holding an OL or CP
82-03 Rev. 1	Stress Corrosion Cracking in Thick-Wall Large-Diameter Stainless Steel, Recirculation System Piping at BWR Plants	10/28/82	Operating BWRs in Table 1 for action and other OLs and CPs for information
82-03	Stress Corrosion Cracking in Thick-Wall Large-Diameter, Stainless Steel, Recirculation System Piping at BWR Plants	10/14/82	Operating BWRs in Table 1 for action and other OLs and CPs for information
82-01 Rev 1, Supp 1	Alteration of Radiographs of Welds in Piping Subassemblies	08/18/82	All power reactor facilities with an OL or CP
82-02	Degradation of Threaded Fasteners in the Reactor Coolant Pressure Boundary of PWR plants	06/02/82	All PWR facilities with an OL for action and all other OLs or CPs for information
82-01 Rev. 1	Alteration of Radiographs of Welds in Piping Subassemblies	05/07/82	All power reactor facilities with an OL or CP

OL = Operating License
CP = Construction Permit

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

Date: 3/14/83

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

FACILITY: Southern California Edison Company
 San Onofre Nuclear Generating Station Units 2 & 3
 San Clemente, California
 Docket No. 50-361/362

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

SUBJECT: PROMPT REPORT - FAILURE OF REACTOR TRIP
 BREAKERS TO OPEN WHEN TESTED USING THE
 UNDER-VOLTAGE COIL - (UPDATED INFORMATION)

Licensee and NRC staff investigation into the failures of the under-voltage trip mechanism during testing is continuing. Testing of the breakers on March 13, 1983, was able to demonstrate improper operation of the breaker. The exact cause is still under review, but may be due, in part, to resistance in the mechanical latching mechanism associated with the under-voltage trip device. In addition to the failures which occurred during surveillance testing in March 1983, it has been determined that there were similar failures in March and July 1982. These earlier failures had not been reported to the NRC. This situation is under review by Region V.

At San Onofre the plant protection system is designed such that a reactor trip signal activates both the under-voltage and shunt trip functions. All tests of the breakers using the shunt trip mechanisms were satisfactory. Accordingly, it appears that the shunt trip mechanism would activate the Reactor Protection System upon receipt of a reactor trip signal. IE Bulletin Number 83-04 has been issued to holders of operating licenses requiring them to test their Reactor Protection System breakers (not covered by a previous Bulletin, No. IEB 83-01), review their breaker maintenance program, and review their emergency operating procedures dealing with a "failure-to-trip" event.

Region V has issued a Confirmation of Action letter to the licensee assuring that both units will stay shut down until the breaker concerns have been resolved to the satisfaction of the NRC staff. The Office of Nuclear Reactor Regulation has assumed lead responsibility in assessing the adequacy of licensee corrective actions.

Media interest has occurred. NRC Headquarters issued a news release on March 11, 1983. This updates information provided in PNO-V-83-11, issued 3/11/83. This information is current as of 11:00 a.m. on March 14, 1983.

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Date: March 18, 1983

PRELIMINARY NOTIFICATION OF RESPONSES TO IE BULLETIN 83-04.--PNO-HQ-83-05

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

SUBJECT: REPORTED UNDERVOLTAGE TRIP FAILURES OF AK-2 BREAKERS

IE Bulletin 83-04, "Failure of the Undervoltage Trip Function of Reactor Trip Breakers" describes recent failures of GE AK-2 breakers used in the reactor protection system at San Onofre, Unit 2 and 3. The bulletin requires licensees with other than Westinghouse DB breakers to perform several actions to assure proper operation of these breakers in the future. Action Item 5 of the bulletin requires licensees to promptly report to the NRC via the emergency notification system (ENS) of breaker failures identified as a result of the testing required by the bulletin.

As required by Action Item 5 of the bulletin, Calvert Cliffs and Maine Yankee have reported via the ENS on March 15, 1983 that some of their breakers required more than the normal time to trip. Calvert Cliffs reported that at its Unit 1 plant, two of eight breakers trip in approximately six seconds. Although Calvert Cliffs reported no Unit 2 breaker failures it did inform its resident inspector that two of the eight breakers required about 1.5 second to trip. Maine Yankee reported that three of its eight breakers exceeded the normal tripping time; one breaker tripped in 1.9 seconds, another in 2.7 seconds, and the third in 10.3 seconds. Maine Yankee further reported that these breakers were subsequently cleaned and lubricated, after which they operated within the normal tripping time.

Subsequent to the ENS report, Region I was informed that additional tests were performed on the Calvert Cliffs breakers on March 16, 1983. The results of these tests indicated erratic behavior of breakers before lubrication and adjustment. The licensee is continuing with a maintenance program to assure proper operation of each breaker and undervoltage (UV) trip device.

NRR representatives were dispatched to San Onofre on March 11, 1983 to assist Region V inspectors review and examine the breakers which had failed to operate during testing on March 2 and 8, 1983. The failures were reproduced during testing. The reviewers noted that the UV trip device was unable to reliably operate the trip bar on the failed breakers although the UV device did actuate in each instance. The testing and specifications indicate a narrow margin of force from the UV device to actuate the breaker. Although multiple UV trip failures (sluggish operation) were identified by the testing, the UV trip function was capable of tripping the plant due to redundancy of the eight breaker arrangement. The shunt coil which provides a much larger force than the UV device remained operable during the testing.

The Salem Event Task Force is working with IE and NRR in the review of incoming information and test results from the CE and B&W plants. These are the only plants that use AK-2 breakers in their reactor trip circuits. Because the breaker problems encountered in the testing are apparently remedied by lubrication and adjustment and because of the diversity and redundancy afforded in RPS designs of CE and B&W, there is no immediate safety question at either CE or B&W plants.

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The results of task group reviews, meetings with NSSS and Owner groups, tests by utilities and data from Bulletin responses are being combined for the W and GE RPS trip breakers. The NRC plans to update information and/or requested actions to utilities regarding these breakers next week.

The results to date from Calvert Cliffs and Maine Yankee testing were conveyed to all utilities via INPO Notepad on March 17, 1983.

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