UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUL 15 1986

MEMORANDUM FOR: Richard W. Starostecki, Director, DRP, RI
Roger D. Walker, Director, DRP, RII
Charles E. Norelius, Director, DRP, RIII
Eric H. Johnson, Director, DRP, RIV
Dennis F. Kirsch, Director, DRP, RV

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

SUBJECT: IE BULLETIN 80-20 CLOSEOUT

Enclosed is a copy of NUREG/CR-3962 pertaining to the closeout of IE Bulletin 80-20 "Failures of Westinghouse Type W-2 Spring Return to Neutral Control Switches". This report was prepared by Parameter Inc. under contract to IE. Parameter's review effort included evaluation of utility responses, deficiency reports, and NRC regional inspection reports for 124 nuclear power plants in operation or under construction.

Parameter's review of utility responses and NRC/IE inspection reports determined that the bulletin has been closed for 122 out of the 124 current facilities. The closed out facilities reported that they either do not use the affected equipment in safety related systems or they comply with the requirements of the bulletin. Proposed followup items for the remaining 2 current facilities (Sequoyah 1&2) are presented in Appendix C.

IE has reviewed NUREG/CR-3962 and concur in the contractor's conclusions that IEB 80-20 is considered closed. However, Appendix C proposes followup items for 2 facilities and IE agrees. Since no additional failures were noted in the responses to this bulletin, IE is not suggesting any additional action.

If you have any questions pertaining to the closeout, please contact James C. Stewart of my staff at 492-9061.

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

Enclosure: NUREG/CR-3962

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NUREG/CR-3962

Closeout of IE Bulletin 80-20: Failures of Westinghouse Type W-2 Spring Return to Neutral Control Switches

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

PARAMETER, Inc.

Prepared for
U.S. Nuclear Regulatory
Commission

NUREG/CR-3962

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NUREG/CR-3962
PARAMETER IE-150

Closeout of IE Bulletin 80-20: Failures of Westinghouse Type W-2 Spring Return to Neutral Control Switches

Manuscript Completed: April 1986
Date Published: June 1986

Prepared by
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Prepared for
Division of Emergency Preparedness and Engineering Response
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
NRC FIN B8729

ABSTRACT

On June 18, 1980, Commonwealth Edison Company submitted Licensee Event Report (LER) 50-295/80-24 to the NRC, describing a malfunction of a Westinghouse Type W-2 control switch important to safety at Zion Unit 1. On the same date, Westinghouse submitted a preliminary issue of Technical Bulletin NSD-TB-80-9 to the NRC on the subject switches. On July 31, 1980, IE Bulletin 80-20 was issued to all power plant licensees and permit holders, requiring them to take specific actions and report results. Evaluation of utility responses and NRC/IE inspection reports shows that the bulletin can be closed out per specific criteria for 122 (98%) of the 124 current facilities to which it was issued. A followup item for the remaining two facilities is proposed for use by NRC/IE, to ensure satisfactory completion of corrective action.

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CLOSEOUT OF IE BULLETIN 80-20: FAILURES OF WESTINGHOUSE TYPE W-2 SPRING RETURN TO NEUTRAL CONTROL SWITCHES

INTRODUCTION

In accordance with the Statement of Work in Task Order 003 under Contract NRC 05-85-157-02, this report provides documentation for the closeout status of IE Bulletin 80-20. Documentation is based on the records obtained from the IE File, the NRC Document Control System, and the cognizant engineer's file.

IE Bulletin 80-20 was issued July 31, 1980 because of concern about failures of Westinghouse Type W-2 spring return to neutral control switches. Commonwealth Edison Company (CECO) had submitted a Licensee Event Report (LER) to the NRC to describe the failure of a Type W-2 switch to actuate automatic start of a service water pump at Zion Unit 1. A review of this matter by Westinghouse led to the issuance of a technical bulletin. In order to ensure operability of safety-related systems containing these switches, all holders of operating licenses and construction permits were required to take specific actions and report results.

For background information, IE Bulletin 80-20, CECO LER 50-295/80-24, Westinghouse Technical Bulletin NSD-TB-80-9, letter of November 19, 1985 from TVA to IE/HQ and letter of August 5, 1981 from Westinghouse to TVA are included in Appendix A. Evaluation of licensees' responses and NRC/IE inspection reports is documented in Appendix B as the basis for bulletin closeout. A followup item is proposed in Appendix C for use by NRC/IE in assuring satisfactory completion of corrective action. Tabulation of supplementary information required by the bulletin is included 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 40 non-current facilities, per Criterion 1 (see Page 4).

2. The bulletin has been closed out for the following 84 current facilities which have no subject Type W-2 switches in safety-related systems, per Criterion 2.

Arkansas 1,2	Fort Calhoun 1	Perry 1,2
Beaver Valley 1,2	Fort St. Vrain	Pilgrim 1
Big Rock Point 1	Grand Gulf 1	Quad Cities 1,2
Browns Ferry 1,2,3	Harris 1	River Bend 1
Brunswick 1,2	Hatch 1,2	Robinson 2
Callaway 1	Hope Creek 1	San Onofre 2,3
Calvert Cliffs 1,2	La Crosse	Seabrook 1,2
Catawba 1,2	LaSalle 1,2	Shoreham
Clinton 1	Limerick 1,2	South Texas 1,2
Cook 1,2	Maine Yankee	Summer 1
Cooper Station	McGuire 1,2	Surry 1,2
Crystal River 3	Millstone 1,2,3	TMI 1
Davis-Besse 1	Monticello	Trojan
Diablo Canyon 1,2	Nine Mile Point 1,2	Vermont Yankee 1
Dresden 2,3	Oconee 1,2,3	Vogtle 1,2
Duane Arnold	Oyster Creek 1	WNP 1,2
Fermi 2	Palisades	Waterford 3
FitzPatrick	Palo Verde 1,2,3	Wolf Creek 1
		Yankee-Rowe 1

3. The bulletin has been closed out for the following 14 current facilities which have no subject Type W-2 switches with the neutral position contacts in control circuits for safety-related systems, per Criterion 3.

Facility	*Number of Type W-2 Switches
Bellefonte 1,2	22
North Anna 1,2	16
Peach Bottom 2,3	26
Rancho Seco 1	4
Salem 1,2	6
St. Lucie 1,2	(Not given)
Susquehanna 1,2	88
WNP 3	(Not given)

*Used in safety-related systems, with neutral position contacts not used in circuits for automatic control of safety-related systems.

4. The bulletin has been closed out for the following 24 current facilities for which NRC/IE inspectors indicate satisfactory completion of corrective action, per Criterion 4.

Braidwood 1,2	Haddam Neck	San Onofre 1
Byron 1,2	Indian Point 2,3	Turkey Point 3,4
Comanche Peak 1,2	Kewaunee	Watts Bar 1,2
Farley 1,2	Point Beach 1,2	Zion 1,2
Ginna	Prairie Island 1,2	

5. The bulletin is called open for Sequoyah 1 and 2. Followup is proposed in Appendix C.

6. Table D.1 lists 1068 subject Type W-2 switches. No failures during the first series of tests have been reported.

7. For Zion 1,2, closure of the bulletin was by Inspection Report 295/80-20, 304/80-21 (11-28-80). After that time, problems developed concerning the switch circuits for starting auxiliary feedwater pumps. The switch modifications made to comply with the bulletin produced these circuitry problems only at Zion. This situation is addressed in detail in Inspection Report 295/81-22, 304/81-18, where inspection followup items were initiated to track the problem. The inspection items were closed out by Inspection Report 295/82-20 for Unit 1, and by Inspection Report 302/84-07 for Unit 2.

CONCLUSIONS

1. There were no failures of the neutral contact closure during the first series of tests. This would verify the Westinghouse conclusion that the problem at Zion 1 was not generic, but rather that the intermittent failure of the contacts to close was a random occurrence.

2. The occurrence of failure of the neutral contacts of the switch to close has been shown to be random, quite infrequent, and unpredictable. The safety-related consequences, as described by the bulletin (Appendix A), are serious. Therefore, action to avoid the occurrence completely is justified. Suitable action approved by the NRC can be any one of the following:
   (1) The periodic and after use testing for contact closure
   (2) Rewiring the switches to put the indicator lamp in series with the neutral contacts
   (3) Replacement of switches with ones made using Westinghouse revised manufacturing procedures.*

   *Refer to Westinghouse letter to TVA of August 5, 1981 (see Appendix A, Page A-10).

3. The problems with modified W-2 switch circuits were unique to Zion and have been corrected.

REMAINING AREAS OF CONCERN

Verification by IE inspection that bulletin actions have been completed satisfactorily is needed to close out the bulletin for Sequoyah 1 and 2 (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 cancelled, deferred indefinitely or shut down indefinitely.

2. A response for the facility complies with actions required by the bulletin and indicates that it does not have Westinghouse Type W-2 spring return to neutral control switches in safety-related systems.

3. A response for the facility complies with actions required by the bulletin and indicates that it has Westinghouse Type W-2 spring return to neutral control switches in safety-related systems, but that the neutral position contacts are not used, or are not used in circuits for automatic control of safety-related systems.

4. A response for the facility complies with required bulletin actions and an NRC/IE inspection report indicates that corrective action has been completed satisfactorily.

APPENDIX A

Background Information

SSINS No.: 6820
Accession No.:
8006190023

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

July 31, 1980

IE Bulletin No. [illegible]-20

FAILURES OF WESTINGHOUSE TYPE W-2 SPRING RETURN TO NEUTRAL CONTROL SWITCHES

By letter dated June 18, 1980, Commonwealth Edison Company submitted Licensee Event Report No. LER 50-295/80-24 to the NRC describing a malfunction of a Westinghouse Type W-2 control switch at the Zion Generating Station, Unit 1. The malfunctioning switch is a three position spring return to neutral switch. Although the switch was in its proper neutral position when it malfunctioned, its neutral contacts failed to close properly thereby preventing the automatic start of 1A Service Water Pump.

Subsequent tests conducted on the malfunctioning switch revealed that contact closure was intermittent with the switch in the neutral (or "Auto Start") position. Other tests conducted on identical switches from spares and from Unit 2 equipment disclosed two additional switches with a tendency for intermittent contact closure.

A review of this matter by Westinghouse led to the issuance of NSD Technical Bulletin No. NSD-TB-80-9 to the utility owners of all Westinghouse operating plants. The recommendations contained in the Westinghouse technical bulletin include: (i) testing the neutral position contacts of the subject W-2 switches for continuity, and (ii) rewiring of the indicating light circuit to permit the early detection of a neutral contact failure as shown in Figure 1.

Depending on how the indicating light circuit is wired, loss of continuity thru the neutral position contact of a W-2 switch could remain undetected until the equipment associated with the switch were called upon to operate. Since such a failure would be equivalent to by-passing the system associated with the switch, consideration should be given to rewiring the switches used in safety-related applications as shown in Figure 1. Such rewiring would provide an acceptable means for detecting contact failure, provided the indicating light is in the control room and readily visible by the operator. If the indicating light is not so located, consideration should be given to annunciating the neutral position contact failures at the control room to alert the operator of the inoperable status of a safety-related system. In addition, consideration should be given to adding redundant contacts to the W-2 switches or to replacing the W-2 switches with others having a more positive contact wiping action.

ACTIONS TO BE TAKEN BY LICENSEES AND HOLDERS OF CONSTRUCTION PERMITS:

1. Determine whether Westinghouse Type W-2 control switches with spring return to neutral position are used in safety-related applications at your facility. If so, identify the safety-related systems using these

switches and the total number of switches so used. If no such switches are used in your facility, you should indicate that this is the case and ignore the remaining questions.

2. Licensees of operating plants using Type W-2 spring return to neutral control switches in safety-related applications shall perform continuity tests on all such switches. These tests shall be performed with the switch operator in the neutral position and completed within ten (10) days of the date of this bulletin. In addition, this continuity test shall be repeated at least every thirty-one (31) days after the initial test and after each manipulation of the switch from its neutral position. These continuity tests may be discontinued subsequent to implementing the longer term corrective measures described below.

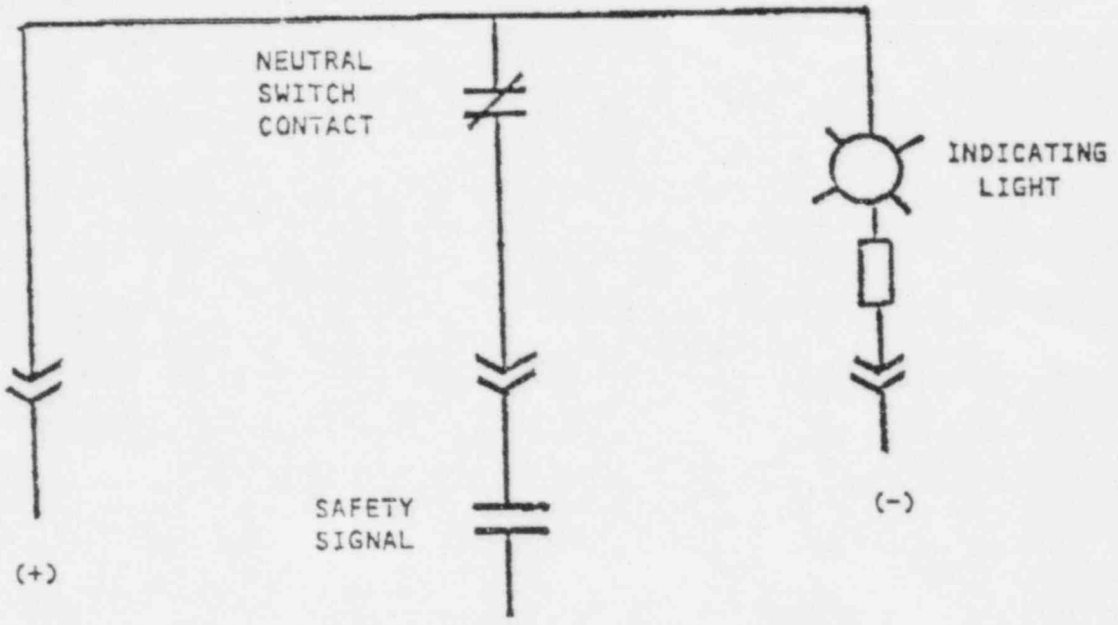
3. Licensees of operating plants and holders of construction permits shall describe the longer term corrective measures planned and the date by which such measures will be implemented by actual installation or by design change, as appropriate. As a minimum, the longer term corrective measures should include rewiring the indicating light as shown in Figure 1 provided the light is readily visible to the control room operator. If not, failures of the neutral position contacts should be annunicated in the control room.

A report addressing the above matters, including the number of failures detected during the first series of tests and the safety-related systems involved, shall be submitted to the director of the appropriate NRC regional office within forty-five (45) days of the date of this bulletin. A copy of the report shall be forwarded to the Director, Division of Reactor Operations Inspection, Office of Inspection and Enforcement, Nuclear Regulatory Commission, Washington, D. C. 20555.

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

Enclosure:
Figure 1

EXISTING INDICATING LIGHT CIRCUIT (TYPICAL)



PROPOSED REWIRING OF INDICATING LIGHT CIRCUIT (TYPICAL)

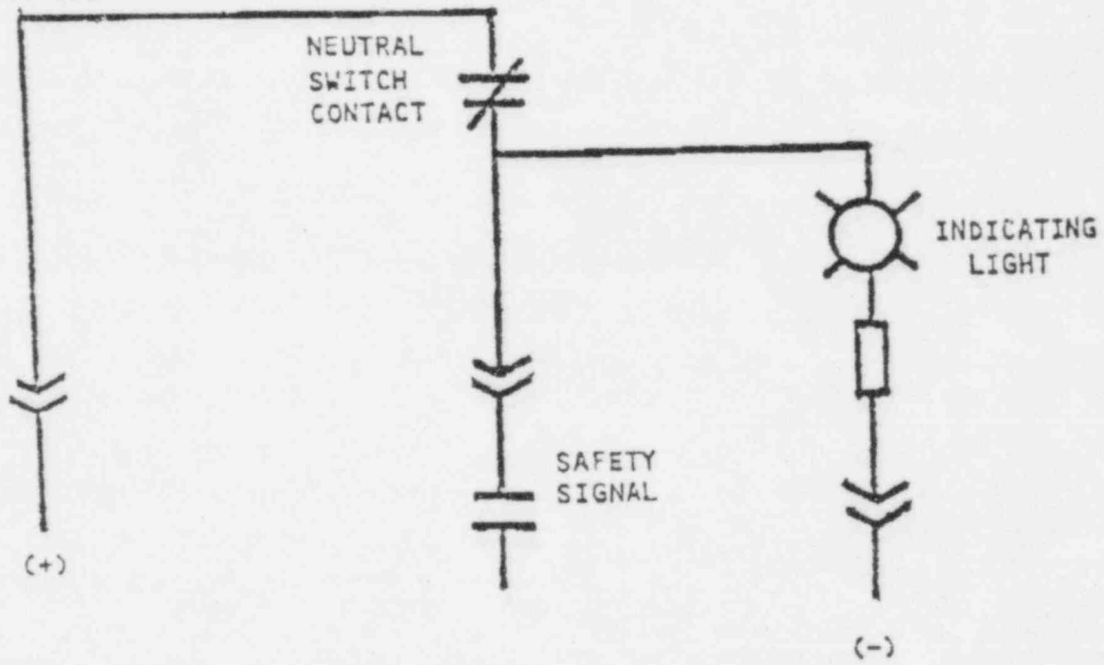


FIGURE 1

REWIRING OF INDICATING LIGHT CIRCUIT OF W-2 SWITCHES

AS RECOMMENDED BY WESTINGHOUSE TECHNICAL BULLETIN NSD-TB-80-9

NRC FORM 366 (7-77)

Updated Report - Previous Report Date: 6-13-80

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT

CONTROL BLOCK: (1) (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

0 1	I L Z I S 1 (2)	LICENSEE CODE	0 0 - 0 0 0 0 0 - 0 0 (3)	LICENSE NUMBER	4 1 1 1 1 (4)	LICENSE TYPE	(5)	CAT

CON'T 0 1	REPORT SOURCE	L (6)	0 5 0 0 0 2 9 5 (7)	DOCKET NUMBER	0 5 1 5 8 0 (8)	EVENT DATE	0 6 1 8 8 0 (9)	REPORT DATE

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

0 2 During power operation while performing PT-10, Safeguards Actuation Tests

0 3 1A service water pump failed to start from train A of Safeguards. The

0 4 pump was started from the control board satisfactorily. Re-test was

0 5 immediately attempted and completed satisfactorily from train A and B of

0 6 Safeguards. On 6/14/80 this was reported to the NRC under 10CFR21.

0 7

0 8

	SYSTEM CODE	CAUSE CODE	CAUSE SUBCODE	COMPONENT CODE	COMP. SUBCODE	VALVE SUBCODE
0 9	W A (11)	B (12)	B (13)	C K T B R K (14)	E (15)	Z (16)

(17) LER/RO REPORT NUMBER	EVENT YEAR		SEQUENTIAL REPORT NO.		OCCURRENCE CODE	REPORT TYPE		REVISION NO.
	8 0	—	0 2 4	/	9 9	X	—	1

ACTION TAKEN	FUTURE ACTION	EFFECT ON PLANT	SHUTDOWN METHOD	HOURS (22)	ATTACHMENT SUBMITTED	NPRD-4 FORM SUB.	PRIME COMP. SUPPLIER	COMPONENT MANUFACTURER
X (18)	F (19)	Z (20)	Z (21)	0 0 0 0	Y (23)	Y (24)	N (25)	W 1 2 1

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

1 0 After circuit was proved operable a follow up investigation revealed

1 1 Westinghouse Type W-2 switch contacts used in ESF component actuation

1 2 circuits were making intermittent contact. The root cause could not be

1 3 determined due to the random nature of the failure. All switch contacts

1 4 have been verified closed. Permanent modifications are being evaluated.

	FACILITY STATUS	% POWER	OTHER STATUS (30)	METHOD OF DISCOVERY	DISCOVERY DESCRIPTION (32)
1 5	E (28)	1 0 0 (29)	NA	C (31)	Engineer Observation

	ACTIVITY RELEASED	CONTENT OF RELEASE	AMOUNT OF ACTIVITY (35)	LOCATION OF RELEASE (36)
1 6	Z (33)	Z (34)	NA	NA

PERSONNEL EXPOSURES

	NUMBER	TYPE	DESCRIPTION (39)
1 7	0 0 0 (37)	Z (38)	NA

PERSONNEL INJURIES

	NUMBER	DESCRIPTION (41)
1 8	0 0 0 (40)	NA

LOSS OF OR DAMAGE TO FACILITY (43)

	TYPE	DESCRIPTION
1 9	Z (42)	NA

PUBLICITY

	ISSUED	DESCRIPTION (45)	NRC USE ONLY
2 0	N (44)	NA	

8006300412

NAME OF PREPARER: N. R. Kurth PHONE: 312-746-2084 X349

ATTACHMENT TO LER

NO. 80-24/99 X-1

COMMONWEALTH EDISON CO.

ZION GENERATING STATION

50-295

The failure of the 1A Service Water Pump during testing precipitated an investigation of the actuating circuit for this particular pump. The testing revealed a random failure mode for the Westinghouse Type W-2 Control Switch which caused the closed auto start contact to be open intermittently. These switches are used in many of the ESF Components' Circuitry and the failure of the auto start contact could prohibit component auto start on a safeguards actuation signal. Therefore the NRC was notified of a safety significant defect in the Westinghouse Type W-2 Control Switch under the requirements of 10CFR21.21. Voltage measurements were made to verify the contacts were in fact closed on the operating unit. All W-2 switch contacts on the unit in refueling will be verified prior to startup. Permanent modifications are being evaluated to correct the problem.

The following information is provided as required by 10CFR21.21.b.3:

i. Name and address of the individual or individuals informing the Commission.

Larry Soth, Assistant Superintendent, Zion Generating Station.
101 Shiloh Blvd
Zion, Illinois 60099

ii. Identification of the facility, the activity, or the basic component supplied for such facility or such activity within the United States which fails to comply or contains a defect.

Westinghouse Type W-2 Control Switch with spring return to neutral position.

iii. Identification of the firm constructing the facility or supplying the basic component which fails to comply or contains a defect.

Westinghouse Electric Company (Electrical Division)

iv. Nature of the defect or failure to comply and the safety hazard which is created or could be created by such defect or failure to comply.

The auto start closed contact has been observed to fail open when the switch is in the neutral or auto start position. This failure could cause the respective piece of ESF equipment controlled by the switch to fail to auto start on a safety injection signal.

v. The date on which the information of such defect or failure to comply was obtained.

6/13/80

vi. In the case of a basic component which contains a defect or fails to comply, the number and location of all such components in use at, supplied for, or being supplied for one or more facilities or activities subject to the regulations in this part.

There are presently 29 switches per unit in ESF circuits at Zion Station and 7 in the station storeroom. No new switches are presently on order.

vii. The corrective action which has been, is being, or will be taken; the name of the individual or organization responsible for the action; and the length of time that has been or will be taken to complete the action.

All switches on the operating unit in ESF circuits have been tested to show the contact to be presently closed. 13 of the 29 switches on the unit in refueling have been tested and the remaining 16 switches will be tested prior to startup. Modifications are being evaluated for permanent solution to the problem by Commonwealth Edison Company and Westinghouse Electric Corporation. Modifications will be implemented expeditiously.

viii. Any advice related to the defect or failure to comply about the facility, activity, or basic component that has been, is being, or will be given to purchasers or licensees.

Commonwealth Edison Company is presently awaiting written results of the Westinghouse management evaluation and recommended solution.

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 2728, Pittsburgh, PA 15230

Subject	Number
W-2 Switches (with spring return to neutral)	NSD-TB-80-9 (Rev. 1)
System(s)	Date
Electrical Control	2/16/81
Affected Plants	S.O.(s)
All Sites	385
References	Sheet 1 Of 2
NSD TB-73-26, & initial issue of this bulletin, dated 7/18/80	

BACKGROUND INFORMATION

During monthly operational testing of the safeguards system at an operating nuclear plant, intermittent W-2 switch operation was discovered in the neutral (auto) position Investigations revealed that the intermittent operation resulted when the switch is returned from the eleven or one o'clock position to the neutral (auto) position. The matter was reported to the Nuclear Regulatory Commission on June 18, 1980. At the same time, the initial issue of this Bulletin presented preliminary Westinghouse recommendat,

W Switchgear Division, the manufacturer, has completed a thorough evaluation of the W-2 switch with spring return to neutral (auto), and concluded that no generic failure mechanism exists. This conclusion has been confirmed by independent tests at the W Research Laboratories. The intermittent contact closure reported above was a random occurrence. The RECOMMENDED ACTION previously provided by Westinghouse in the initial issue of this Bulletin is modified as indicated below. These actions meet the minimum requirements recommended by NRC Bulletin 80-20 of July 31, 1980.

RECOMMENDED ACTION

1. All plants should test all safety-related contacts of the W-2 switches (with spring return to neutral position) in the neutral position.

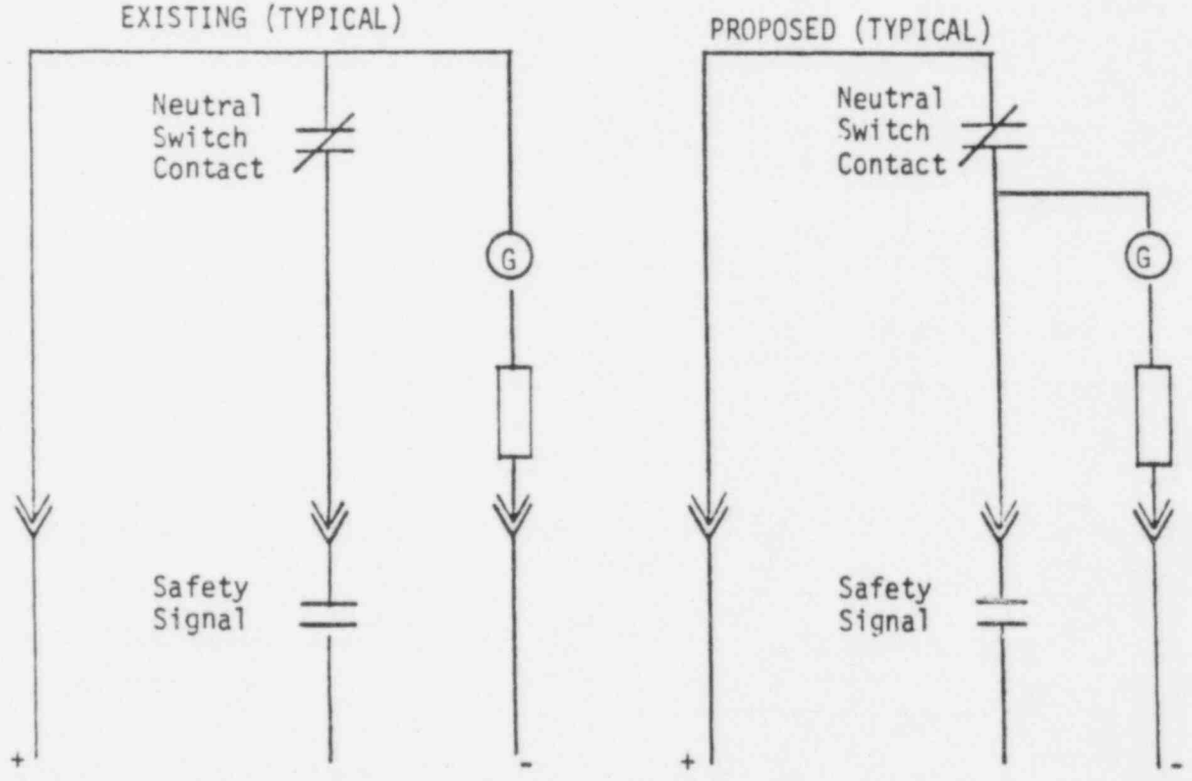
2. These tests should be repeated following each subsequent use (removal from the neutral position) of the switch, and should be done either at normal operating voltage at the contacts, or at least 24 VDC.

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

Originator	Approval
W H Furfari	
W. H. Furfari	J. R. Terry, Manager
Electric Service	Electric Service

WESTINGHOUSE FORM 55378

As an alternative to these periodic tests, a permanent resolution of any tendencies to intermittent contact continuity is to wire the existing breaker green light indicator in series with the neutral position safety-related switch contacts (See Sketch). In those instances where no indicating lights exist, a lamp drawing a minimum of 30 milliamperes D.C. should be added. This current provides for breakdown of contact film contaminents (fritting) so that no safety circuit relaying on contact continuity can fall into a degraded condition. Green light indication will now confirm closure of the safety-related switch contacts, and this indication should be checked after each switch operation.



TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
5N 157B Lookout Place

November 19, 1985

Mr. James Stewart
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mail Stop 359 EW/W

Dear Mr. Stewart

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2 - OFFICE OF INSPECTION AND ENFORCEMENT - BULLETIN 80-20 - FAILURES OF WESTINGHOUSE TYPE W-2 SPRING RETURN-TO-NEUTRAL CONTROL SWITCHES - SUPPLEMENTAL INFORMATION

As discussed in your recent telephone conversation with Ralph Shell, we are providing a copy of the August 5, 1981 Westinghouse letter describing to us the two options available for correction of the problems with the type W-2 switches.

If there are any question, please get in touch with R. H. Shell at FTS 858-2688.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

J. W. Hufham

J. W. Hufham, Manager
Licensing and Risk Protection

Enclosure

-345-05
345-05
95-29-

NAR

820827D[illegible]191

(2)

Westinghouse Electric Corporation

Water Reactor Divisions

Nuclear Commercial Operations Division

Box 355
Pittsburgh Pennsylvania 15230

AUG 13 '81

JAF CDW	DRAFT REPLY	COM COPY	INFO COPY	DUE DATE
[illegible] W [illegible]		1		9/4
[illegible]				
M.B W1002[illegible]				
HNC 249A HB[illegible]				
[illegible]				
	X		JFC	
[illegible]				9/11
EWC		1		9/4

August 5, 1981

TVA Contract Nos. [illegible]919
and 71C62-54114-1

TVA-8319
WAT-D-4525

File: 16.0

Mr. J. A. Raulston
Chief Nuclear Engineer
TENNESSEE VALLEY AUTHORITY
400 Commerce Avenue, W10 C126
Knoxville, Tennessee 37902

DLHill X-4184

N.A.R.
[illegible] 9/27/82

08 12 623

Dear Mr. Raulston:

TENNESSEE VALLEY AUTHORITY
SEQUOYAH AND WATTS BAR NUCLEAR PLANTS
UNIT NUMBERS 1 AND 2

W-2 Switch - Punch List Item 12-395-05

The purpose of this letter is to review and document the Westinghouse position on the W-2 switch used in safety related applications at Sequoyah and Watts Bar and many other Westinghouse designed nuclear facilities.

Following the reported intermittent behavior at the Zion station, W conducted a thorough investigation of similar W-2 switches in service at the time of failure at Zion, switches mounted at the Byron Units and switches in inventory at both stations.

The results of the testing proved that there was no common mode failure mechanism at work in the W-2 switches. The failures induced in the test samples were random in nature and were attributable to dirt, sulfide on contact services and plastic debris from manufacture.

Westinghouse then recommended to our customers and the NRC that the lamp, previously recommended, be maintained in service with the subject contact to assure the operator that the contact is capable of carrying current.

In summary, Westinghouse has confined through the testing that the switch is adequate for the service intended, internal contaminants could produce switch malfunctions and there are no common mode failure mechanisms. Westinghouse has revised the switch manufacturing process to include additional cleaning steps to reduce internal contamination during assembly.

NEB '820803 992

FILE

N2M/N3M-2-X

ADVANCE COPY OF THIS
LETTER SENT TO SWP.

TVA has two options:

1) To wire in the monitoring lamp for assurance of contact continuity

-or-

2) To purchase switches manufactured to the new manufacturing process for additional margin.

If Westinghouse can be of any further assistance, please call.

Very truly yours,

WESTINGHOUSE ELECTRIC CORPOR

J. L. Tain, Manager
Tennessee Valley Author
Projects

/rcc

J. A. Raulston, 3L

cc: R. E. Lyman. 1L
S. A. Moser, 1L
B. Wade, 1L
L. M. Mills, 1L

APPENDIX B

Documentation of Bulletin Closeout

TABLE B.1 BULLETIN CLOSEOUT STATUS

Facility	Utility	Docket	Facility Status	NRC Region	Utility Response Date	Inspection Report and Date	Closeout Status and Criterion
Arkansas 1	AP&L	50-313	OL	IV	09-09-80		Closed 2
Arkansas 2	AP&L	50-368	OL	IV	09-09-80		Closed 2
Bailly 1	NIPSCO	50-367	CD	III	08-11-80		Closed 1
Beaver Valley 1	DLC	50-334	OL	I	08-18-80	80-25(12-05-80)	Closed 2
Beaver Valley 2	DLC	50-412	CP	I	09-19-80	82-11(10-25-82)	Closed 2
Bellefonte 1	TVA	50-438	CP	II	09-16-80	82-14(06-15-82)	Closed 3
					12-12-80		
					04-02-81		
					08-13-81		
					11-09-81		
Bellefonte 2	TVA	50-439	CP	II	09-16-80	82-14(06-15-82)	Closed 3
					12-12-80		
					04-02-81		
					08-13-81		
					11-09-81		
Big Rock Point 1	CPC	50-155	OL	III	08-15-80	80-10(09-25-80)	Closed 2
Braidwood 1	CECO	50-456	CP	III	07-23-80	85020(04-30-85)	Closed 4
					09-15-80		
					01-09-81		
					04-10-81		
					04-30-81		
					08-29-84		
Braidwood 2	CECO	50-457	CP	III	07-23-80	85021(04-30-85)	Closed 4
					09-15-80		
					01-09-81		
					04-10-81		
					04-30-81		
					08-29-84		
Browns Ferry 1	TVA	50-259	OL	II	09-12-80	81-35(12-18-81)	Closed 2
Browns Ferry 2	TVA	50-260	OL	II	09-12-80	81-35(12-18-81)	Closed 2
Browns Ferry 3	TVA	50-296	OL	II	09-12-80	81-35(12-18-81)	Closed 2
Brunswick 1	CP&L	50-325	OL	II	08-19-80		Closed 2
Brunswick 2	CP&L	50-324	OL	II	08-19-80		Closed 2

See notes at end of table.

TABLE B.1 (contd.)

Facility	Utility	Docket	Facility Status	NRC Region	Utility Response Date	Inspection Report and Date	Closeout Status and Criterion
Byron 1	CECO	50-454	OL	III	07-23-80 09-15-80 01-09-81 04-10-81 04-30-81 08-29-84	84-69(10-10-84)	Closed 4
Byron 2	CECO	50-455	CP	III	07-23-80 09-15-80 01-09-81 04-10-81 04-30-81 08-29-84	84-47(10-10-84)	Closed 4
Callaway 1	UE	50-483	OL	III	09-09-80	81-17(08-13-81)	Closed 2
Callaway 2	UE	50-486	CD	III	09-09-80		Closed 1
Calvert Cliffs 1	BG&E	50-317	OL	I	08-21-80	80-26(02-11-81)	Closed 2
Calvert Cliffs 2	BG&E	50-318	OL	I	08-21-80	80-22(02-11-81)	Closed 2
Catawba 1	DUPCO	50-413	OL	II	08-20-80		Closed 2
Catawba 2	DUPCO	50-414	CP	II	08-20-80		Closed 2
Cherokee 1	DUPCO	50-491	CD	II	08-14-80		Closed 1
Cherokee 2	DUPCO	50-492	CD	II	08-14-80		Closed 1
Cherokee 3	DUPCO	50-493	CD	II	08-14-80		Closed 1
Clinton 1	IP	50-461	CP	III	09-16-80	81-11(06-19-81)	Closed 2
Clinton 2	IP	50-462	CHI	III	09-16-80		Closed 1
Comanche Peak 1	TUGCO	50-445	CP	IV	08-29-80 11-19-80 05-07-81 08-04-81 10-07-81 12-09-81	84-22(10-02-84)	Closed 4

See notes at end of table.

TABLE B.1 (contd.)

Facility	Utility	Docket	Facility Status	NRC Region	Utility Response Date	Inspection Report and Date	Closeout Status and Criterion
Comanche Peak 2	TUGCO	50-446	CP	IV	08-29-80 11-19-80 05-07-81 08-04-81 10-07-81 12-09-81	84-07(10-02-84)	Closed 4
Cook 1	IMECO	50-315	OL	III	09-08-80	80-13(10-22-80)	Closed 2
Cook 2	IMECO	50-316	OL	III	09-08-80	80-11(10-22-80)	Closed 2
Cooper Station	NPPD	50-298	OL	IV	08-06-80	80-12(08-29-80)	Closed 2
Crystal River 3	FP	50-302	OL	II	08-05-80		Closed 2
Davis-Besse 1	TECO	50-346	OL	III	09-12-80	80-25(10-14-80)	Closed 2
Diablo Canyon 1	PG&E	50-275	OL	V	09-22-80	81-06(04-03-81)	Closed 2
Diablo Canyon 2	PG&E	50-323	OL	V	09-22-80	81-06(04-03-81)	Closed 2
Dresden 1	CECO	50-010	SDI	III	09-15-80		Closed 1
Dresden 2	CECO	50-237	OL	III	09-15-80	84-03(04-10-84)	Closed 2
Dresden 3	CECO	50-249	OL	III	09-15-80	84-02(04-10-84)	Closed 2
Duane Arnold	IELPCO	50-331	OL	III	08-29-80		Closed 2
Farley 1	APCO	50-348	OL	II	09-16-80 09-24-80 12-18-81	83-31(01-10-84)	Closed 4
Farley 2	APCO	50-364	OL	II	09-16-80 09-24-80 10-28-80 12-18-81	83-29(01-10-84)	Closed 4
Fermi 2	DECO	50-341	OL	III	09-15-80		Closed 2
FitzPatrick	PASNY	50-333	OL	I	08-12-80	81-06(03-23-81)	Closed 2
Forked River	JCP&L	50-363	CD	I			Closed 1
Fort Calhoun 1	OPPD	50-285	OL	IV	08-08-80	81-14(07-23-81)	Closed 2
Fort St. Vrain	PSCC	50-267	OL	IV	09-18-80		Closed 2
Ginna	RG&E	50-244	OL	I	09-10-80 11-17-80	81-11(07-31-81)	Closed 4
Grand Gulf 1	MP&L	50-416	OL	II	09-17-80 10-15-80		Closed 2

See notes at end of table.

TABLE B.1 (contd.)

Facility	Utility	Docket	Facility Status	NRC Region	Utility Response Date	Inspection Report and Date	Closeout Status and Criterion
Grand Gulf 2	MP&L	50-417	CHI	II	09-17-80 10-15-80		Closed 1
Haddam Neck	CYAPCO	50-213	OL	I	09-15-80	85-13(09-05-85)	Closed 4
Harris 1	CP&L	50-400	CP	II	09-12-80		Closed 2
Harris 2	CP&L	50-401	CHI	II	09-12-80		Closed 1
Harris 3	CP&L	50-402	CHI	II	09-12-80		Closed 1
Harris 4	CP&L	50-403	CHI	II	09-12-80		Closed 1
Hartsville A-1	TVA	50-518	CD	II	09-12-80		Closed 1
Hartsville A-2	TVA	50-519	CD	II	02-10-81		Closed 1
Hartsville B-1	TVA	50-520	CD	II	06-15-81		Closed 1
Hartsville B-2	TVA	50-521	CD	II	08-14-81 10-30-81 02-19-82		Closed 1
Hatch 1	GPC	50-321	OL	II	09-12-80		Closed 2
Hatch 2	GPC	50-366	OL	II	09-12-80		Closed 2
Hope Creek 1	PSE&G	50-354	CP	I	09-03-80 11-14-80 12-23-80 11-04-83		Closed 2
Hope Creek 2	PSE&G	50-355	CHI	I	09-03-80 11-14-80 12-23-80 11-04-83		Closed 1
Humboldt Bay 3	PG&E	50-133	SDI	V	09-08-80		Closed 1
Indian Point 1	ConEd	50-003	SDI	I	09-15-80		Closed 1
Indian Point 2	ConEd	50-247	OL	I	09-15-80 03-03-81	85-07(04-22-85)	Closed 4
Indian Point 3	PASNY	50-286	OL	I	09-12-80 02-10-81 03-03-81 06-24-82	82-03(03-19-82) 85-24(12-12-85)	Closed 4
Jamesport 1	LILCO	50-516	CD	I	09-16-80		Closed 1
Jamesport 2	LILCO	50-517	CD	I	09-16-80		Closed 1

See notes at end of table.

TABLE B.1 (contd.)

Facility	Utility	Docket	Facility Status	NRC Region	Utility Response Date	Inspection Report and Date	Closeout Status and Criterion
Kewaunee	WPS	50-305	OL	III	09-19-80	80-28(01-15-81)	Closed 4
La Crosse	DPC	50-409	OL	III	08-08-80		Closed 2
LaSalle 1	CECO	50-373	OL	III	09-15-80		Closed 2
LaSalle 2	CECO	50-374	OL	III	09-15-80	83-08(04-06-83)	Closed 2
Limerick 1	PECO	50-352	OL	I	09-10-80	84-01(02-17-84)	Closed 2
Limerick 2	PECO	50-353	CP	I	09-10-80	84-02(02-17-84)	Closed 2
Maine Yankee	MYAPCO	50-309	OL	I	09-04-80		Closed 2
Marble Hill 1	PSI	50-546	CHI	III	09-15-80		Closed 1
Marble Hill 2	PSI	50-547	CHI	III	09-15-80		Closed 1
McGuire 1	DUPCO	50-369	OL	II	08-20-80	80-33(12-11-80)	Closed 2
McGuire 2	DUPCO	50-370	OL	II	08-20-80	80-18(12-11-80)	Closed 2
Midland 1	CPC	50-329	CHI	III	09-22-80		Closed 1
Midland 2	CPC	50-330	CHI	III	09-22-80		Closed 1
Millstone 1	NNECO	50-245	OL	I	09-15-80		Closed 2
Millstone 2	NNECO	50-336	OL	I	09-15-80		Closed 2
Millstone 3	NNECO	50-423	CP	I	09-15-80	82-02(03-11-82)	Closed 2
Monticello	NSP	50-263	OL	III	09-12-80	80-20(01-16-81)	Closed 2
Nine Mile Point 1	NMP	50-220	OL	I	09-11-80		Closed 2
Nine Mile Point 2	NMP	50-410	CP	I	09-11-80 10-30-80		Closed 2
North Anna 1	VEPCO	50-338	OL	II	09-15-80	82-40(02-07-83)	Closed 3
North Anna 2	VEPCO	50-339	OL	II	09-15-80	82-40(02-07-83)	Closed 3
North Anna 3	VEPCO	50-404	CD	II	08-27-80 09-01-82		Closed 1
North Anna 4	VEPCO	50-405	CD	II	08-27-80 09-01-82		Closed 1
Oconee 1	DUPCO	50-269	OL	II	08-14-80	80-32(11-03-80)	Closed 2
Oconee 2	DUPCO	50-270	OL	II	08-14-80	80-28(11-03-80)	Closed 2
Oconee 3	DUPCO	50-287	OL	II	08-14-80	80-25(11-03-80)	Closed 2
Oyster Creek 1	JCP&L	50-219	OL	I	08-28-80		Closed 2
Palisades	CPC	50-255	OL	III	08-12-80	80-21(11-21-80)	Closed 2

See notes at end of table.

TABLE B.1 (contd.)

Facility	Utility	Docket	Facility Status	NRC Region	Utility Response Date	Inspection Report and Date	Closeout Status and Criterion
Palo Verde 1	APSCO	50-528	OL	V	09-15-80	83-08(03-30-83)	Closed 2
Palo Verde 2	APSCO	50-529	CP	V	09-15-80	83-04(03-30-83)	Closed 2
Palo Verde 3	APSCO	50-530	CP	V	09-15-80	83-03(03-30-83)	Closed 2
Peach Bottom 2	PECO	50-277	OL	I	09-10-80	84-26(09-21-84)	Closed 3
Peach Bottom 3	PECO	50-278	OL	I	09-10-80	84-22(09-21-84)	Closed 3
Perkins 1	DUPCO	50-488	CD	II	08-14-80		Closed 1
Perkins 2	DUPCO	50-489	CD	II	08-14-80		Closed 1
Perkins 3	DUPCO	50-490	CD	II	08-14-80		Closed 1
Perry 1	CEI	50-440	CP	III	09-04-80		Closed 2
Perry 2	CEI	50-441	CP	III	09-04-80		Closed 2
Phipps Bend 1	TVA	50-553	CD	II	09-12-80		Closed 1
Phipps Bend 2	TVA	50-554	CD	II	02-10-81 06-15-81 08-14-81 10-30-81 02-19-82		Closed 1
Pilgrim 1	BECO	50-293	OL	I	08-08-80		Closed 2
Point Beach 1	WEPCO	50-266	OL	III	09-16-80	80-20(12-17-80)	Closed 4
Point Beach 2	WEPCO	50-301	OL	III	09-16-80	80-20(12-17-80)	Closed 4
Prairie Island 1	NSP	50-282	OL	III	09-12-80 12-11-80	82-05(04-19-82)	Closed 4
Prairie Island 2	NSP	50-306	OL	III	09-12-80 12-11-80	82-05(04-19-82)	Closed 4
Quad Cities 1	CECO	50-254	OL	III	09-15-80		Closed 2
Quad Cities 2	CECO	50-265	OL	III	09-15-80		Closed 2
Rancho Seco 1	SMUD	50-312	OL	V	09-15-80	80-27(10-22-80)	Closed 3
River Bend 1	GSU	50-458	LPTL	IV	09-19-80		Closed 2
River Bend 2	GSU	50-459	CD	IV	09-19-80		Closed 1
Robinson 2	CP&L	50-261	OL	II	08-21-80 09-30-80	80-29(11-10-80)	Closed 2
Salem 1	PSE&G	50-272	OL	I	09-05-80 10-14-80	80-23(12-03-80)	Closed 3
Salem 2	PSE&G	50-311	OL	I	09-05-80 10-14-80	80-18(12-03-80)	Closed 3

See notes at end of table.

TABLE B.1 (contd.)

Facility	Utility	Docket	Facility Status	NRC Region	Utility Response Date	Inspection Report and Date	Closeout Status and Criterion
San Onofre 1	SCE	50-206	OL	V	09-05-80 11-18-81	81-41(12-30-81)	Closed 4
San Onofre 2	SCE	50-361	OL	V	09-11-80	81-07(05-22-81)	Closed 2
San Onofre 3	SCE	50-362	OL	V	09-11-80	81-02(05-22-81)	Closed 2
Seabrook 1	PSNH	50-443	CP	I	08-22-80	82-04(07-07-82)	Closed 2
Seabrook 2	PSNH	50-444	CP	I	08-22-80	82-04(07-07-82)	Closed 2
Sequoyah 1	TVA	50-327	OL	II	09-16-80 12-12-80 04-02-81 08-13-81 11-09-81 01-20-83	81-09(03-19-81)	Open
Sequoyah 2	TVA	50-328	OL	II	09-16-80 12-12-80 04-02-81 08-13-81 11-09-81 01-20-83	81-08(03-19-81)	Open
Shoreham	LILCO	50-322	LPTL	I	10-10-80	81-22(01-14-82)	Closed 2
South Texas 1	HL&P	50-498	CP	IV	09-09-80	81-32(11-12-81)	Closed 2
South Texas 2	HL&P	50-499	CP	IV	09-09-80	81-32(11-12-81)	Closed 2
St. Lucie 1	FPL	50-335	OL	II	09-12-80	80-36(01-29-81)	Closed 3
St. Lucie 2	FPL	50-389	OL	II	09-15-80 11-13-80	80-16(12-15-80)	Closed 3
Sterling	RG&E	50-485	CD	I			Closed 1
Summer 1	SCE&G	50-395	OL	II	09-11-80	81-04(03-09-81)	Closed 2
Surry 1	VEPCO	50-280	OL	II	09-15-80	84-09(03-23-84)	Closed 2
Surry 2	VEPCO	50-281	OL	II	09-15-80	84-09(03-23-84)	Closed 2
Susquehanna 1	PP&L	50-387	OL	I	09-23-80 11-03-80	82-08(04-08-82)	Closed 3
Susquehanna 2	PP&L	50-388	OL	I	09-23-80 11-03-80	82-04(05-19-82)	Closed 3
TMI 1	Met-Ed	50-289	OL	I	09-02-80	80-29(05-12-81)	Closed 2
TMI 2	Met-Ed	50-320	SDI	I	09-30-80		Closed 1

See notes at end of table.

TABLE B.1 (contd.)

Facility	Utility	Docket	Facility Status	NRC Region	Utility Response Date	Inspection Report and Date	Closeout Status and Criterion
Trojan	PGE	50-344	OL	V	09-15-80	80-25(11-03-80)	Closed 2
Turkey Point 3	FPL	50-250	OL	II	09-16-80 03-31-81	84-14(06-15-84)	Closed 4
Turkey Point 4	FPL	50-251	OL	II	09-16-80 03-31-81	84-14(06-15-84)	Closed 4
Vermont Yankee 1	VYNP	50-271	OL	I	08-22-80		Closed 2
Vogtle 1	GPC	50-424	CP	II	09-16-80	81-15(01-28-82)	Closed 2
Vogtle 2	GPC	50-425	CP	II	09-16-80	81-15(01-28-82)	Closed 2
WNP 1	WPPSS	50-460	CP	V	09-08-80	80-13(11-21-80)	Closed 2
WNP 2	WPPSS	50-397	OL	V	09-15-80	81-02(02-19-81)	Closed 2
WNP 3	WPPSS	50-508	CP	V	10-01-80	82-03(02-26-82)	Closed 3
WNP 4	WPPSS	50-513	CHI	V	09-08-80		Closed 1
WNP 5	WPPSS	50-509	CHI	V	10-01-80		Closed 1
Waterford 3	LP&L	50-382	OL	IV	09-09-80 10-15-80		Closed 2
Watts Bar 1	TVA	50-390	CP	II	09-16-80 12-12-80 04-02-81 08-13-81 11-09-81 06-02-82 03-30-83 11-19-85	83-46(11-22-83)	Closed 4
Watts Bar 2	TVA	50-391	CP	II	09-16-80 12-12-80 04-02-81 08-13-81 11-09-81 06-02-82 03-30-83 11-19-85	83-35(11-22-83)	Closed 4
Wolf Creek 1	KG&E	50-482	OL	IV	09-09-80	84-01(02-14-84)	Closed 2

See notes at end of table.

TABLE B.1 (contd.)

Facility	Utility	Docket	Facility Status	NRC Region	Utility Response Date	Inspection Report and Date	Closeout Status and Criterion
Yankee-Rowe 1	YAECO	50-029	OL	I	08-29-80	80-20(01-28-81)	Closed 2
Yellow Creek 1	TVA	50-566	CHI	II	09-16-80		Closed 1
Yellow Creek 2	TVA	50-567	CHI	II	12-12-80 04-02-81 08-13-81 11-09-81		Closed 1
Zimmer 1	CG&E	50-358	CD	III	09-02-80		Closed 1
Zion 1	CECO	50-295	OL	III	09-15-80	80-20(11-28-80)	Closed 4
Zion 2	CECO	50-304	OL	III	09-15-80	80-21(11-28-80)	Closed 4

Notes:

1. Facility Status is based on References 1, 2, and 3, Page B-10.

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 4 for Bulletin Closeout Criteria.

REFERENCES

1. United States Nuclear Regulatory Commission, Licensed Operating Reactors, Status Summary Report, Data as of 09-30-85, NUREG-0020, Volume 9, Number 10, October 1985.

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 Regulations, Energy, Title 10, Chapter 1, January 1, 1985, cited as 10CFR 0.735-1.

APPENDIX C

Proposed Followup Item

Region II

Sequoyah 1,2

IE inspection report 81-09/81-08 of 03-19-81 holds the bulletin open. Open status was confirmed by NRC/IE in letter to Parameter, Inc. (R.S. Dean) from R.L. Baer (IE) of February 12, 1986. Closeout is to be included in a future inspection report.

APPENDIX D

TABLE D.1 IDENTIFICATION OF AFFECTED SYSTEMS, NUMBER OF TYPE W-2 SWITCHES AND NUMBER OF FAILURES

Facility	Affected Systems	Number of Switches: Used	Failed
Braidwood 1,2	Primary Containment HVAC	16	
	Auxiliary Feedwater	4	
	Essential Service Water	4	
	Component Cooling	8	
	Containment Spray	4	
	Safety Injection	4	
	Residual Heat Removal	4	
	Boron Thermal Regeneration	2	
	Chemical and Volume Control	6	
	Boric Acid Processing	2	
	Reactor Coolant	24	
	Main Steam	4	
	Diesel Generator Room Ventilation	4	
	Switchgear Room Ventilation	12	
	Containment Purge	4	
	Auxiliary Power	24	
	Diesel Generator	12	
	Auxiliary Building Ventilation	16*	
	Control Room Ventilation	6*	
	Chilled Water	4*	
	Essential Service Water	18*	
	Total	182	
Byron 1,2	Primary Containment HVAC	16	
	Auxiliary Feedwater	4	
	Essential Service Water	4	
	Component Cooling	8	
	Containment Spray	4	
	Safety Injection	4	
	Residual Heat Removal	4	
	Boron Thermal Regeneration	2	
	Chemical and Volume Control	6	
	Boric Acid Processing	2	
	Reactor Coolant	24	

See notes at end of table.

TABLE D.1 (contd)

Facility	Affected Systems	Number of Switches: Used	Failed
Byron 1,2 (contd)	Main Steam	4	
	Diesel Generator Room Ventilation	4	
	Switchgear Room Ventilation	12	
	Containment Purge	4	
	Auxiliary Power	24	
	Diesel Generator	12	
	Auxiliary Building Ventilation	16*	
	Control Room Ventilation	6*	
	Chilled Water	4*	
	Essential Service Water	18*	
	Total	182	
Comanche Peak 1,2	Electrical System (alternate offsite and onsite 6.9KV breakers)	8	
	Service Water	4	
	Safety Injection	8	
	Containment Spray	12	
	Containment Vent	2*	
	Component Cooling Water	4	
	Safety Chiller Water	4	
	Residual Heat Removal	4	
	Chemical and Volume Control	4	
	Main Steam Reheat	8	
	Main Feedwater	24	
	Auxiliary Feedwater	4	
	Safeguard and Electrical Area Vent	48	
	Auxiliary Building and Fuel Building Vent	8	
	Uncontrolled and Miscellaneous Areas Vent	8	
	Primary Plant Vent	2*	
	Control Room and Facilities Vent	20*	
	Total	172	
Farley 1,2	Electrical	14	
	Reactor Trip	4	
	Total	18	

See notes at end of table.

TABLE D.1 (contd)

Facility	Affected Systems	Number of Switches: Used	Failed
Ginna	Safety Injection	4	
	Containment Spray	2	
	Component Cooling Water	2	
	Auxiliary Feedwater	2	
	Residual Heat Removal	2	
	Service Water	4	
	Containment Vent	4	
	Diesel Generator Supply	4	
	Total	24	
Haddam Neck	Containment Air Recirculation	4	
	Service Water	4	
	High Pressure Safety Injection	2	
	Low Pressure Safety Injection	2	
	Charging Pumps	2	
	Emergency Diesel Generators	2	
	Primary Water Transfer	2	
	Total	18	
Indian Point 2	Service Water	8	
	Component Cooling	3	
	Residual Heat Removal	2	
	Emergency Power Systems (includes MCC's)	10	
	Containment Recirculation	5	
	Safety Injection	4	
	Containment Spray	2	
	Auxiliary Feedwater	2	
	Recirculation Pumps	2	
	Total	38	0
Indian Point 3	Safety Injection	5	
	Auxiliary Coolant	5	
	Containment Spray	2	
	Containment Ventilation	5	
	Service Water	6	
	Feedwater	2	
	Electrical Distribution	13	
	Total	38	0

See notes at end of table.

TABLE D.1 (contd)

Facility	Affected Systems	Number of Switches: Used	Failed
Kewaunee	4150V Supply & Distribution Diesel Generators Component Cooling Containment Spray Residual Heat Removal Safety Injection Service Water Reactor Building Vent Feedwater & Auxiliary Feedwater Total	27	0
Point Beach 1,2	Residual Heat Removal	4	
	Containment Spray	4	
	Containment Cooling Fans	8	
	Service Water	6	
	Auxiliary Feedwater	2	
	Safety Injection	4	
	Component Cooling	4	
	Supply Breaker	4	
	Tie Breaker	2	
	Total	38	0
Prairie Island 1,2	(Not identified)	42	0
San Onofre 1	Safety Injection	3	0
Sequoyah 1,2	Main Steam including Generator Blowdown Main and Auxiliary Feedwater High-pressure Fire Protection Diesel-generator, Turbine, Auxiliary Control and Reactor Buildings Ventilation Control Building, Heating and Air Conditioning Auxiliary Building, Additional Equipment Building, and Fuel Handling, Heat and Air Conditioning Associated Electrical Systems Chemical and Volume Control Safety Injection Emergency Gas Treatment Essential Raw Cooling Water Reactor Coolant Component Cooling Containment Spray System Residual Heat Removal Total	130	0

See notes at end of table.

TABLE D.1 (contd)

Facility	Affected Systems	Number of Switches: Used	Failed
Turkey Point 3,4	Component Cooling Water	6	
	Safety Injection	8	
	Residual Heat Removal	4	
	Containment Spray	4	
	Intake Cooling Water	6	
	Startup Transformer Breaker	4	
	Load Center Feeder Breaker	8	
	Emergency Startup Transfer Breaker	2	
	Total	42	0
Watts Bar 1,2	Volume Control		
	Safety Injection		
	Emergency Gas Treatment		
	Residual Heat Removal		
	Containment Spray		
	Auxiliary Feedwater		
	Essential Raw Cooling Water		
	Ventilation		
	Air Conditioning		
	Reactor Coolant		
	Total	67	
Zion 1,2	Auxiliary Power		
	Component Cooling		
	Containment Spray		
	Auxiliary Feedwater		
	Residual Heat Removal		
	Reactor Ventilation		
	Safety Injection		
	Service Water		
	Volume Control		
	Total	47	0

Notes:

1. An affected system is a safety-related system containing a subject Type W-2 switch.

2. The information given in this table is required per Action Item 1 and the second last paragraph of IEB 80-20.

3. Blanks indicate information not given.

4. For twin units, numbers are totals for both units.

5. Switches common to twin units are identified with asterisks (*).

6. No failures were reported as a result of the testing required by the bulletin.

APPENDIX E

Abbreviations

AEPSCO	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
CD	Cancelled
CECO	Commonwealth Edison Company
CEI	Cleveland Electric Illuminating Company
CFR	Code of Federal Regulations
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
DECO	Detroit Edison Company
DLC	Duquesne Light Company
DPC	Dairyland Power Cooperative
DUPCO	Duke Power Company
FP	Florida Power Corporation
FPL	Florida Power & Light Company
GAO	Government Accounting Office
GPC	Georgia Power Company
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/IE)
JCP&L	Jersey Central Power and Light Company
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
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
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
NU	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
PSE&G	Public Service Electric and Gas Company
PSI	Public Service Indiana
PSNH	Public Service Company of New Hampshire
R	Region (NRC)
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
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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13 ABSTRACT (200 words or less)

On June 18, 1980, Commonwealth Edison Company submitted Licensee Event Report (LER) 50-295/80-24 to the NRC, describing a malfunction of a Westinghouse Type W-2 control switch important to safety at Zion Unit 1. On the same date, Westinghouse submitted a preliminary issue of Technical Bulletin NSD-TB-80-9 to the NRC on the subject switches. On July 31, 1980, IE Bulletin 80-20 was issued to all power plant licensees and permit holders, requiring them to take specific actions and report results. Evaluation of utility responses and NRC/IE inspection reports shows that the bulletin can be closed out per specific criteria for 122 (98%) of the 124 current facilities to which it was issued. A followup item for the remaining two facilities is proposed for use by NRC/IE, to ensure satisfactory completion of corrective action.

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