



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

AUG 27 1980

AEOD/E010

MEMORANDUM FOR: Harold R. Denton, Director  
Office of Nuclear Reactor Regulation

FROM: Carlyle Michelson, Director  
Office for Analysis and Evaluation of  
Operational Data

SUBJECT: TIE BREAKER BETWEEN REDUNDANT CLASS 1E BUSES -  
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

50-266

Based on a review of the enclosed Licensee Event Report (LER No. 80-005/03L-0 for Point Beach Unit 2) and subsequent clarification of the event by the licensee,\* it can be concluded that the design of Point Beach Nuclear Plant, Units 1 and 2, under certain conditions, allows manual interconnection of redundant electrical load groups and thereby parallels their standby power sources.

Further, the fact that it took the plant operators approximately five (5) weeks to discover that the electrical distribution system line-up was not in the proper configuration raises a possible generic concern regarding the adequacy of procedural and administrative controls. In this instance, the lack of procedures to include the monitoring of the status of the plant electrical distribution system during plant operation, through several shift changes, prevented the detection of the human error committed.

Each unit of Point Beach Nuclear Plant has tie breakers that interconnect redundant Class 1E buses; one between 4160V Class 1E buses and another between 480V Class 1E buses (see enclosed one line diagram). The tie breakers had been provided for flexibility in operation of the distribution system. They are designed to automatically open (when closed) upon loss of normal ac power supply to the buses. The control scheme of a tie breaker is such that it cannot be closed when both the normal feeder breakers to the buses are closed. Interlocks are provided that will prevent closure of a normal feeder breaker if the tie breaker is closed. Interlocks are also provided between the emergency diesel generator output breakers and the 4160V tie breaker that will prevent closure of the diesel generator breaker if the tie breaker is closed. All these design features insure that redundant power sources are not operated in parallel when redundant load groups are interconnected. However, the plant design does not prevent the closure of the 4160V tie breaker when the 4160V Class 1E buses are supplied power by the emergency diesel generators. This is contrary to the requirements of Position 4(d) of

\*Clarification was obtained by telephone conversations between the licensee, the project manager, and a staff member of AEOD.

Harold R. Denton

Regulatory Guide 1.6,\* which states that if manual connection of redundant load groups is possible, then at least one interlock should be provided to prevent parallel operation of standby power sources.

We believe that the design of the interconnection between redundant safety-related electrical load groups at Point Beach Nuclear Power Plant, Units 1 and 2, should be reviewed and modified, as required, to assure that it fully complies with the requirements of Regulatory Guide 1.6.

We also believe that the generic concern regarding procedural controls to reduce human errors could be addressed in the modification or development of procedures that will assure that at shift change-overs the plant operators who will be taking over control are fully aware of the plant status.

Original Signed by  
Carlyle Michelson

Carlyle Michelson, Director  
Office for Analysis and Evaluation  
of Operational Data

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\*Regulatory Guide 1.6, "Independence Between Redundant Standby (Onsite) Power Sources and Between Their Distribution Systems."

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 AUTHOR: NAME      AUTHOR AFFILIATION.  
 Wisconsin Electric Power Co.  
 RECIPIENT AFFILIATION  
 Region 3, Chicago, Office of the Director

SUBJECT: LER 80-005/03L-0: on 800609, during training walkdown of  
 safeguards electrical supply cabinets, noted that tie breaker  
 between 405 & 406 safeguards buses was shut, probably caused  
 by improper electrical lineup after loss of ac test.

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	NRC PDR	02	1	1	OP EX EVAL BR	3	3
	OP ASSESS BR		1	1	POWER SYS BR	1	1
	PPAS		1	1	PROC/TST REV BR	1	1
	QA 90		1	1	RAD ASSESS BR	1	1
	REACT SYS BR		1	1	REG FILE	01	1
	REL & RISK & BR		1	1	SFTY PROG EVAL	1	1
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Wisconsin Electric POWER COMPANY  
31 W. MICHIGAN, P.O. BOX 2046, MILWAUKEE, WI 53201

June 27, 1980

Mr. J. G. Keppler, Regional Director  
Office of Inspection and Enforcement,  
Region III  
U. S. NUCLEAR REGULATORY COMMISSION  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137

Dear Mr. Keppler:

DOCKET NO. 50-301  
POINT BEACH NUCLEAR PLANT UNIT 2  
LICENSEE EVENT REPORT NO. 80-005/03L-0

Enclosed is Licensee Event Report No. 80-005/03L-0, with an attachment which provides a description of an event reportable in accordance with Technical Specification 15.6.9.2.B.3, "Observed inadequacies in the implementation of administrative or procedural controls which threaten to cause reduction of degree of redundancy provided in reactor protection systems or engineered safety feature systems."

This event was originally reported in accordance with Technical Specification 15.6.9.2.A.6 and immediate notification per the "red phone" was made. After completing a thorough investigation of the event and its impact, it has been determined that the event did not require either a 24-hour written notification or "red phone" notification.

Very truly yours,

C. W. Fay, Director  
Nuclear Power Department

Enclosure

Copy to NRC Resident Inspector -  
Point Beach Nuclear Plant

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ADD 2  
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CONTROL BLOCK:                          ①

(PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

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LICENSEE CODE 14 LICENSE NUMBER 15 25 26 LICENSE TYPE JO 57 CAT 58

⑥ L ⑦ 6 0 5 0 0 0 3 0 1 ⑧ 7 0 6 0 9 8 1 0 ⑨ 5 0 6 2 7 8 1 0 ⑩

REPORT SOURCE 60 DOCKET NUMBER 64 69 EVENT DATE 74 75 REPORT DATE 80

DESCRIPTION AND PROBABLE CONSEQUENCES ⑩

At 1415 hours on 06-09-80, during a training walkdown of the safeguards electrical supply cabinets, it was noted that the tie breaker between the A05 and A06 safeguards buses was shut. This is an improper electrical lineup. In the event that the single breaker tying buses A05 and A06 together fails to open on a loss of AC, closure of both emergency Diesel generator output breakers would be prevented. This event is reportable per Technical Specification 15.6.9.2.B.3

⑪ E B ⑫ A ⑬ A ⑭ C K T B R K ⑮ A ⑯ Z

SYSTEM CODE 9 CAUSE CODE 11 CAUSE SUBCODE 12 COMPONENT CODE 13 COMP. SUBCODE 15 VALVE SUBCODE 20

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LER NO REPORT NUMBER 21 EVENT YEAR 22 SEQUENTIAL REPORT NO. 23 OCCURRENCE CODE 24 REPORT TYPE 25 REVISION NO. 26

⑳ X ㉑ Z ㉒ Z ㉓ 0 0 0 0 ㉔ Y ㉕ N ㉖ N ㉗ W I 2 0 ㉘

ACTION TAKEN 34 FUTURE ACTION 35 EFFECT ON PLANT 36 SHUTDOWN METHOD 37 HOURS 38 ATTACHMENT SUBMITTED 39 NRC FORM 306 40 PRIME COMP. SUPPLIER 41 COMPONENT MANUFACTURER 42 43 44 47

DESCRIPTION AND CORRECTIVE ACTIONS ⑳

The improper electrical lineup probably occurred after the loss of AC test conducted on 05-02-80 but prior to unit return to critical on 05-12-80. Upon discovery of the improper lineup, the correct lineup was promptly established. To prevent recurrence of this event, the breaker will be uniquely identified and a procedure change implemented.

⑳ E ㉑ 1 0 0 ㉒ N/A ㉓ A ㉔ Operator observation

FACILITY STATUS 26 % POWER 27 OTHER STATUS 28 METHOD OF DISCOVERY 29 DISCOVERY DESCRIPTION 30

⑳ Z ㉑ Z ㉒ N/A ㉓ N/A ㉔ N/A

ACTIVITY CONTENT 31 RELEASED OF RELEASE 32 AMOUNT OF ACTIVITY 33 LOCATION OF RELEASE 34

⑳ 0 0 0 ㉑ Z ㉒ N/A

PERSONNEL EXPOSURES 35 NUMBER 36 TYPE 37 DESCRIPTION 38

⑳ 0 0 0 ㉑ N/A

PERSONNEL INJURIES 39 NUMBER 40 DESCRIPTION 41

⑳ N/A

PROPERTY OR DAMAGE TO FACILITY 42 DESCRIPTION 43

⑳ 2 ㉑ Newspaper ㉒ 9-8-80 384 ㉓ C. W. Fav

ISSUED 44 DESCRIPTION 45 66 65 NRC USE ONLY 80

ATTACHMENT TO LICENSEE EVENT REPORT NO. 00-005/02L-0

Wisconsin Electric Power Company  
Point Beach Nuclear Plant Unit 2  
Docket No. 50-301

With the unit at 100% steady state power, it was noted at 1415 hours on June 9, 1980 that the safeguards buses were improperly energized. Instead of the A05 bus being independently supplied by the A03 bus, it was supplied by the A06 bus via the bus tie breaker. A05 and A06 are the two high voltage safeguards buses for the unit. The discovery of the improper electrical lineup was made during a training walk-down, and proper lineup was promptly restored following discovery of the improper lineup.

Shutting the tie breaker between the A05 and A06 buses threatened to cause a reduction in the degree of redundancy provided by engineered safety feature systems.

In order for the breaker to cause problems, the following sequence of events would have to occur. First, there would have to be a total loss of off-site power, that is all four tie lines would have to be knocked out of service. Then, the bus tie breaker would have to fail to open. This would be another component failure since the breaker is designed to open automatically on a loss of AC. At this point, the emergency diesel generators would not automatically phase to the Unit 2 safeguards buses; however, they would phase to Unit 1. This is due to the fact that a failure of this single breaker to open during a loss of AC accident would prevent both emergency diesel generators from automatically supplying power to their respective Unit 2 buses because of an interlock. The output breakers for each emergency diesel generator are interlocked to the tie breaker between the A05 and A06 buses. Thus, a failure of the A05 and A06 buses' tie breaker to open automatically on loss of AC would prevent the emergency diesel generator output breakers from closing. This single component failure coupled with loss of AC would prevent both emergency diesel generators from automatically supplying power to their associated safeguards buses during a loss of AC accident.

The operator would immediately know that the diesels did not phase in on Unit 2 and must either recognize that the bus tie breaker failed to open and manually open it, or manually synchronize the diesels to their buses. Sufficient time, approximately one to two hours, would exist to do this since the steam driven auxiliary feed pump would be operating and supplying water to the steam generators for decay heat removal. Condensate tank water and service water would be available for steam generator feedwater. The primary system temperature, pressure, and level would not significantly change since the steam generator atmospheric dumps would be maintaining temperature and there would be no letdown. Loss of power to the letdown motor-operated valve and/or all charging pumps will secure letdown by initiating closure of the orifice valves.

Thus, sufficient time, indicators, and options are available to the operator to mitigate any adverse consequences of this low probability event.

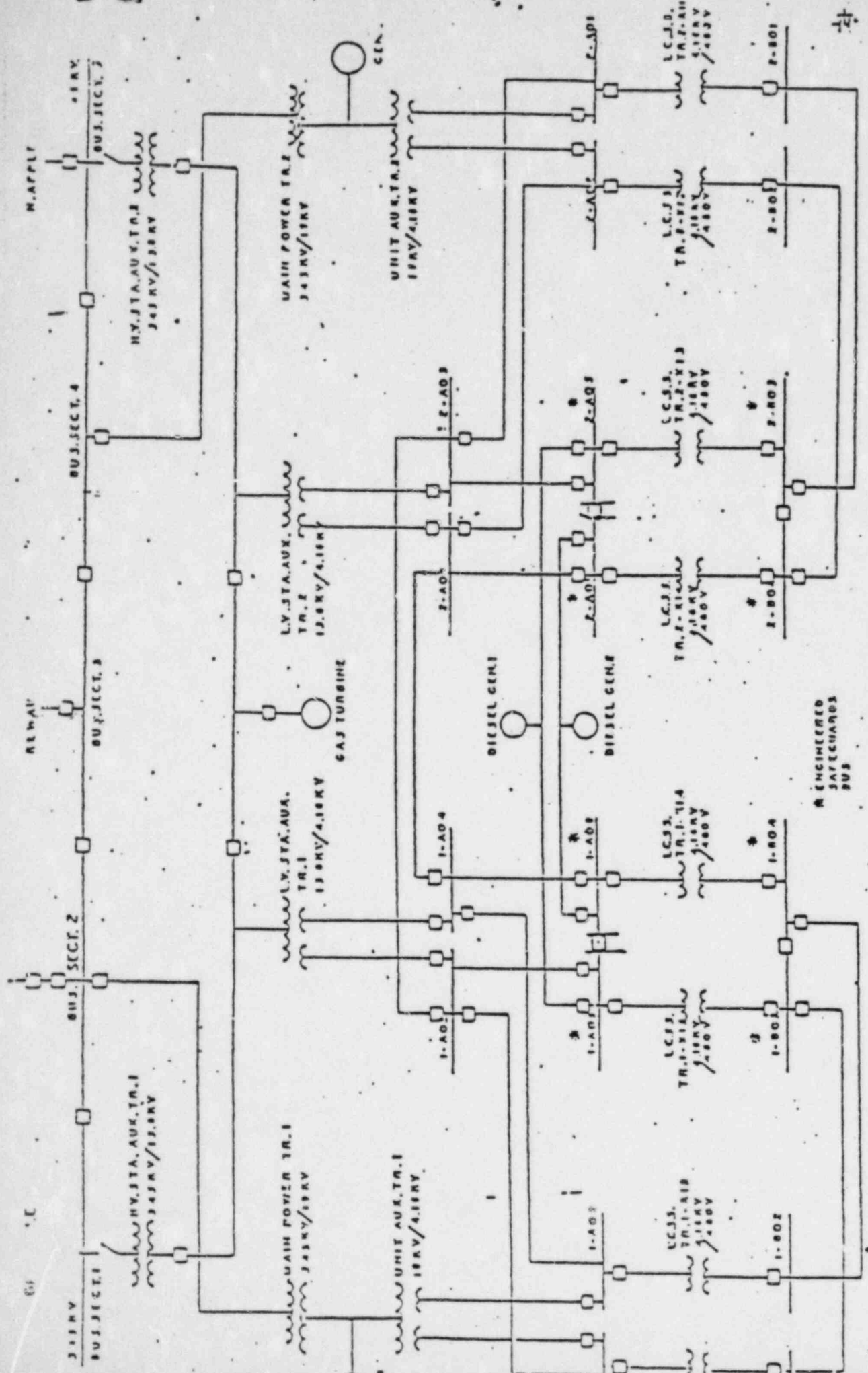
The diesels were available to supply power at all times; the automatic feature could be prevented only if the closed tie breaker would have failed to open.

The improper electrical lineup has been attributed to personnel error and is postulated as occurring subsequent to the performance of the loss of AC test conducted on May 2, 1980, but prior to the unit returning critical on May 12, 1980. The unit was shut down for refueling during this time period. The breaker cannot be closed once the unit is electrically lined up properly and loaded without going through a rather elaborate sequence of events.

To prevent future recurrence of this event, the electrical layout board will be modified to provide unique identification of the A05 and A06 buses' tie breaker. This modification will also include like tie breakers between other safeguards buses. Also, procedures will be changed to include an electrical lineup check after performance of the loss of AC test and prior to return to power.

This event is being reported in accordance with Technical Specification 15.6.9.2.B.3. The event was discussed with the NRC Resident Inspector on the morning of June 10 and "red phone" notification was made at 0845 hours the same day. A 24-hour written report was also submitted on June 10. After performing a complete evaluation of the event it was determined that this event did not require either "red phone" notification or a 24-hour report.





SIMPLIFIED ELECTRICAL ONE LINE DIAGRAM...  
 POINT BEACH NUCLEAR PLANT  
 UNITS 1 & 2