

ESTIMATED BUDEN PER REQUEST TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 500 HRS FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F53M) U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503

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EVENT DATE (B)			LER NUMBER (B)			REPORT DATE (2)			OTHER FACILITIES INVOLVED (B)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
									PBNP Unit 2	0 5 0 0 0 3 10 11
0	1	07	93	93	001	00	02	16	93	0 5 0 0 0 1 1

OPERATING MODE (8)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following): (11)				
N		20.402(k)		20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	11010	20.405(a)(1)(i)		50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)		50.36(c)(2)	50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	X	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	X	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)		50.73(a)(2)(iii)	50.73(a)(2)(ix)	

NAME	TELEPHONE NUMBER	
	AREA CODE	
Paul J. Katers, Electrical Systems Engineering	4114	21211-141510

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	

YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO	EXPECTED SUBMISSION DATE (15)
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ABSTRACT (Limit to 1400 spaces, i.e. approximately fifteen single space typewritten lines) (16)

On January 7, 1993, an evaluation was completed that showed the settings for the degraded grid voltage relays on the 4160V safety-related buses could be too low to provide adequate protection for all safety-related equipment. Therefore, all 4160V degraded grid voltage protection channels were declared inoperable at 1515 CST, invoking the requirements of Technical Specification Table 15.3.5-3, "Emergency Cooling," Item 4.a. This invoked Technical Specification 15.3.0, which requires that the affected units be placed in hot shutdown within 3 hours and in cold shutdown within 48 hours if the condition is not corrected. An NRR Waiver of Compliance was requested and granted to allow time to determine new setpoints, calibrate the relays, submit a Technical Specification Change Request, and receive a license amendment for this setpoint change. The new setpoint determinations and setpoint changes were performed. These actions were completed January 15, 1993. A Technical Specification Change Request was submitted to the NRC in a letter dated January 18, 1993.

NRC Form

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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YEAR SEQUENTIAL REVISION  
NUMBER NUMBER NUMBER

Point Beach Nuclear Plant, Unit 1 0 5 0 0 0 2 6 6 9 3 - 0 0 1 - 0 0 0 2 OF 0 6

TEXT (If more space is required, use additional NRC Form 306A's) (17)

## EVENT DESCRIPTION

Analysis of ABB Impell Corporation Calculation 0870-150-007, Revision 0, which determined the steady state and transient voltage levels on the PBNP electrical distribution system at various plant operating conditions, began on approximately December 2, 1992. The results of this calculation indicated that there are several safety-related electrical loads which could have voltage levels lower than the minimum value required to assure continued operation following a trip of one unit or if one unit was at 100% power coincident with a LOCA on the second unit and the off-site grid voltage was lower than normal.

Operation of electrical equipment at voltages lower than its electrical rating is not desirable because such operation may result in the equipment not properly performing its intended safety function or may result in damage to the equipment. For this reason, existing plant design includes protection against sustained operation of safety-related loads at lower than recommended voltages.

On January 7, 1993, with both units operating at full power, analysis of the ABB Impell calculation was completed. The analysis concluded that the settings for the degraded grid voltage relays installed on the 4160V safety-related buses were too low to provide adequate protection for all safety-related equipment. Therefore, all 4160V degraded grid voltage protection channels were declared inoperable at 1515 CST, invoking the requirements of Technical Specification Table 15.3.5-3, "Emergency Cooling," Item 4.a, which allows continued power operation for up to 7 days provided the affected buses are being supplied by the associated emergency diesel generators.

Upon further review, it was determined that the requirements of Technical Specification Section 15.3.7, "Auxiliary Electrical Systems," Specification B.1.d would not allow this electrical system configuration. Technical Specification 15.3.7.B.1.d permits operation of the affected unit for up to 7 days with only one supply bus, A03 or A04 (the normal supply to Buses A05 and A06 respectively) out of service. Continued operation of a unit is prohibited with power supplied to both trains of safeguards from the associated emergency diesel generator.

The Point Beach Manager's Supervisory Staff (MSS) determined that operation for an extended period of time with all four of the safety-related 4160V buses supplied from the diesel generators was not consistent with maintaining the optimum level of plant safety given the fact that grid voltage could best be maintained at a high level with both Point Beach units on line. This is a condition prohibited by the Technical Specifications. Therefore, Technical Specification 15.3.0.A was entered at 1515 CST on January 7, 1993.

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The action statement for Technical Specification 15.3.0.A requires the affected unit(s) to be placed in hot shutdown within three hours. The power reduction on both units began at approximately 1620 CST. At approximately 1640 CST, the NRC Office of Nuclear Reactor Regulation (NRR) granted a temporary hold of the 3-hour hot shutdown requirement pending formal request for a waiver of compliance. A verbal 14-day Temporary Waiver of Compliance from Technical Specification 15.3.0.A was requested and granted by NRR at 1920 CST on January 7, 1993. Both units were subsequently returned to full power at approximately 2000 CST.

The request for waiver was documented in a letter to the NRC dated January 8, 1993. The NRC provided confirmation of the waiver in a letter dated January 14, 1993. This letter changed the duration of the waiver to extend until a Technical Specification change for the degraded voltage relay setpoint is issued. New degraded voltage setpoints were determined and setpoint changes completed on January 15, 1993.

## COMPONENT AND SYSTEM DESCRIPTION

Degraded grid voltage relays are installed on each of safety-related 4160V Buses 1A05, 1A06, 2A05, and 2A06. The purpose of these relays is to detect lower than acceptable voltage levels on these buses. These relays generate the signal to disconnect the safety-related 4160V buses from the preferred off-site source. This results in an undervoltage condition on the safety-related buses, which causes the emergency diesel generators to start and energize these buses.

The degraded grid voltage relays were installed in 1981 and 1982 in response to an NRC generic letter dated June 2, 1977. At that time, it was determined that the minimum allowable voltage at which all 480V bus safety-related loads could operate was 414V (90% of the nominal 460V rating for the containment ventilation fan motors, which are considered to be the most limiting components). It was then determined that a minimum 3797V was necessary on the 4160V safety-related buses to assure 414V is available at the fan motors. The results of these evaluations were provided to the NRC as the basis for the degraded grid voltage relay setting of  $\geq 3875V \pm 2\%$ , which appears in Technical Specification Table 15.3.5-1, Item 9.

## REPORTABILITY

This Licensee Event Report is provided pursuant to the requirements of 10 CFR 50.73(a)(2)(ii)(B), "Any event or condition that resulted in the condition of the nuclear plant, including its principal safety barriers, being seriously degraded, or that resulted in the nuclear power plant being in a condition that was outside the design basis of the plant." This report is also required by 10CFR50.73(a)(2)(i)(B), "Any event or condition

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prohibited by the plant's Technical Specifications." Additionally, a 1-hour NRC notification was made at 1642 CST on January 7, 1993 in accordance with 10 CFR 50.72(b)(1)(i)(A). The NRC Resident Inspector was also informed about this event.

## SAFETY ASSESSMENT

Operation with 4160V bus degraded voltage relay settings of  $\geq 3875 \pm 2\%$  will not ensure adequate protection of all safety-related equipment under degraded electrical system conditions. Analysis indicates that with the 345KV bus voltage at or below 351KV, a LOCA would cause the 480V bus voltage to be below the minimum required to ensure proper operation of safety-related equipment. Operation of equipment at lower than its electrical rating is not desirable because such operation may result in equipment not properly performing its intended function or may result in damage to the equipment itself. Without compensatory actions, this is unacceptable due to the need to prevent loss of safeguards performance.

## CORRECTIVE ACTIONS

The immediate corrective action for this situation was to issue guidance to the operators for reducing the chances of and handling a degraded voltage situation at PBNP. PBNP Operations Special Order 93-01 was issued on January 7, 1993. This special order specified the following compensatory actions for this situation:

1. The Unit 2 control operator was assigned to monitor and record hourly voltage readings on 4160V Buses A05 and A06 associated with Units 1 and 2.
2. System Control (located in Pewaukee, WI) continued normal monitoring of the 345KV voltage of Bus Sections 1, 2, 3, 4 and 5. If System Control receives a voltage alarm indicating that bus section voltage has decreased to less than 354KV, PBNP would be notified in accordance with normal practice. System Control was informed about the increased importance of maintaining stable system voltage at PBNP.
3. Upon notification that system voltage had decreased below 354KV, a dedicated licensed operator would immediately report to the control room and continuously monitor voltage on the A05 and A06 buses associated with Units 1 and 2. The dedicated licensed operator would continue his duties until system voltage remains stable and greater than 354KV.



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4. The following actions would be taken by the Unit 2 control operator or the dedicated licensed operator when required:

- If the voltage on either Unit 1 or Unit 2 A05 and/or A06 buses drops below 4100V, System Control would be immediately requested to take action to increase system voltage until all vital bus voltages exceed 4100V.
- If the voltage on Buses A05 and/or A06 associated with Units 1 and/or 2 drops below 4050V, the on-site combustion turbine generator would be started but not loaded. The combustion turbine will serve as a back-up power supply (20 MWe capacity) to the diesel generators (5.7 MWe total capacity) if needed.
- If the voltage on Buses A05 and/or A06 associated with Units 1 and/or 2 drops below 4000V, the normal feeder breaker associated with the bus or buses below 4000V would be immediately opened (1A52-57 for 1A05, 1A52-63 for 1A06, 2A52-70 for 2A05, and/or 2A52-76 for 2A06). This would result in the starting of the appropriate emergency diesel generator(s) and the resupply of the bus from the emergency diesel generator(s). Normal voltage from the emergency diesel generator(s) would be verified on any bus which had its normal feeder breaker opened.

5. Following any action taken above, the Duty Shift Superintendent (DSS) would place Units 1 and 2 in the appropriate operating condition for the resulting electrical configuration as directed by Technical Specification 15.3.7.

6. The emergency diesel generators would not be removed from service for maintenance.

The Temporary Waiver of Compliance confirmation letter from the NRC, dated January 14, 1993, also required the following additional compensatory actions:

1. The on-site combustion turbine will be tested biweekly (twice per week) until the issuance of a permanent Technical Specification change.
2. Plant modifications will be made to change the undervoltage setpoints within 14 days.

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3. The licensee will include documentation of the plans to verify the adequacy of the new undervoltage setpoint in the request for license amendment.

The degraded voltage relay setpoints at PBNP have been changed from the existing Technical Specification setpoint of  $\geq 3875$  volts  $\pm 2\%$  to the proposed  $\geq 3959$  volts  $\pm 1/2\%$ . This change was completed on January 15, 1993. A proposed Technical Specification change was submitted to the NRC on January 19, 1993. Plans to verify the new undervoltage setpoint are described in the Technical Specification change request letter. The combustion turbine is being tested on a biweekly (twice per week) frequency until the Technical Specification amendments are issued. The other compensatory actions are no longer required because the setpoint change has made them unnecessary.

## SIMILAR OCCURRENCES

Other Licensee Event Reports that describe problems discovered in the electrical distribution system are:

Unit 1

LER 90-004	B03/B04 Tie Breaker Single Failure Potential
LER 90-012	B04/B02 and B03/B01 Bus Tie Breaker Single Failure Potential
LER 89-009	DC Breaker Fault Current Capability
LER 88-001	Single Failure Potential in 4160 V Safeguards Switchgear
LER 88-003	Surveillance of 4160 V Safeguards Power Supply Undervoltage Relay Not in Accordance with Technical Specifications
LER 82-025	480 V Relays Outside Technical Specification Limits
LER 72-020	480 V Breaker Overcurrent Timing Possible Generic Defect

Unit 2

LER 82-003	Undervoltage Relay Time Delay Out of Specification
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