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VPNPD-91- 368 NRC-91- 122

10CFR50.73

October 22, 1991

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Gentlemen:

DOCKET 50-2

LICENSEE EVEN. 12-00
NUCLEAR INSTRUCTION FRINE RUNBACK

POINT BEACH NUCLEAR PLAN, UNIT 1

Enclosed is Licensee Event Report 91-012-00 for Point Beach Nuclear Plant, Unit 1. This report is provided in accordance with 10CFR50.73(a)(2)(iv), "The licensee shall report. . . any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS)."

This report describes a runback of the Unit 1 turbine generator due to an instrument bus voltage transient initiated during inverter maintenance. This voltage transient activated the dropped rod turbine runback circuitry on power range nuclear instrument channel N44.

If any further information is required, please contact us.

Very truly yours,

James J. Zach Vice President Nuclear Power

Enclosures

Copy to: NRC Resident Inspector

NRC Regional Administrator

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LICENSEE EVENT REPORT (LER) UND COMMAND REGISTREE			APPROV. D OMB NO 3150-0104 EXPIRES 4/10/02 ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 80 0 MRS FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (#530) U.S. NUCLEAR REGULATORY COMMISSION WASHINGTON, DC 20655 AND TO THE PAPERWORK REFUCTION PROJECT (3150-0104) OFFICE OF MANAGEMENT AND BURGET WASHINGTON, DC 20603.			
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ABSTRACT

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ABSTRACT (Limit to 1400 spaces i.e. approximately fifteen single-space typewritte

At 1027 on September 24, 1991 Unit 1 experienced a turbine runback from 100% to approximately 80% power during maintenance on inverter DYOD. The runback was caused by a voltage loss on instrument buses 1404 and 14104 when the supply breaker from DC bus DO4 to inverter DYOD was closed. Prior to this event, swing inverter DYOD (Elgar Model 253-1-103) had been taken out of service for maintenance. The turbine runback (curred when the DO4 to DYOD supply breaker was closed while bringing the inverter back into service. The input circuit breaker filter capacitors to inverter DYOD had not been charged prior to attempted closure. The uncharged capacitors caused a voltage spike to occur on the DC supply bus to inverter 1DY04 (bus DO4). This voltage spike scrambled the inverter's logic, blowing a fuse and shutting down inverter 10Y04. Also, the uncharged capacitor created an excessive current draw on inverter DYOD, causing the DC supply breaker to trip on overcurrent. Power to yellow instrument buses 1904 and 19104, which was being supplied by inverter 1DY04, was subsequently lost. Because power range nuclear instrument channel N44 is powered by the yellow instrument bus, this loss of power produced a negative voltage spike on N44, activating the dropped rod turbine runback circuitry. All instrumentation and control systems operated as designed. Unit 1 was returned to full power at 1257. This event is an actuation of a reactor protection system. Therefore, a four-hour notification to the NRC was made in accordance with 10CFR50.72(b)(2)(ii).

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U.S. NUCLEAR REGULATORY COMMISSION

APPROVED DMB NO 3160-0104 EXPIRES 4/30/92

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WIN THIS INFORMATION COLLECTION REQUEST SOO HRS. FORWARD COMMENT PROGRAMMENT BRANCH FROM TO THE RECORDS AND REPORTS MANAGEMENT BRANCH PESD, US NUCLEAR REGULATORY COMMISSION, WASHINGTON DC 20505 AND TO THE EAPERWORK REDUCTION PROJECT (3150-0104). OFFICE OF MANAGEMENT AND RUDGET, WASHINGTON, DC 2050).

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EVENT DESCRIPTION

At 1027 on September 24, 1991, Point Beach Nuclear Plant Unit 1 experienced a turbine runback from 100% to approximately 80% power due to a dropped rod signal from power range nuclear instrument channel N44.

Prior to this event, swing inverter DYOD had been taken out of service (per MWR 912471) to remove a jumper wire. When it was discovered that the wire had not been installed, the decision was made to back out of the procedure and return the inverter to service. The turbine runback occurred when the supply breaker from DC bus D04 to inverter DYOD was closed while bringing the inverter back into service. The inverter input circuit breaker was closed with the filter capacitors uncharged. The uncharged capacitors produced a direct short on the DC bus creating two events: an excessive current draw on inverter DYOD causing its DC supply breaker to trip on overcurrent and a logic fault in inverter 1DY04 (which is supplied by DC bus DO4), causing it to blow a fuse and shut down. Power to yellow instrument buses 1Y04 and 1Y104, which was being supplied by inverter 1DY04, was subsequently lost. Because power range nuclear instrument channel N44 is powered by the yellow instrument bus, this loss of power produced a negative voltage spike on N44, activating the dropped rod turbine runback circuitry.

EQUIPMENT DESCRIPTION

Each unit is supplied with four separate and independent reactor protection instrument channels termed Channels I, II, III, and IV; color-coded red, white, blue and yellow. Each instrument channel is supplied by a separate 120 VAC instrument bus (for example, the "Yellow" bus). Each instrument bus is made up of two sub-buses (for example, buses 1Y04 and 1Y104). For a given instrument channel, one inverter is dedicated to the Unit 1 instrument bus and a second is dedicated to the Unit 2 instrument bus. A third inverter acts as a spare which can swing between both units' instrument buses. This spare inverter allows either dedicated inverter to be taken out of service for maintenance.

The red and blue instrument bus inverters are Westinghouse Kodel 125 CT single-phase, fixed frequency inverters. The white and yellow inverters are Elgar Model 253-1-103, 125 VDC to 120 VAC, single phase, 60 Hz inverters. Inverter 1DY04 normally supplies yellow instrument buses 1Y04 and 1Y104. Swing inverter DY0D can supply yellow instrument buses 1Y04 and 1Y104 or 2Y04 and 2Y104.

If a prolonged overloa ad condition (125% of rated inverter output for 5 seconds) exists, overload trip logic will deenergize the output breaker undervoltage trip coil, tripping the breaker. A similar undervoltage trip coil associated with the input circuit breaker will trip the input breaker during undervoltage conditions. A precharge circuit, operated by a pushbutton, slowly charges the input filter capacitors during startup

NRC FORM 366A

U.S. NUCLEAR REGULATORY COMMISSION

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TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REDUEST 80.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (FASC) U.S. NUCLEAR REGULATORY COMMISSION WASHINGTON DC 20855. AND TO THE PAPERWORK REDUCTION PROJECT (3150-0704) OFFICE OF MANAGEMENT AND BUDGET WASHINGTON DC 20502

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)	PAGE (3)
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operations, resetting the input undervoltage trip coil and enabling breaker closure.

Each Point & the Nuclear Plant unit has four independent and redundant power range ... lear instrument channels. Each channel has a dual section uncompensated ion chamber to monitor the neutron flux at its respective quadrant of the core. The four channels provide rod drop protection with bistables that respond to a rate-sensitive circuit. If a control rod drops, the nuclear instrumentation system detects a sudden depression of neutron flux in a localized region of the core. If a single channel detects a power decrease of 2½% in a 5-second time period, the dropped rod signal and bistable initiate a turbine runback. The purpose of the rod drop protection is to limit core hot channel effects due to the power redistribution caused by a dropped rod.

CAUSE

The rod drop signal and resulting turbine runback were a result of personnel error during maintenance. However, an inadequate procedure contributed to this event. A Human Performance Enhancement System (HPES) evaluation will be conducted and the results will be reported in a supplemental LER.

CORRECTIVE ACTIONS

Immediate:

 The rod drop circuitry for power range channel N44 was placed in "bypass".

Short Term:

- 1. Yellow instrument buses 1Y04 and 1Y104 were reenergized via inverter DY0D after it was examined and declared operable.
- All loads lost upon the loss of the yellow instrument buses were restored to service.
- 3. Maintenance Planners and Supervisors were briefed on this event. One of the contributing factors to this event was a work plan that referenced the use of only a portion of a procedure. The appropriate method would have been to perform a temporary change to the procedure to incorporate the scope of work. Had this been done, adequate reviews would have been completed, and the worker would not have had to interpret exactly which steps in the procedure were to be performed.
- 4. The direct line supervisors were counseled on the need to evaluate appropriate recovery steps when it is discovered that a planned

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U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO 3150/0104 EXPIRES 4/30/92

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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activity will not be performed and it becomes necessary to back out of a procedure and restore the equipment into service.

Long Term:

- A Human Performance Enhancement System (HPES) evaluation will be conducted to investigate procedure non-compliance and inadequacy. The findings of the HPES evaluation will be reported in supplemental LER 266/91-012-01 by December 2, 1991.
- 2. Maintenance Work Request 914559 has been issued to perform a test of the DC input breaker undervoltage trip to inverter DYOD, which may have malfunctioned during this event. The results of this test will be reported in supplemental LER 266/91-012-01.
- Permanent operator aids will be installed at the inverter supply breakers to the DC buses. This will be performed by Operations personnel prior to 1/31/92.
- 4. Routine Maintenance Procedure RMP 45 will be enhanced to include equipment specific instruction. This will be accomplished prior to 1/31/92 by Maintenance personnel.
- 5. Modification Requests 84-227 (Unit 1) and 84-228 (Unit 2) have been approved to replace the manual inverter transfer system with an Automatic Bus Transfer (ABT) transfer. Static transfer switches will be installed which will automatically transfer an instrument bus to an alternate source should an inverter failure or trip occur, thus preventing a loss of power to an instrument bus. This will be accomplished by 1/31/93.

Supplemental:

The Transient Analysis group will implement the RCCA dropped rod analysis methodology described in WCAP-11394, April 1987, to eliminate the need for turbine load runback and automatic rod withdrawal block as part of the Reactor Protection System. This was previously committed in LER 266/91-009-00 and will be completed by 11/20/92.

REPORTABILITY

This event is being reported under the requirements of 10CFR50.73(a)(2)(iv), "The licensee shall report. . .any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS)." A four-hour notification to the NRC was made in accordance with 10CFR50.72(b)(2)(ii). The NRC Resident Inspector was also notified.

EXPIRES 4/30/82

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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SAFETY ASSESSMENT

All systems functioned as designed during this event. The safety of the plant and the health and safety of the public and plant employees were not jeopardized by this event.

GENERIC IMPLICATIONS

No generic implications were identified.

SIMILAR OCCURRENCES

Since 1989, there have been four events that were the direct result of inadequate procedures. These events were reported in the LERs listed below:

LER NO.	DATE	TITLE
266/90-002-00	03/20/91	INADVERTENT START OF AUXILIARY FEEDWATER PUMP
266/89-010-00	11/20/89	INADVERTENT ISOLATION OF AUXILIARY FEEDWATER FLOW TRANSMITTERS
301/89-009-00	11/15/89	UNEXPECTED "LEVEL LOW" REACTOR TRIP SIGNAL DURING EMERCENCY DC LIGHTING TEST
301/89-007-00	10/27/89	UNANTICIPATED SAFETY INJECTION SIGNAL