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POWER COMPANY

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VPNPD-95-098

November 27, 1995

Document Control Desk
U.S. NUCLEAR REGULATORY COMMISSION
Mail Station P1-137
Washington, DC 20555

Gentlemen:

DOCKET 50-301
LICENSEE EVENT REPORT 95-004-00
INADVERTENT ESF ACTUATION
AS A RESULT OF IMPROPER RELAY ALIGNMENT
POINT BEACH NUCLEAR PLANT, UNIT 2

Enclosed is Licensee Event Report 95-004-00 for Point Beach Nuclear Plant, Unit 2. This report is being filed in accordance with 10 CFR 50.73(a)(2)(iv), "Any event or condition that resulted in the manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS)." This report describes an inadvertent, automatic start of an auxiliary feedwater pump during safeguards relay testing of Unit 2 Train B.

Please contact us if there are any questions.

Sincerely,

Bob Link
Vice President
Nuclear Power

GDA

Enclosure

cc: NRC Regional Administrator
NRC Resident Inspector

IE22
1/1

NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT

# LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

| FACILITY NAME (1) | DOCKET NUMBER (2) | PAGE (3) |
|---|---|---|
| Point Beach Nuclear Plant, Unit 2 | 05000301 | 1 OF 5 |

TITLE (4)
Inadvertent ESF Actuation as a Result of Improper Relay Alignment

| EVENT DATE (5) | | | LER NUMBER (6) | | | REPORT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | |
|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | MONTH | DAY | YEAR | FACILITY NAME | DOCKET NUMBER |
| | | | | | | | | | | 05000 |
| 10 | 26 | 95 | 95 | -- 004 -- | 00 | 11 | 27 | 95 | FACILITY NAME | DOCKET NUMBER 05000 |

| OPERATING MODE (9) | N | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| POWER LEVEL (10) | | | 20.2201(b) | | 20.2203(a)(2)(v) | | 50.73(a)(2)(i) | | 50.73(a)(2)(viii) |
| | | | 20.2203(a)(1) | | 20.2203(a)(3)(i) | | 50.73(a)(2)(ii) | | 50.73(a)(2)(x) |
| | | | 20.2203(a)(2)(i) | | 20.2203(a)(3)(ii) | | 50.73(a)(2)(iii) | | 73.71 |
| | | | 20.2203(a)(2)(ii) | | 20.2203(a)(4) | X | 50.73(a)(2)(iv) | | OTHER |
| | | | 20.2203(a)(2)(iii) | | 50.36(c)(1) | | 50.73(a)(2)(v) | | Specify in Abstract below |
| | | | 20.2203(a)(2)(iv) | | 50.36(c)(2) | | 50.73(a)(2)(vii) | | or in NRC Form 366A |

LICENSEE CONTACT FOR THIS LER (12)

| NAME | TELEPHONE NUMBER (Include Area Code) |
|---|---|
| Jim Schweitzer, Maintenance Manager | (414) 755-6283 |

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NPRDS | | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NPRDS |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |
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| SUPPLEMENTAL REPORT EXPECTED (14) | | | | EXPECTED SUBMISSION DATE (15) | MONTH | DAY | YEAR |
|---|---|---|---|---|---|---|---|
| | YES (If yes, complete EXPECTED SUBMISSION DATE). | X | NO | | | | |


ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On October 26, 1995, with Unit 2 defueled during its annual refueling and maintenance outage, Instrumentation and Control Procedure (ICP) 5.58B-1, "Safeguards Timing Relays Calibration Unit 2 Train B", was being performed. During the performance of the calibrations, licensee personnel misaligned Unit 2 Time Delay Relay (TDR) 20 while installing it into its base. This error placed a voltage potential across two other safeguards time delay relay coils, and caused the electric-driven B-Train Auxiliary Feedwater Pump (P-38B) to start after the associated relay timed out. The B-Train Residual Heat Removal Pump (2P-10B) would also have auto-started had the electrical power and automatic controls of the pump not been disconnected at the time. No auxiliary feedwater was delivered to either Unit 1 or Unit 2 steam generator because the circuit associated with opening the AFW isolation valves, by design, was not actuated by this event. AFW Pump P-38B was allowed to run in the minimum recirculation mode for approximately 38 minutes while troubleshooting this event. The misaligned relay was tested and then installed in the proper alignment. The AFW System was returned to its standby condition.

| FACILITY NAME (1) | DOCKET NUMBER (2) | LER NUMBER (6) | | | PAGE (3) |
|---|---|---|---|---|---|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| Point Beach Nuclear Plant, Unit 2 | 05000301 | 95 | - 004 - | 00 | 2 OF 5 |

TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

**Event Description:**

On October 26, 1995, with Unit 2 defueled during its annual refueling and maintenance outage, Instrumentation and Control Procedure (ICP) 5.58B-1, "Safeguards Timing Relays Calibration Unit 2 Train B", was being performed. This ICP is performed annually to verify the calibration of the Unit 2, B-Train time delay relays 2TDR-20 through 2TDR-29 which actuate PBNP Engineered Safety Features. Each relay has a 4-by-4 pin matrix that mates with a 4-by-4 socket base.

The procedure requires that only one relay be removed from its base at a time. After removal, each relay is tested in a special test fixture, adjusted if necessary, and then re-installed in its base. The ICP cautions that the relay must be installed in the correct socket, and installed with the adjustment pot in the upward position. Mounting strap connections on each relay prevent horizontal misalignment; however, there are no similar constraints such as guide pins to prevent vertical misalignment.

While performing the installation of relay 2TDR-20, an I&C technician misaligned the relay one row below the proper vertical alignment. In effect, 12 pins of the relay were inserted in the bottom 12 pins of the socket. By inserting the relay in this manner, a normally-closed set of relay contacts placed a voltage potential across two other safeguards time delay relay coils; energizing the Auxiliary Feedwater Pump (P-38B) Relay 2TDR-22 and Residual Heat Removal Pump (2P-10B) Relay 2TDR-21.

At 0829 (CT) the AFW System responded as designed. The AFW Pump (P-38B) started after its TDR timed out, and discharged to its minimum recirculation flowpath. No auxiliary feedwater was discharged to either Units' steam generators because the initiating event by design did not cause the AFW discharge isolation valves to open. The AFW Pump (P-38B) was allowed to run for approximately 38 minutes in the minimum recirculation mode while personnel were troubleshooting this event.

Because Unit 2 was defueled and the associated RHR System was secured, there was no consequence to energizing the Residual Heat Removal Pump (2P-10B) time delay relay 2TDR-21. The pump's electrical supply breaker was racked out and its control switch was not in automatic. Therefore, the RHR Pump (2P-10B) did not start.

Once the cause of the event was determined, the AFW Pump (P-38B) was secured and restored to a standby condition. The misaligned relay was tested and then installed in the proper alignment. Procedure 2ICP-5.58B-1 was completed by I&C personnel using concurrent checking by two I&C technicians. A four-hour NRC event notification was made at 1115 (CT).

| FACILITY NAME (1) | DOCKET NUMBER (2) | LER NUMBER (6) | | | PAGE (3) |
|---|---|---|---|---|---|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| Point Beach Nuclear Plant, Unit 2 | 05000301 | 95 | 004 | 00 | 3 OF 5 |

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

**Component and System Description:**

The Safeguards Timing Relays are used to sequence Engineered Safety Features (ESF) electrical loads onto the associated emergency diesel generator after a loss of offsite power or a safety injection signal. These are Agastat Series ETR Time Delay Relays; installed in both units in 1994 to replace Agastat electro-pneumatic time delay relays that experienced timing drift. The new relays are mechanically actuated with a solid state timer.

The new ETR relays not only provided a more accurate timing capability, but provided the capability for relay removal and individual relay testing that was not provided in the original design. The modification provided for relays with a 4-by-4 pin matrix that mate with a 4-by-4 socket base. This design allows the capability to remove an individual relay and plug it into a special fixture for testing and calibration.

The associated modification package acknowledged that a certain degree of circuit isolation would be necessary to ensure that the remaining ESF timing relays would not be disabled or actuated during removal of any one individual relay. By using the new relays, the modification provided a design which inherently provided isolation when the associated relay was removed from its base. This design was considered favorable because it eliminated the possible seismic and circuit continuity problems associated with the installation of isolation switches and test jacks.

**Cause:**

This event was caused when the I&C technician assigned to perform the procedure failed to accurately align the subject relay during a step which re-installs the relay. Immediately preceding that step, the procedure provides a caution statement to ensure the relay is installed in the correct socket with the correct orientation. These cautions alone should have been adequate to prevent this event; however, local lighting conditions, the socket design, and the relatively new nature of the testing procedure may have been contributing factors.

The original electro-pneumatic relays could not be removed for testing. However, the 1994 modifications that installed the new ETR relays allowed relay removal for periodic testing. I&C Procedures 1&2 ICP-5.58 were first approved May 1, 1995 to conduct this testing. During the initial use of these procedures in the spring of 1995, the corresponding relays on Unit 1 were removed, tested, and re-installed without incident.

The evaluation of the 1994 relay modification did not completely recognize the potential for relay removal to cause an ESF actuation during routine testing. The evaluation assumed that removal of the relay would provide adequate isolation of the actuation circuit. It was believed that the design of the actuation circuit with the relay removed would be inherently

| FACILITY NAME (1) | DOCKET NUMBER (2) | LER NUMBER (6) | | | PAGE (3) |
|---|---|---|---|---|---|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| Point Beach Nuclear Plant, Unit 2 | 05000301 | 95 | - 004 - | 00 | 4 OF 5 |

TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

safe with respect to preventing an inadvertent actuation. However, the evaluation did not consider the possibility for misaligning a relay as described in this event. Without proper physical constraints to prevent such a misalignment, the burden of alignment was placed on the technician. This was a new responsibility for which the technician was not made completely aware.

**Corrective Action:**

To prevent recurrence of the misalignment, an additional technician was assigned to concurrently check the proper removal and installation of the remaining relays that required testing on Unit 2. ESF Timing Relay Tests were completed without further incident.

The I&C technician who committed the misalignment was personally counseled for inadequate self-checking during maintenance. I&C supervisors provided further instruction to the other technicians who conduct this type of testing. This instruction included lessons learned from this particular event, and emphasized the technician's responsibility to ensure adequate lighting levels in the work area; arranging for temporary lights if necessary.

In addition to the personnel aspects of this event, the adequacy of the design was evaluated, particularly with respect to the need for a physical interlock which would prevent any future misalignment of these relays. Presently, the installation of plastic "stand-offs" is being considered to constrain the vertical alignment of the relay.

**Reportability:**

This Licensee Event Report is being submitted in accordance with the requirements of 10 CFR 50.73(a)(2)(iv), "Any event or condition that resulted in manual or automatic actuation of any engineered safety feature (ESF), including the reactor protection system (RPS)". A 4-hour NRC notification was made at 11:15 a.m. (CT) on October 26, 1995, in accordance with the requirements of 10 CFR 50.72(b)(2)(ii). The NRC Resident Inspector was notified within one hour of this event.

**Safety Assessment:**

AFW Pump (P-38B) remained operable throughout the event. Had a valid AFW actuation been required on the operating Unit 1 Steam Generators, the AFW Pump would have been available and would have provided flow to the Unit 1 B Steam Generator after the respective isolation valve received its automatic signal to open. Running the AFW Pump (P-38B) on its minimum recirculation flowpath for the 38-minute period is not considered detrimental because the pump's design basis allows for such transient operation.

Actuation of the Unit 2 RHR pump (2P-10B) relay had no effect on Unit 2 during the prevailing plant conditions, and would have had insignificant effect if Unit 2 had been operating in a more limiting condition at the time of the event. Because Unit 2 was defueled and the Unit 2 RHR pump (2P-10B) was electrically isolated at the time of this event, the inadvertent pump-start signal had no effect on the condition of Unit 2 RHR System. While defueled, RHR System operation is not required.

To complete the safety assessment, the possibility must be considered that the event could have occurred during cold shutdown, because the prerequisites of the test procedure (2ICP-5.58) allow testing in a cold or refueling shutdown (administrative controls prevent this type of testing while in reduced inventory with fuel in the reactor vessel). Had the RHR System been aligned for cold shutdown with the A-Train RHR pump operating, an inadvertent start of the B-Train RHR pump (2P-10B) could have increased system flowrate a small amount, and caused a brief cooldown (or would have increased the rate of an existing cooldown). However, the RHR System is only aligned in the one-pump condition late in the cooldown, after the capability of one RHR train is assured. During all cooldowns, the cooldown rate is closely monitored and manually controlled, so any unexpected change would have been addressed.

Also, an inadvertent pump start in the cooldown condition would not have caused pump degradation because of the provision for minimum recirculation flow.

The operability and availability of the Engineered Safety Features (ESF) Systems were not adversely affected by this event. Therefore, the health and safety of plant personnel and the general public were not endangered during this event.

**Similar Occurrences:**

A review of previous Licensee Event Reports was performed. The following reports describe ESF actuations that resulted from maintenance activities.

LER 301/92-007-00 Inadvertent ESF Actuation as a Result of Improper Surveillance Testing

LER 301/90-002-00 Inadvertent Auxiliary Feedwater Pump Start

LER 301/90-001-00 Inadvertent Auxiliary Feedwater Pump Start