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VPNPD-96-026

May 3, 1996

Document Control Desk
US NUCLEAR REGULATORY COMMISSION
Mail Station P1-137
Washington, DC 20555

Gentlemen:

DOCKET 50-266
LICENSEE EVENT REPORT 96-001-00
INADVERTENT ESF ACTUATION IN TRAIN B
DUE TO DC SYSTEM GROUND
POINT BEACH NUCLEAR PLANT, UNIT 1

Enclosed is Licensee Event Report 96-001-00 for Point Beach Nuclear Plant, Unit 1. This report is provided in accordance with 10 CFR 50.73(a)(2)(iv), "Any event or condition that resulted in a manual or automatic actuation of any engineered safety feature (ESF), including the reactor protection system (RPS)." This report describes an event where a Unit 1, Train B, safety injection actuation was initiated due to the actuation of the Unit 1, Train B, automatic safety injection relay during search for a ground on the 125 volt DC system.

If you require additional information, please contact us.

Sincerely,

A handwritten signature in black ink, appearing to read 'Bob Link'.

Bob Link
Vice President
Nuclear Power

CAC

Attachment

cc: NRC Resident Inspector
NRC Regional Administrator

9605100195 960503
PDR ADOCK 05000266
S PDR

LICENSEE EVENT REPORT (LER)

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

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

FACILITY NAME (1)

Point Beach Nuclear Plant, Unit 1

DOCKET NUMBER (2)

05000266

PAGE (3)

1 OF 5

TITLE (4)

Inadvertent ESF Actuation in Train B due to DC System Ground

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
04	05	96	96	-- 001 --	00	05	03	96		05000
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)										
OPERATING MODE (9)		N		20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
POWER LEVEL (10)		0		20.2203(a)(1)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		50.73(a)(2)(x)
				20.2203(a)(2)(i)		20.2203(a)(3)(iii)		50.73(a)(2)(iii)		73.71
				20.2203(a)(2)(iii)		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

Curtis A. Castell, Senior Engineer-Licensing

TELEPHONE NUMBER (Include Area Code)

(414) 221-2019

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

SUPPLEMENTAL REPORT EXPECTED (14)

YES
(If yes, complete EXPECTED SUBMISSION DATE).

X NO

EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR

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

On April 5, 1996, at about 0128 hours, a light bulb test rig was connected between the positive side of the D02 DC system and ground, as part of the search technique for locating a ground in the D02 DC system. When the light bulb test rig was attached, and based on the location of the ground, a circuit was completed that provided sufficient current to the Unit 1 SIA-B operate coil to cause actuation of the Unit 1, Train B, automatic safety injection circuitry. The ground had been inadvertently introduced on April 3, at approximately 1524 hours, when an electrician re-installing the relay mounting base for relays 1-62-1X1/A06 and 1-27-1X1/A06 in cubicle A00-82 did not notice that a wire was caught under the mounting frame and as the assembly was tightened, the wire insulation was damaged sufficiently to cause a ground in the D02 DC system. A root cause evaluation has been completed for this event. The cause of the ESF actuation has been determined to be an inadequate ground search technique. The introduction of the ground was mainly attributed to a difficult position for working on the relays that hindered the worker from observing that a wire had been pinched.

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

Event Description:

On April 3, 1996, two Electrical Testing and Maintenance (ETM) personnel were performing work in the Unit 1 4160 Volt bus (1A06) switchgear to install test switches in the degraded voltage circuit as part of the modification to install additional emergency diesel generators at PBNP. At approximately 1524 hours, one of the ETM electricians re-installing the relay mounting base for relays 1-62-1X1/A06 and 1-27-1X1/A06 in cubicle A00-82 did not notice that a wire was caught under the mounting frame and as the assembly was tightened, the wire insulation was damaged sufficiently to cause a ground in the D02 DC system.

A "D08 Battery Charger Trouble" alarm was received in the control room. D08 was the operating battery for D02 at the time. Operations personnel investigated the alarm and determined that there was a ground on D02 by about 1600 hours. The D02 ground was announced over the plant announcement system and one of the engineers coordinating the work on 1A06 was contacted to determine if the 1A06 work was the cause.

The engineer monitoring the 1A06 work heard the D02 ground alarm announced and based on his recollection that the circuitry being worked on in 1A06 being powered from the DC bus D04, not D02, he concluded that the work being performed by the ETM electricians could not be the cause. He provided his reasoning and his conclusion to operations personnel that the ground could not be caused by the work at 1A06.

Operations personnel initiated a work order to search for the source of the D02 ground. Maintenance personnel began searching for the D02 ground during the night shift on April 3. The search for the ground continued during the night shift on April 4. At about 0128 hours (April 5), a light bulb test rig was connected between the positive side of breaker D21-2 and ground. When the light bulb test rig was attached and based on the location of the ground, a circuit was completed that provided sufficient current to the Unit 1 SIA-B operate coil to cause actuation of the Unit 1, Train B, automatic safety injection circuitry. Based on the manner in which the Train B safety injection circuit was actuated, no direct indication of safety injection actuation (i.e. a first-out annunciator) was available.

The equipment actuated by the Unit 1 SIA-B, included the two Train B emergency diesel generators, three Train B service water pumps, the Train B low head safety injection pump, one Train B auxiliary feedwater pump, and Train B containment isolation. Operations personnel quickly identified the Unit 1, Train B Safety Injection circuit actuation. Operations personnel response included restoration of equipment to normal status.

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

During the system restoration, one of the operators was responding to high service water (SW) header pressure by securing SW pumps. When the number of operating SW pumps was reduced to less than four, a SW isolation signal was actuated. The service water isolation included spent fuel pool cooling, the Unit 1 turbine hall, the blowdown evaporator, and the water treatment facility. The operators restarted a SW pump and cleared the SW isolation condition. The SW isolation was unintentional. It was primarily attributable to the unusual manner in which the safety injection circuitry was actuated, without first-out indication.

The Unit 1, Train B SI circuitry is powered from breaker D21-04. The actuation of this circuitry led to the conclusion that the ground was located in the Unit 1, Train B SI circuit. The ground was isolated by opening the D21-04 breaker. Maintenance personnel repaired the ground on April 7 and power to the Unit 1 Train B SI circuit was restored.

Unit 1 remained in refueling shutdown during this event. Unit 2 remained at 90% power.

Component and System Description:

The safety injection actuation circuitry at PBNP is comprised of independent and redundant Train A and Train B circuits. The Train A and Train B circuits are powered by separate and independent DC power supplies. Train A is powered by the D01 DC supply, and Train B is powered by the D02 DC supply. The ground that had occurred on the negative side of D02 was in the 1A06 bus voltage permissive circuit for allowing the reset of the Train B safety injection circuitry. This caused the automatic safety injection actuation relay SIA-B to energize and actuate the Train B SI circuit in Unit 1 when a ground of sufficiently low resistance was introduced on the positive side of D02.

The equipment actuated by the Unit 1 SIA-B during this event, included the two Train B emergency diesel generators, three Train B service water pumps, the Train B low head safety injection pump, one Train B auxiliary feedwater pump, and Train B containment isolation.

Cause:

A root cause evaluation has been completed for this event. The cause of the ESF actuation has been determined to be an inadequate ground search technique. The introduction of the ground was mainly attributed to a difficult position for working on the relays that hindered the worker from observing that a wire had been pinched.

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

Corrective Action:

We will be performing an evaluation of our DC ground search techniques to determine how these techniques can be improved. The objective of this evaluation will be twofold: (1) Establish techniques that have a high probability of locating the ground quickly and accurately, and (2) that have a low probability of initiating unwanted consequences, such as ESF actuations or equipment inoperability.

Prior to completion of this evaluation, Site Engineering personnel will be involved in any ground detection that is needed on the DC system.

Reportability:

This event is being reported in accordance with the requirements of 10 CFR 50.73(a)(2)(iv), "The licensee shall report any event or condition that resulted in a manual or automatic actuation of any engineered safety feature (ESF), including the reactor protection system (RPS)."

The NRC Operations Center was notified via the Emergency Notification System at 0222, on April 5, 1996, of the reactor trip in accordance with 10 CFR 50.72(b)(2)(ii), "Any event or condition that results in a manual or automatic actuation of any engineered safety feature (ESF), including the reactor protection system (RPS)."

Safety Assessment:

The actuation of the Train B SI circuitry for Unit 1 during refueling shutdown had no deleterious safety effects. The equipment that was capable of operating automatically did so in the manner expected and the operators were able to quickly determine that the actuation was not valid and that the affected equipment was able to be returned to normal. The unintended service water isolation that occurred during the recovery from the inadvertent Train B SI was primarily due to one of the control operator's attempts to reduce service water header pressure. The SW header pressure was abnormally high due to the operation of more service water pumps than were needed at that time because of the automatic start of three Train B SW pumps. The operator was responding as expected for the situation. The unintended service water isolation was also quickly recognized and recovered.

The ground that was introduced in the D02 DC system did not affect operability of any equipment necessary for maintaining safe shutdown of Unit 1 or power operation of Unit 2. Unit 1 was in refueling shutdown and Unit 2 was operating at 90% power during this event.

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

Similar Occurrences:

The database of PBNP Licensee Event Reports was searched. No reports were identified that included ESF actuation due to a DC system ground. A Unit 2 LER (89-008-00) reported an event in which a spurious reactor trip signal was generated during shutdown due to a ground fault introduced on an instrument bus.