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SUBJECT: LER 90-026-00:on 901024,inadequate electrical power supply separation in two control room panels due to design error.

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

P.O. Box 968 • 3000 George Washington Way • Richland, Washington 99352

Docket No. 50-397

November 19, 1990

GO2-90-190

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: NUCLEAR PLANT NO. 2
LICENSEE EVENT REPORT NO. 90-026

Dear Sir:

Transmitted herewith is Licensee Event Report No. 90-026 for the WNP-2 Plant. This report is submitted in response to the report requirements of 10CFR50.73 and discusses the items of reportability, corrective action taken, and action taken to preclude recurrence.

Very truly yours,

J.W. Baker (M/D 927M)
WNP-2 Plant Manager

JWB:lr

Enclosure:
Licensee Event Report No. 90-026

cc: Mr. John B. Martin, NRC - Region V
Mr. C. Sorensen, NRC Resident Inspector (M/D 901A)
INPO Records Center - Atlanta, GA
Mr. D. L. Williams, BPA (M/D 399)
NRC Resident Inspector - walk over copy

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U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 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.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Washington Nuclear Plant - Unit 2	0 5 0 0 0 3 9 7	1 OF 0 5

TITLE (4) Inadequate Electrical Power Supply Separation in Two Control Room Panels Due to Design Error

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 NAMES	DOCKET NUMBER(S)
										0 5 0 0 0
1 0	2 4	9 0	9 0	0 2 6	0 0	1 1	1 9	9 0		0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	1 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		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)(vii)	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)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
C. L. Fies, Compliance Engineer	5 0 9 3 7 7 - 2 5 0 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13) X 2039

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

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 fifteen single-space typewritten lines) (16)

On October 24, 1990 an Electrical Designer identified a discrepancy in the Control Room 24 volt DC wiring. This problem was discovered during a walkdown associated with the preparation of a Design Change Package. The basic problem was the discovery that the safety related (Division I and II) and the non-safety related (Division A and B) 24 volt DC power supplies were tied together at two locations in the control room. This was a violation of the electrical separation criteria for the plant. Since this event was a condition outside the design basis it is a reportable event.

Immediate corrective action was taken to separate the safety related and non-safety related power. This was done by lifting two leads in Control Room Panel H13-841 and two leads in Panel H13-833.

The root cause of this event was an equipment design deficiency. The drawings and labeling were less than adequate leading to the violation of separation criteria.

Corrective actions will be taken to correct the associated drawings.

This condition did not threaten the health and safety of the public or Plant personnel.

Plant Conditions

a) Power Level - 100%
b) Plant Mode - 1 (Power Operation)

Event Description

On October 24, 1990 an Electrical Designer identified a discrepancy in the Control Room 24 volt DC wiring. This problem was discovered during the walkdown associated with the preparation of a Design Change Package. The basic problem was the discovery that the safety-related Division I and the non-safety-related Division A 24 volt DC power supplies were tied together in the control room. A similar situation existed for the Division II and B 24 volt DC power supplies. This was a violation of the electrical separation criteria of the plant.

The first problem was associated with the internal wiring on Control Room Panel H13-P841. The walkdown revealed that Division I and Division A 24 volt DC power supplies were tied together at the location of the module (analog device) associated with Service Water Pressure Switch 38A (SW-PS-38A). Panel H13-P841 holds 119 active analog devices that use two 24 volt DC power supplies. One power supply (E-E/S-99) provides Division I power to 72 active devices within the panel that involve safety-related equipment. The second power supply (E-E/S-199) provides Division A power to 47 active devices within the panel that are associated with non-safety-related equipment. Both these power supplies get their power from Division I 120 volt AC Instrument Power through Power Panel PP-7AA Circuit 18. At the location of SW-PS-38A, both Division I and Division A power were connected to the device.

A similar condition existed in Control Room Panel H13-P833. Here the walkdown revealed that Division II and Division B 24 volt DC power supplies were tied together at the location of the module (analog device) associated with Service Water Pressure Switch 38B (SW-PS-38B). Panel H13-P833 holds 90 active analog devices that use two 24 volt DC power supplies. One power supply (E-E/S-299) provides Division II power to 43 active devices within that panel that involve safety-related equipment. The second power supply (E-E/S-399) provides Division B power to 47 active devices within the panel that are associated with non-safety-related equipment. Both these power supplies get their power from Division II 120 volt AC Instrument Power through Power Panel PP-8AA Circuit 33. At the location of SW-PS-38B both Division II and Division B power were connected to the device.

Division I and II safety-related instrumentation located in Control Room Panels H13-P841 and H13-P833 includes devices associated with Standby Service Water (SW), Containment Nitrogen (CN), Fuel Pool Cooling (FPC), Containment Monitoring System (CMS), Standby Gas Treatment (SGT), Safety Related Heating and Ventilating Systems (HVAC), Main Steam Leakage Control (MSLC), and Containment Atmospheric Control (CAC). Since a number of safety-related components and systems were involved in this event it was difficult to understand the cumulative affect of power supply failure on Plant Safety. In view of this uncertainty, at 1608 hours on October 24, 1990 an unusual event was declared and Technical Specification Action Statement 3.0.3 was entered. A 50.72 notification was made at 1611 hours.

Immediate Corrective Action

Immediate corrective action was taken to remove the duplicate power sources from SW-PS-38A and SW-PS-38B. This was done by lifting two leads in Control Room Panel H13-841 and two leads in Panel H13-833. After the leads were lifted the unusual event was terminated at 1647 hours.

Further Evaluation and Corrective Action

A. Further Evaluation

1. This event is reportable per 10CFR50.73(a)(2)(ii)(B) as a condition outside of the Plant design basis. In addition, this event is reportable under paragraph (a)(2)(i)(B) as a condition prohibited by the plant's Technical Specifications. As discussed above, Action Statement 3.0.3 was entered as a result of this event.

2. The root cause of this event was an equipment design deficiency. The drawings and labeling was less than adequate leading to the violation of the electrical separation criteria. Specifically, the design showed the device as a separate instrument with a separate power supply. In actuality, the device consisted of a circuit card with a prewired power supply already in place.

3. There were no structures, components, or systems inoperable prior to the event which contributed to the event.

B. Further Corrective Action

1. Corrective action will be taken to as-build the drawings associated with SW-PS-38A and SW-PS-38B.

2. All devices in these two panels were inspected for multiple power supplies and no further seperation problems were found.

3. Additional corrective action is not warranted on this item for the following reasons:

   a. The design change (Project Engineering Directive 218-E-A416) was developed by the Architect Engineer, Burns and Roe in late 1982 before plant power operation. The design controls in place now are different than those that were in effect at the time this error occurred. Engineering now provides each electrical design change with an independent 100 percent point to point check. In addition, current electrical design procedures emphasize the need for electrical separation at all steps in the process.

b. These panels contain the majority of the Balance of Plant safety-related instrumentation wiring that was designed by the Architect Engineer. Other safety-related instrumentation panels were within the design scope of the Nuclear Steam Supply System (NSSS) vendor, General Electric. This type of error would not be expected from the NSSS vendor in the control room panels. Thus, the need for additional inspections is precluded.

Safety Significance

The two pressure switches (SW-PS-38A and SW-PS-38B) are part of the Standby Service Water System Bypass and Inoperable Status Indication (BISI) Display System. These switches receive signals from Pressure Transmitters (SW-PT-38A and SW-PT-38B) located on the Service Water Piping downstream of the Residual Heat Removal (RHR) Heat Exchangers (RHR-HX-1A and RHR-HX-1B). They provide an alarm on low Service Water pressure.

The Division I safety-related instrumentation located in Control Room Panel H13-P841 includes other devices associated with Standby Service Water (SW), Containment Nitrogen (CN), Fuel Pool Cooling (FPC), Containment Monitoring System (CMS), Standby Gas Treatment (SGT), Safety Related Heating and Ventilating Systems (HVAC), Main Steam Leakage Control (MSLC), and Containment Atmospheric Control (CAC).

Division II safety-related instrumentation located in Control Room Panel H13-P833 includes devices associated with the same systems.

A detailed review of the function of each device located in these panels was not performed. This type of review would be long and involved and, at this point in time, unnecessary since the problem is resolved. Thus, the specific items of safety significance on the individual devices has not been determined.

In general, the main item of safety significance in this event would be a fault initiated in the non-safety-related instrumentation that could have propagated to the safety-related power supply resulting in the loss of power to all devices in the associated panel. In addition, certain site wide events such as an earthquake could have resulted in the loss of power to safety-related instrumentation in both Division I and II.

This event did not threaten the health and safety of the public or Plant personnel as no loss of safety-related instrumentation occurred because of this condition.

Similar Events

LER 85-023 reported, in part, on inadequate spatial separation involving raceways carrying prime circuits (Non-class IE circuits connected to a class IE power supplies). LER 89-032 reported a violation of electrical separation criteria in three circuits. Two of the three errors described in LER 89-032 were made by the Architect Engineer, Burns and Roe in 1984. LER 89-039 describes electrical separation problems with the Reactor Building Exhaust Air (REA) Radiation Monitoring System.

While all the above events were related to the general criteria for electrical separation the events described in this LER are isolated to two control room panels and appear to be unrelated to those described above.

EIIS Information

Text Reference	EIIS Reference System	EIIS Reference Component
Control Room Panel H13-841	--	PL
Control Room Panel H13-833	--	PL
Service Water Pressure Switch 38A (SW-PS-38A)	BS	PS
Power Supply 99 (E-EIS-99)	EE	--
Power Supply 199 (E-EIS-199)	EE	--
Power Panel PP-7AA	EBJ	PP
Power Supply 299 (E-EIS-299)	EE	--
Power Supply 399 (E-EIS-399)	EE	--
Power Panel PP-8AA	EBJ	--
Standby Service Water (SW)	BS	--
Containment Nitrogen (CN)	LK	--
Fuel Pool Cooling (FPC)	DA	--
Containment Monitoring System (CMS)	IK	--
Standby Gas Treatment (SGT)	BH	--
Heating and Ventilating Systems (HVAC)	VA	--
Main Steam Leakage Control (MSLC)	SB	--
Containment Atmospheric Control (CAC)	BK	--
Bypass and Inoperable Status Indication (BISI)	IB	--
Residual Heat Removal Heat Exchangers (RHR-HX-1A/1B)	SO	HX