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 AUTH. NAME AUTHOR AFFILIATION
 DAVISON, W.S. Washington Public Power Supply System
 POWERS, C.M. Washington Public Power Supply System
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 89-032-00: on 890811, violation of electrical separation criteria found during technical evaluation.

W/8 ltr.

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 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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

Docket No. 50-397

September 11, 1989

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

Subject: NUCLEAR PLANT NO. 2
LICENSEE EVENT REPORT NO. 89-032

Dear Sir:

Transmitted herewith is Licensee Event Report No. 89-032 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,

C M Powers

C. M. Powers (M/D 927M)
WNP-2 Plant Manager

CMP:lr

Enclosure:
Licensee Event Report No. 89-032

cc: Mr. John B. Martin, NRC - Region V
Mr. C. J. Bosted, NRC Site (M/D 901A)
INPO Records Center - Atlanta, GA
Ms. Dottie Sherman, ANI
Mr. D. L. Williams, BPA (M/D 399)

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Washington Nuclear Plant - Unit 2										DOCKET NUMBER (2) 0 5 0 0 0 3 9 7 1				PAGE (3) 1 OF 0 4		
TITLE (Violation of Electrical Separation Criteria Found During Technical Evaluation Caused by Design Deficiency)																
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 8	1 1	8 9	8 9	0 3 2	0 0	0 9	1 1	8 9					0 5 0 0 0			
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)														
1		20.402(b)				20.405(c)				50.73(a)(2)(iv)				73.71(b)		
POWER LEVEL (10)		20.405(a)(1)(i)				50.38(c)(1)				50.73(a)(2)(v)				73.71(c)		
1 0 0		20.405(a)(1)(ii)				50.38(c)(2)				50.73(a)(2)(vi)				OTHER (Specify in Abstract below and in Text, NRC Form 366A)		
		20.405(a)(1)(iii)				50.73(a)(2)(i)				50.73(a)(2)(viii)(A)						
		20.405(a)(1)(iv)				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 W. S. Davison, Compliance Engineer										TELEPHONE NUMBER						
										AREA CODE 5 0 9 3 7 7 - 1 2 5 0 1						
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13) E X T. 2 7 2 6																
CAUSE	SYSTEM	COMPONENT	MANUFAC Turer	REPORTABLE TO NPDs		CAUSE	SYSTEM	COMPONENT	MANUFAC Turer	REPORTABLE TO NPDs						
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 August 10, 1989, a technical evaluation being conducted as follow up for an Operating Experience Report resulted in the discovery of a non-Class 1E 120 volt AC electrical power supply branch circuit (Circuit Number 40 Power Panel PP-8A-A) that violated the WNP-2 Electrical System separation criteria. On August 11, 1989, further investigation identified this condition as requiring corrective action to alleviate its affect on the safety related portion of the power plant electrical system. Before corrective action could be finalized and implemented on August 11, 1989, the plant was shut down in response to another unrelated electrical system condition which affected the operability of a major portion of the Class 1E 480 volt AC Electrical Distribution System (see LER 89-34). During the shutdown, investigation was continued and resulted in the discovery of two more circuits which contained separation criteria violations. PP-8A-A Circuit Number 7, which supplies process radiation monitoring instruments, contained only a single series fuse. PP-8A-E Circuit Number 9, which supplies the Loose Parts Detection System, also contained only a single series fuse. All three circuit design deficiencies were corrected during the outage. The root cause of this event was evaluated as being: Equipment /Design Deficiency/Specification Less Than Adequate and Equipment/Design Deficiency/Review Did Not Detect Errors. An ongoing evaluation of the design change process will be modified to include determination of the necessity for improvements to address electrical separation requirements.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Washington Nuclear Plant - Unit 2	0 5 0 0 0 3 9 7	8 9	0 3 2	0 0	0 2	OF	0 4

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

Training will be provided to selected Generation Engineering Department personnel and Plant Technical personnel on the Electrical Separation Practices Document. An engineering evaluation will be performed to identify separation problems associated with downstream branch circuits fed from Class 1E power panels. A technical evaluation was conducted to discover similar separation problems which included the first power cable of each branch circuit of all safety related electrical power panels. In addition a sampling of Safety Related Motor Control Center power feeder cables were reviewed. No additional problems were discovered. This event posed no significant threat to the safety of plant personnel or the public.

Plant Conditions

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

Event Description

On August 10, 1989, a technical evaluation being conducted as follow up for and Operating Experience Report resulted in the discovery of a non-Class 1E 120 volt AC electrical power supply branch circuit (Circuit Number 40 Power Panel PP-8A-A) that violated the WNP-2 Electrical System separation criteria. On August 11, 1989, further investigation identified this condition as requiring corrective action to alleviate its affect on the safety related portion of the power plant. Before corrective action could be finalized and implemented on August 11, 1989, the plant was shut down in response to another unrelated electrical system condition which affected the operability of a large portion of the Class 1E 480 volt AC Electrical Distribution System.

The circuit in question, Power Panel PP-8A-A Circuit number 40, which supplies a portion of the Digital Electro-Hydraulic Turbine Control System (DEH) instrumentation, was found to have only one circuit protective device (fuse) installed between the Class 1E power panel and the non-Class 1E load (DEH). The separation design for the WNP-2 Electrical System allows designated non-Class 1E loads to be powered from Class 1E panels if two circuit protective devices (in this case fuses) are installed in series to protect against faults in the cabling and downstream load or if the cable to the non-1E load is routed to 1E requirements through a single Class 1E fuse (Prime Circuit designation). In this instance, only one series fuse was installed but the cable was not designated as a Prime Circuit. Thus, the circuit did not comply with the requirement for separation of the non-Class 1E sections of the electrical system from the Class 1E system.

The plant shutdown provided the opportunity to modify the system design to correct the fault by installing an additional fuse in series with the existing fuse to provide the required double fusing arrangement. During the shutdown, investigation was continued and resulted in the discovery of two more circuits which contained separation criteria violations. PP-8A-A Circuit Number 7, which supplies process radiation monitoring instruments, contained only a single fuse and was not routed or designated as a Prime Circuit. PP-8A-E Circuit Number 9, which supplies the Loose Parts/Detection System, also contained only a single fuse and was not routed or designated as a Prime Circuit.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

Immediate Corrective Action

During the outage associated with the forced shutdown on August 11, 1989, through August 14, 1989, an additional fuse was installed on the panel side of PP-8A-A Circuit Number 40 to bring the installation into compliance with WNP-2 separation criteria. Two additional circuits were also identified and corrected. PP-8A-A Circuit Number 7 and PP-8A-E Circuit Number 9 were each provided with an additional fuse.

Further Evaluation and Corrective ActionA. Further Evaluation

1. This event is being reported as an event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to; shutdown the reactor and maintain it in a safe condition or mitigate the consequences of an accident per the requirements of 10CFR50.73(a)(2)(v).
2. The root cause of this event was evaluated as being:
 - o Equipment/Design Deficiency/Specification Less Than Adequate -

A total of three circuits were identified which were incorrectly designed with only a single fuse between non-Class 1E loads and Class 1E electrical power supplies. The WNP-2 Electrical Separation Practices Document identifies the requirement for double fusing (two fuses in series) in these cases. The design documents for this equipment did not conform with this requirement.
 - o Equipment/Design Deficiency/Review Did Not Detect Errors -

Design changes were issued which failed to meet the requirements for electrical separation. The design change process contains reviews which should have spotted these flaws and corrected them prior to issuance of the design change package.
3. Of the three design errors discovered, two were made by the Architect Engineer, Burns and Roe Company, (PP-8A-A Circuit Number 40 and PP-8A-A Circuit Number 7) prior to initial plant startup in 1984 and one was made by the Supply System design staff (PP-8A-E Circuit Number 9) during the 1987 refueling outage. Since the time of these errors, the design change process at WNP-2 has been evaluated and improved such that the probability for recurrence of these types of design flaws has been significantly reduced.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

B. Further Corrective Action

1. An ongoing evaluation of the design change process will be modified to include determination of the necessity for improvements to address electrical separation requirements.
2. Training will be provided to selected Generation Engineering Department personnel on the Electrical Separation Practices Document.
3. Training will be provided to selected Plant Technical Department personnel on the Electrical Separation Practices Document.
4. An engineering evaluation will be performed to identify separation problems associated with downstream branch circuits fed from Class 1E power panels.
5. A technical evaluation was conducted to discover similar separation problems which included the first power cable of each branch circuit of all safety related electrical power panels. In addition, a sampling of Safety Related Motor Control Center power feeder cables were reviewed. No additional problems were discovered.

Safety Significance

Prior to the discovery and correction of the separation problems associated with this event, there was increased probability that a single fault in a Class 1E electrical component (Inverter IN-3) could have caused the loss of major portions of the remaining Division 1 Class 1E low voltage electrical power system during accident conditions. Thus, this event resulted in a decrease in the probability of achieving safe shutdown had an accident condition occurred. Since no such event actually occurred at WNP-2, this event posed no significant threat to the safety of plant personnel or the public.

Similar Events

None

EIIS InformationText Reference

DEH
Electrical power supply branch circuit
Power Panel PP-8A-A
PP-8A-E
Loose Parts Detection System
Process radiation monitoring instruments

EIIS Reference

System	Component
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TG	---
ED	PL
ED	PL
ED	---
II	---
IL	---