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RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 92-021-00: on 920513, discovered that certain QC-2 instruments were not appropriately isolated from QC-1. Caused by less than adequate design. No corrective action was taken. W/920612 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 7
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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

**SUBJECT: NUCLEAR PLANT WNP-2, OPERATING LICENSE NPF-21
LICENSEE EVENT REPORT NO. 92-021**

Transmitted herewith is Licensee Event Report No. 92-021 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.

Sincerely,



J. W. Baker
WNP-2 Plant Manager (Mail Drop 927M)

JWB/JDA/lc
Enclosure

cc: Mr. J. B. Martin, NRC - Region V
Mr. C. Sorensen, NRC Resident Inspector (Mail Drop 901A, 2 Copies)
INPO Records Center - Atlanta, GA
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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

PAGE (3)

1 OF 6

TITLE (4)

Inadequate Electrical Separation Pertaining to Post-Accident Radiation Monitoring Instrument Circuitry and Quality Class 1 Components Connected to Quality Class 2 Power Due to Less Than Adequate Design

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 NUMBERS(S)				
0	5	1	4	9	2	9	2	0	2	1	0	0		
0	5	1	4	9	2	9	2	0	6	1	2	9		
OPERATING MODE (9)			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)											
5														
POWER LEVEL (10)			20.402(b)			20.405(c)			50.73(a)(2)(iv)			77.71(b)		
0			20.405(a)(1)(i)			50.36(c)(1)			50.73(a)(2)(v)			73.73(c)		
0			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)		
0			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	TELEPHONE NUMBER
J. D. Arbuckle, Licensing Engineer	
	AREA CODE
	5 0 9 3 7 7 - 4 1 4 5

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS

SUPPLEMENTAL REPORT EXPECTED (14)

<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

ABSTRACT (16)

This LER describes two related events pertaining to electrical separation that were discovered by Supply System Engineering personnel. The first event was determined to be reportable on May 14, 1992 and the second event was determined to be reportable on May 21, 1992.

On May 13, 1992, during the performance of a design verification review on Post-Accident Radiation Monitoring Boards, Engineering personnel discovered that certain QC-2 instruments were not appropriately isolated from QC-1 components in that only single-circuit protective devices (fuses) had been installed and downstream circuits were not provided with adequate electrical separation. In addition, it was also discovered that the protective fuses feeding a partially-deactivated nonsafety-related chlorine analyzer were coordinated such that an analyzer fault could have potentially affected the operability of safety-related Primary Containment Radiation Monitors in redundant divisions.

On May 18, 1992, as part of a wiring diagram upgrade effort, Engineering personnel discovered that QC-1 components for Standby Service Water (SW) and Main Steam Leakage Control (MSLC) were connected to QC-2 power supplies in a Control Room power panel.

The causes of these events are Less Than Adequate Design and Change-Related Equipment Not Modified. Because the Plant was already shutdown for the annual maintenance and refueling outage, there was no immediate corrective action taken pertaining to this LER. Further corrective actions consist of 1) providing double fusing for the QC-2 loads on the Post-Accident Radiation Monitoring Boards (completed), 2) deactivating the control power to the chlorine analyzers (completed), 3) relocating the QC-1 components to a QC-1 power supply, and 4) performing an engineering review of Control Room Panels E-CP-H13/P833 and E-CP-H13/P841 for any other problems pertaining to electrical separation.

These events did not affect the health and safety of either the public or Plant personnel.

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TITLE (4) Inadequate Electrical Separation Pertaining to Post-Accident Radiation Monitoring Instrument Circuitry and Quality Class 1 Components Connected to Quality Class 2 Power Due to Less Than Adequate Design							

Plant Conditions

Power Level - 0%
Plant Mode - 5 (Refueling)

Event Description

This LER describes two related events pertaining to electrical separation that were discovered by Supply System Engineering personnel while the Plant was shut down for the annual maintenance and refueling outage. The first event was determined to be reportable on May 14, 1992 and the second event was determined to be reportable on May 21, 1992.

On May 13, 1992, during the performance of a design verification review on Post-Accident Radiation Monitoring Boards BD-RAD-22 and BD-RAD-23, Engineering personnel discovered that QC-2 instruments were connected to Class 1E power in a manner not consistent with the WNP-2 Electrical Separation Design Specification. It was discovered that the QC-2 instruments were not appropriately isolated from the QC-1 components in that only single circuit protective devices (fuses) had been installed and downstream circuits were not provided with adequate electrical separation. This situation, which has existed since construction of WNP-2, could have potentially affected the operability of post-accident radiation monitoring instrumentation. The separation design for the WNP-2 Electrical System allows designated non-Class 1E loads to be powered from Class 1E panels if two fuses are installed in series to protect against faults in the cabling and the downstream loads, or a single fuse if the downstream circuits have adequate electrical separation. The affected components involved are Post-Accident Radiation Monitoring Instruments CMS-RIS-12/1A(1B), CMS-RIS-12/3A(3B), CMS-RIS-27A - 27F, WOA-RIS-31A(B), WOA-RIS-32A(B), and PRM-RR-1(2). The purpose of these instruments is to monitor and display radiation levels to ensure that 1) appropriate protective corrective action is taken to limit the potential release of radioactive materials from the Reactor Vessel and Reactor Building if predetermined radiation levels are exceeded in the major process effluent streams, and 2) the inflow of airborne radioactivity to the control room is limited following an accidental release.

Furthermore, it was also determined that the protective fuses feeding a partially deactivated chlorine analyzer were coordinated such that the fuse designated to isolate the deactivated component may not have blown before the upstream QC-1 fuse. As a result, the loss of the upstream fuse potentially could have affected the operability of Primary Containment Radiation Monitors CMS-RIS-27E and CMS-RIS-27F. This condition has also existed since construction of WNP-2.

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On May 18, 1992, during the WNP-2 Electrical Wiring Diagram (EWD) upgrade efforts, Supply System Engineering personnel discovered additional electrical separation problems while creating circuit details for AC Electrical Distribution Power Panels E-PP-7AA and E-PP-8AA. The problems included QC-1 components that were connected to QC-2 power supplies, which is contrary to design requirements, in Control Room Panels E-CP-H13/P833 and E-CP-H13/P841. In this particular case, the safety-related components that were powered by a 24 Volt DC nonsafety-related power supply are Standby Service Water (SW) Temperature Scalers SW-SCL-1B and SW-SCL-1D, and Main Steam Leakage Control (MSLC) Inboard Line Heat Trace HT-TS-MSLC/10A1, HT-TS-MSLC/10B1, HT-TS-MSLC/10C1 and HT-TS-MSLC/10D1. This condition has existed since construction of WNP-2. If power had been lost to the Class 2 Bus, this instrumentation would have been inoperable. The SW Scalers feed Temperature Indicators SW-TI-1B and SW-TI-1D which have indication and alarm functions only. The purpose of the inboard MSLC Heat Trace is to energize system heaters to vaporize any condensate that might form between the inboard and outboard Main Steam Isolation Valves (MSIVs).

It should be noted that all of the circuits involved were "low energy" circuits related to Plant instrumentation and, therefore, the probability of damage from faults would be low.

Immediate Corrective Action

Because the Plant was already shutdown for the annual maintenance and refueling outage, there was no immediate corrective action taken pertaining to this LER.

Further Evaluation and Corrective Action

A. Further Evaluation

1. These events are reportable in accordance with the requirements of 10CFR50.73(a)(2)(v) as any event or condition alone that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident. These events were also verbally reported to the NRC in accordance with the requirements of 10CFR50.72 as four-hour, nonemergency notifications on May 14, 1992 and May 21, 1992 respectively.
2. There were no systems, structures or components that were inoperable at the time of the events that contributed to the events.

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3. The causes of these events are 1) **Less Than Adequate Design** in that there was a lack of appropriate electrical separation between safety-related and nonsafety-related equipment, and Quality Class 1 loads were powered from a Quality Class 2 power supply and 2) **Change-Related Equipment Not Modified** in that an existing design change to reduce the fuse size (providing coordination) in the deactivated chlorine analyzers was either not implemented, or was implemented incorrectly.

The identified problems pertaining to electrical separation and the chlorine analyzer fuse size have existed since construction of WNP-2 (prior to 1984). Furthermore, a Project Engineering Directive was generated in 1984 to reduce the fuse size in the chlorine analyzers. In 1986, the control and alarm functions of the chlorine analyzers were deactivated because the method for treating the Circulating Water (CW) System was changed from chlorine gas to sodium hypochlorite and the analyzers were not required. A note in the Design Change Package for that effort stated that deletion of the analyzers and other associated instrumentation, including power circuitry, would be addressed in a separate design change. However, no further component modifications were made and, as a result, the analyzer panels were left in an energized configuration. Further followup of this issue is being addressed by the root cause process pertaining to this LER.

Since the time of these errors, significant improvements have been made to the design change process at WNP-2. For example, Supply System Engineering now performs an independent 100 percent check/verification for each electrical design. In addition, the need for electrical separation at all steps in the process has been emphasized to WNP-2 engineers and designers. The design modification process now in place also requires design changes to be tracked by means of the Plant Tracking Log to ensure field completion of any changes, including any followup modifications that must be made.

Furthermore, the Supply System EWD upgrade effort is an ongoing process intended to improve the quality and accuracy of electrical drawings. Other events resulting from this effort may be reported as revisions to this LER.

B. Further Corrective Action

1. A design change was implemented to provide double fusing for the QC-2 loads on Post-Accident Radiation Monitoring Boards BD-RAD-22 and BD-RAD-23.
2. The control power to the chlorine analyzers has been deactivated and the cables spared in place.

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3. The QC-1 components that were identified as being connected to QC-2 power in Control Room Panels E-CP-H13/P833 and E-CP-H13/P841 will be relocated to a QC-1 power supply. This will be completed prior to restart from the ongoing maintenance and refueling outage (currently scheduled for July 1, 1992).
4. An engineering review is currently in process to evaluate the signal conditioning units and measurement loop devices in Control Room Panels E-CP-H13/P833 and E-CP-H13/P841 for any additional problems pertaining to electrical separation. This review will be completed prior to restart from the ongoing maintenance and refueling outage.

Safety Significance

The primary items of safety significance for these events would be: 1) a fault initiated in the nonsafety-related instrumentation circuitry that could have propagated to the safety-related power supply and resulted in the loss of power to all devices being fed by that power supply, and 2) a loss of the nonsafety-related sources supplying power to the MSLC Heat Trace which could have resulted in the loss of system safety function. However, the potential for failure of the power supplies for the components described in this LER is considered to be low. The design of the power supplies is such that they are current-limiting and the loads consist of low energy instrumentation circuits. In the case of Radiation Monitoring Boards BD-RD-22 and BD-RD-23, the power supplies for the RIS monitoring instrumentation also contain internal fuses that potentially could have been considered as additional isolation devices. However, this particular configuration of double-fusing was not formally evaluated.

Furthermore, these events did not affect the health and safety of either the public or Plant personnel because no loss of safety-related instrumentation occurred because of conditions identified in this LER.

Similar Events

1. LER 89-032, "Violation of Electrical Separation Criteria Found During Technical Evaluation Caused by Design Deficiency." This LER described a situation where a Digital Electro-Hydraulic (DEH) Turbine Control System circuit was found to have only one circuit protective device (fuse) installed between the Class 1E power panel and the non-Class 1E load (DEH).
2. LER 89-039, "Inadequate Electrical Separation and Non-Failsafe Design of the Reactor Building Exhaust Air Radiation Monitoring System." This LER described three discrepancies pertaining to inadequate electrical separation in Control Room cabinets, routing of failsafe cable in nonfailsafe raceways outside of the Power Generation Control Complex (PGCC), and a nonfailsafe design response of the radiation monitors to inoperative/downscale conditions.

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3. LER 90-026, "Inadequate Electrical Power Supply Separation in two Control Room Panels due to design Error." This LER described a situation where it was discovered that safety-related and nonsafety-related 24 Volt DC power supplies were tied together at two locations in the control room.

EIIS Information

Text Reference

BD-RAD-22/BD-RAD-23
 CMS-RIS-12/1A (1B)
 CMS-RIS-12/3A (3B)
 CMS-RIS-27A - 27F
 WOA-RIS-31A (B)
 WOA-RIS-32A (B)
 PRM-RR-1 (2)
 Reactor Vessel
 Reactor Building
 Chlorine Analyzer
 Power Panels E-PP-7A/E-PP-8AA
 Panel E-CP-H13/P833
 Panel E-CP-H13/P841
 SW-SCL-1A (1D)
 MSLC-HT-10A1 (10B1, 10C1, 10D1)
 SW-TI-1B (1D)
 Main Steam Isolation Valves (MSIVs)
 Circulating Water (CW) System

EIIS Reference

<u>System</u>	<u>Component</u>
IL	ECBD
IK	DET
IK	DET
IK	DET
VH	DET
VH	DET
IK	RR
NG	RCT
NG	BLDG
VH	MON
EA	PL
EI	PL
EI	PL
BI	SCL
SB	----
BI	TI
SB	ISV
KE	----