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 SORENSEN, G.C. Washington Public Power Supply System
 BAKER, J.W. Washington Public Power Supply System
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 91-009-00: on 910417, ESF actuation & RWCU isolation occurred when electricians cut wires to plug of wind direction recorder, causing voltage drop. Caused by equipment installation error. Wires reversed. W/910510 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 5
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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NSIC POORE, W.	1 1	NUDOCS FULL TXT	1 1

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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

Docket No. 50-397

May 10, 1991

G02 91-094

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

Subject: NUCLEAR PLANT NO. 2
LICENSEE EVENT REPORT NO. 91-009

Dear Sir:

Transmitted herewith is Licensee Event Report No. 91-009 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. M. Baker (M/D 927M)
WNP-2 Plant Manager

JWB:ac

Enclosure:
Licensee Event Report No. 91-009

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

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LICENSEE EVENT REPORT (LER)

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.

FACILITY NAME (1)

Washington Nuclear Plant - Unit 2

DOCKET NUMBER (2)

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PAGE (3)

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TITLE (4)

REACTOR WATER CLEANUP SYSTEM (RWCU) CONTAINMENT ISOLATION-ESF
ACTUATION CAUSED BY WIRING 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	4	17	9	1	9	1	0	5	1	0
0	4	17	9	1	9	1	0	5	1	0
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)								
5		20.402(b) <input type="checkbox"/> 20.405(c) <input checked="" type="checkbox"/> 50.73(a)(2)(iv) <input type="checkbox"/> 73.71(b) <input type="checkbox"/>								
POWER LEVEL (10)		20.405(a)(1)(i) <input type="checkbox"/> 50.36(c)(1) <input type="checkbox"/> 50.73(a)(2)(v) <input type="checkbox"/> 73.71(c) <input type="checkbox"/>								
101%		20.405(a)(1)(ii) <input type="checkbox"/> 50.36(c)(2) <input type="checkbox"/> 50.73(a)(2)(vi) <input type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 366A) <input type="checkbox"/>								
		20.405(a)(1)(iii) <input type="checkbox"/> 50.73(a)(2)(i) <input type="checkbox"/> 50.73(a)(2)(viii)(A) <input type="checkbox"/>								
		20.405(a)(1)(iv) <input type="checkbox"/> 50.73(a)(2)(ii) <input type="checkbox"/> 50.73(a)(2)(viii)(B) <input type="checkbox"/>								
		20.405(a)(1)(v) <input type="checkbox"/> 50.73(a)(2)(iii) <input type="checkbox"/> 50.73(a)(2)(x) <input type="checkbox"/>								

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
AREA CODE	
G. C. Sorensen, Manager, Regulatory Programs	510 19 317 171-1 513 12 18

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC

SUPPLEMENTAL REPORT EXPECTED (14)

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

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single space typewritten lines) (16)

On April 17, 1991 at 1251 hours, with the plant shut down for the annual refueling outage, an Engineered Safety Feature (ESF) actuation occurred. This ESF actuation was part of a Nuclear Steam Supply Shutoff System (NS⁴) Group 7 isolation and involved the closure of a single valve in the Reactor Water Cleanup System (RWCU). The isolation occurred when contractor electricians cut the wires to the plug of a wind direction recorder which was to be replaced. Although the fuse in this circuit had been pulled, an electrically hot wire to the plug still existed. The momentary grounding of the recorder power supply caused a voltage drop on other circuits in the same electrical panel, which caused a false RWCU high flow differential trip.

As an immediate corrective action, plant operators reopened the RWCU isolation valve, restarted the RWCU pump and restored the system to service.

The root cause of this event was equipment installation error which resulted in the NEUTRAL and HOT wires being switched in a junction box.

This event presented no threat to the health and safety of plant personnel or the public.

EXPIRES: 4/30/92

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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.

FACILITY NAME (1)

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NUMBER

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

Plant Conditions

Power level - 0%

Plant mode - 5 (Refueling)

Event

On April 17, 1991 at 1251 hours, with the plant shut down for the annual refueling outage, an Engineered Safety Feature (ESF) actuation occurred. This ESF actuation was part of a Nuclear Steam Supply Shutoff System (NS⁴) Group 7 isolation and involved the closure of a single containment isolation valve in the Reactor Water Cleanup System (RWCU). Contractor electricians, working under an approved plant Maintenance Work Request, were in the process of replacing the control room recorder which provides meteorological tower wind direction information. The fuse to the recorder had been removed and tagged under a plant clearance order. As part of the authorized work, the plug from the power panel to the recorder was to be changed out to match the new recorder. The electricians observed a small arc when the plug wires were cut, immediately stopped any further work on the panel and notified the control room supervisor. The momentary electrical transient caused by cutting an energized wire to the plug resulted in a voltage dip in other systems powered from the same electrical panel, which created a false RWCU high flow differential trip. This caused the outboard isolation valve (RWCU-V-4) in the RWCU to close and tripped the RWCU pump (RWCU-P-1A).

Immediate Corrective Action

At 1255 hours, Plant operators opened RWCU-V-4 and restarted RWCU-P-1A, returning the system to service.

Further Evaluation and Corrective ActionA. Further Evaluation

1. This event is being reported as an event that resulted in the automatic actuation of an Engineered Safety Feature under the requirements of 10CFR50.73 (a)(2)(iv). This event was previously reported on the Emergency Notification System as a four hour reportable event at 1452 hours on April 17, 1991.
2. The root cause of this event was determined to be equipment installation error, which resulted in the NEUTRAL and HOT leads being reversed in the junction box (JB-TCU-4.1) between the breaker (power panel 7A-A) and the control room panel (board L). A contributing cause was less than adequate work practices, in that common practice did not include checking each wire to ground to assure the absence of voltage prior to cutting the wires.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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.

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

3. The ESF actuation was due to an electrical transient caused by cutting the wires on the plug from the power panel to the wind direction recorder (MET-WDR-4). A clearance order for the work on the recorder had pulled and tagged the correct fuse (FBL1-F01) to the circuit, but the fuse was in fact in the neutral line of the circuit and the plug remained electrically "hot". The source of the problem was found to be a wiring error in Junction Box JB-TCU-4.1 such that the HOT and NEUTRAL wires had been crossed. This error apparently had existed since prior to initial plant startup. The electrical transient created by the momentary grounding of the power to the recorder plug caused a voltage dip at the panel (PP-7A-A).
4. Further investigation found that the wires had been pulled from the power panel (PP-7A-A) to the junction box (JB-TCU-4) during Plant construction on October 15, 1979. At this time, the wires should have been marked with the proper color coded markers. In 1982, the wires were remarked with "Duramark Wire Markers." There are no records of other work having been done on this circuit or the equipment which would have resulted in crossing the wires or checking the voltages on either the HOT or NEUTRAL circuits before this event occurred. It appears that this error has existed since 1979.
5. It is indeterminate as to why the crossed wiring was not found during initial Plant construction and subsequent startup testing. Documentation for the installation of the wiring in October 1979 shows that although Quality Control (QC) should have approved the installation, this step apparently was missed for this installation as there was no QC signoff on the electrical contractor's installation documentation. The work in 1982 which added new wire markers was signed off by QC as required. However, this work did not require or include checking for correct installation, only correct marking. Current procedures require QC signoff on such work and should prevent a recurrence of this error.
6. There were no structures, systems or components that were inoperable prior to the start of this event which contributed to the event.

B. Further Corrective Action

1. A maintenance work request was written on 18 April 1991 to reverse the HOT and NEUTRAL wires in junction box JB-TCU-4.1 and assure that the wires are correctly marked.
2. The Plant electrical maintenance supervisor issued an Interoffice Memorandum to all maintenance workers informing them that prior to determining, lifting, cutting or unplugging, to include as standard practice the verifying of all wires for a potential (load), NEUTRAL and GROUND included.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 60.0 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.

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

3. Contractor electrical supervision has informed their craft of the same precaution noted in 2 above.
4. Each control room maintenance work request work package will include the precaution contained in 2 above.

Safety Significance

The RWCU and NS⁴ systems functioned to initiate isolation per the design requirements. The purpose of the cleanup system is to maintain reactor water purity and short outages of the RWCU system have no impact on Plant operations. There is no safety significance to this event as it posed no threat to the safety of Plant personnel or the public.

Similar Events

There have been a number of other LERs, including LER 89-033 and 88-025, dealing with RWCU differential flow isolations. None of these, however, were associated with a wiring error.

EIIS InformationText ReferenceEIIS Reference

	<u>System</u>	<u>Component</u>
Reactor Water Cleanup System (RWCU)	CE	--
Nuclear Supply Shutoff System (NS ⁴)	BD	--
RWCU Valve 4 (RWCU-V-4)	CE	V
RWCU Pump 1A (RWCU-P-1A)	CE	P
Wind Direction Recorder (MET-WDR-4)	--	R
Power Panel (PP-7A-A)	EC	PDM