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 RECIP. NAME: RECIPIENT AFFILIATION

SUBJECT: LER 92-019-01: on 920430, determined that automatic depressurization potentially inoperable due to inadequate installation instructions of solenoid pilot valve power cables. No corrective action required. W/920715 ltr.

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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Washington, D. C. 20555

**SUBJECT: NUCLEAR PLANT WNP-2, OPERATING LICENSE NPF-21
LICENSEE EVENT REPORT NO. 92-019-01**

Transmitted herewith is Licensee Event Report No. 92-019-01 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 for

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

JWB/JDA/jrd
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
Mr. D. L. Williams, BPA (Mail Drop 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				PAGE (3) 1 OF 5												
TITLE (4) AUTOMATIC DEPRESSURIZATION SYSTEM (ADS) POTENTIALLY INOPERABLE DUE TO INADEQUATE INSTALLATION INSTRUCTIONS OF SOLENOID PILOT VALVE POWER CABLES																												
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	4	3	0	9	2	9	2	--	0	1	9	--	0	1	0	7	1	5	9	2								
OPERATING MODE (9) 5			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR §: (Check one or more of the following) (11)																									
POWER LEVEL (10) 0 0 0			20.402(b) 20.405(a)(1)(i) 20.405(a)(1)(ii) 20.405(a)(1)(iii) 20.405(a)(1)(iv) 20.405(a)(1)(v)				20.405(C) 50.36(c)(1) 50.36(c)(2) 50.73(a)(2)(i) 50.73(a)(2)(ii) 50.73(a)(2)(iii)				50.73(a)(2)(iv) X 50.73(a)(2)(v) 50.73(a)(2)(vii) 50.73(a)(2)(viii)(A) 50.73(a)(2)(viii)(B) 50.73(a)(2)(x)				77.71(b) 73.73(c) OTHER (Specify in Abstract below and in Text, NRC Form 366A)													
LICENSEE CONTACT FOR THIS LER (12)																												
NAME J. D. Arbuckle, Licensing Engineer												TELEPHONE NUMBER AREA CODE 5 0 9 3 7 2 - 5 4 1 8																
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) <input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO												EXPECTED SUBMISSION DATE (15)																
ABSTRACT (16) On April 30, 1992, a reportability evaluation determined that a situation discovered on April 27, 1992, be reported per 10CFR50.72. Routine System Engineer inspection of the Main Steam Safety Relief Valves noted several instances of electrical connector nuts, fittings, and conduits that were not tightly connected. This situation may have not ensured proper system operation under all postulated functional Design Basis Accident environment profiles or seismic events because the as found condition was not equivalent to the equipment qualification configuration. On June 16, 1992 during followup corrective actions pertaining to restoring system configuration to existing design requirements as discussed in the original LER, additional connection problems were identified with solenoid pilot valve power circuitry. These additional problems included instances of soldering of connections and degradation of the moisture barrier-to-socket interface for several connectors. The root cause is inadequate assembly or installation instructions. Immediate corrective action was not required because the plant was still in a shutdown condition and the ADS was not needed to be operable when the condition was initially reported. Further corrective action consisted of replacing all soldered socket pins with crimped socket pins, implementing a design change to provide better structural support of the electrical conduits that route cable to the relief valves, and performing a reinspection of ADS cabling, connectors and conduit. The event posed no threat to the health and safety of either the public or plant personnel since the power to the ADS valves was available for them to perform their safety function. This was demonstrated by the periodic surveillance activities. In addition, each of the ADS valves has two ADS logic activated solenoid pilot valves and a third non-ADS actuated (pressure relief mode) solenoid pilot valve, any of which would allow the valve to operate.																												

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Plant Conditions

Power Level - 0%

Plant Mode - 5

Event Description

On April 30, 1992, a reportability evaluation determined that a situation discovered on April 27, 1992, be reported per 10CFR50.72. Routine System Engineer inspection of the Main Steam Safety Relief Valves (MSRV) noted several discrepancies involving the controlling solenoids' 125VDC power cable, conduit and power cable connectors. The discrepancies were documented and prompted further investigation, which was conducted by the ADS acoustic monitor System Engineers. The expanded inspection revealed additional instances of electrical connector nuts, fittings, and conduits that were not tightly connected. Discrepancies were found on twelve of the eighteen MSRVs.

Seven of the MSRVs are designated as Automatic Depressurization System (ADS) valves. The reportability evaluation concluded that five of the ADS valves, MS-RV-3D, MS-RV-4C, MS-RV-4D, MS-RV-5B, and MS-RV-5C, were not found in a condition that would support the required equipment qualification configuration for in containment ADS power circuits (connectors, cable, and conduit). This condition may have not ensured proper system operation under all postulated Design Basis Accident environment profiles or seismic events because the as found condition was not equivalent to the equipment qualification configuration.

On June 16, 1992 during followup corrective actions pertaining to restoring system configuration to existing design requirements as discussed in the original LER, additional problems were identified with solenoid pilot valve power circuitry. Specifically, it was noted that connections were soldered which is contrary to design and installation requirements for the types of connectors involved. In addition, degradation of the moisture barrier-to-socket interface was also noted for several connectors. Furthermore, instances of degradation of the wire strands soldered to the sockets were discovered on the "C" solenoid pilot valves for ADS valves MS-RV-3A, MS-RV-4A, MS-RV-4B, MS-RV-4C, MS-RV-4D and MS-RV-5B respectively. At the time these additional problems were discovered, the Plant was still in a shutdown condition for the annual maintenance and refueling outage.

Immediate Corrective Action

No immediate corrective action was taken since the ADS was not required to be operable during Plant Operational Condition 5.

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Further Evaluation and Corrective Action

A. Further Evaluation

1. This event is considered reportable per 10CFR50.73(a)(2)(v) as a condition alone which could have prevented the Automatic Depressurization Function. The NRC was verbally notified of this condition on April 30, 1992, per 10CFR50.72(b)(2)(iii)(A). Specifically, five of the seven ADS valves are considered to have been inoperable when the reactor was in operational modes 1, 2, or 3.
2. The root cause investigation identified several factors that may have contributed to the condition of the cable connectors. The root cause that best describes the circumstances is inadequate assembly or installation instructions. Although vibration and work activities around the equipment are the most likely causes of the loose connectors and conduit, no single cause can be specified in this event. Had the equipment been properly installed, the consequences of operational vibration as well as routine operational work activities around the equipment would have been mitigated.
3. There were no structures, components or systems that were inoperable prior to the start of this event which contributed to the event.
4. The ADS is a portion of the backup Emergency Core Cooling System (ECCS), an Engineered Safety Feature, designed to quickly reduce reactor pressure in the unlikely event of failure of the High Pressure Core Spray (HPCS) system. The ADS is composed of seven specially designated relief valves that provide rapid depressurization of the primary system. In the automatic mode each valve is actuated by either of two solenoid pilot valves (one from Division I (A) and one from Division II (B)). The cables, conduits, and connectors addressed herein provide the power necessary for automatic and manual initiation of the ADS valves.
5. The inspection results identified ADS valves MS-RV-4C and MS-RV-5C with connector nut or backshell to connector not tight conditions on the three solenoid pilot valves. However, the ADS power supply circuit design provides for power continuity indication lights on the two corresponding ADS solenoid pilot valves. These lights are looked at every shift by the control room Reactor Operators as part of their normal duties. In normal standby configuration, both lights are illuminated. Power interruption had not been identified. The other reported ADS valves had no common conditions to each of their three solenoid pilot valves.

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6. There were no instances of circuit discontinuity or power interruption noted pertaining to the additional solenoid pilot valve discrepancies that were identified on June 16, 1992.
7. Each ADS solenoid is tested on a scheduled basis by actually energizing the circuit and opening the relief valve. This surveillance was successfully performed October 4, 1991.

B. Further Corrective Action

1. Maintenance Work Requests have been implemented to restore the equipment configuration to existing design requirements. All socket connections were replaced with crimped terminations. Additionally, procedures have been prepared for use on work activities associated with the assembly of cable connectors of the main steam SRVs that include further instructions on specific lock wire methods to preclude loosening of the components after assembly and installation.
2. A design change was implemented that provides better structural support of the electrical conduits that route cable to the relief valves.
3. A reinspection of the ADS cable, connectors, and conduit was performed and no additional discrepancies were identified.

Safety Significance

This event has been reviewed for its safety significance. There was no instance of discontinuity in the circuits and there are several redundant features to deal with Loss of Coolant Accidents as described in Section 6.3 of the FSAR. The first defense against the small break LOCA which does not depressurize the primary system is the HPCS system. Only in the event of failure of the HPCS does the ADS require actuation. The ADS is an emergency system designed to relieve steam pressure in the main steam lines and reactor vessel to allow the Low Pressure Emergency Core Cooling Systems to inject. The ADS has several redundant features. It is composed of seven Safety Relief Valves (SRVs) designated as ADS valves. Each ADS valve in question has three solenoid pilot valves. These solenoid pilot valves are pneumatically operated in parallel such that any one being energized will open the relief valve. The pilot valves are energized by either: 1) the ADS logic (A and B pilot valves), 2) manual control switches (A, B, or C pilot valves), or 3) a pressure relief switch (C pilot valves when in auto). In the event of an accident condition and the failure of the A pilot valve due to loss of power by a loose connector, the valve could still have been automatically actuated by the B pilot valve. In addition, manual actuation of the valve via the C pilot valve could have been possible using the switches in the control room.

Therefore, this event is deemed to have had minimal safety significance.

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Similar Events

LER 86-037 and LER 90-002 have discussed events involving the ADS because of unqualified connectors. However neither had events resulting from connectors not being tight.

EIIS Information

Text Reference

EIIS Reference

<u>System</u>	<u>Component</u>
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Automatic Depressurization System (ADS)

SB

Main Steam Relief Valves

SB

RV

High Pressure Core Spray System

BG
