R●ULA●Y INFORMATION DISTR●TIC●SYSTEM (RIDS)

ACCESSION NBR: 8708070106 DOC. DATE: 87/08/03 NOTARIZED: NO DOCKET #
FACIL: 50-397 WPPSS Nuclear Project, Unit 2, Washington Public Powe 05000397
AUTH. NAME AUTHOR AFFILIATION
WASHINGTON, S. L. Washington Public Power Supply System
POWERS, C. M. Washington Public Power Supply System
RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 87-020-00: on 870702, reactor scrammed. Caused by motor failure of reactor protection sys (RPS) motor generator A due to ground short & broken stop tab on stop plate of RPS power supply transfer switch. W/870803 ltr

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

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INTERNAL:	ACRS MICHELSON	1	1	ACRS MOELLER	2	2
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	AEOD/DSP/ROAB	2	2	AEOD/DSP/TPAB	1	1
	DEDRO	1	1	NRR/DEST/ADE	1	0
	NRR/DEST/ADS	1	0	NRR/DEST/CEB	1	1
	NRR/DEST/ELB	1	1	NRR/DEST/ICSB	1	1
	NRR/DEST/MEB	1	1	NRR/DEST/MTB	1	1
	NRR/DEST/PSB	1	1	NRR/DEST/RSB	1	1
	NRR/DEST/SGB	1	1	NRR/DLPQ/HFB	1	1
	NRR/DLPQ/QAB	1	1	NRR/DOEA/EAB	1	1
	NRR/DREP/RAB	1	1	NRR/DREP/RPB	2	2
	NRR/PMAS/ILRB	1	1	NRR/PMAS/PTSB	1	1
	REG FILE 02	1	1	RES DEPY GI	1	1
	RES TELFORD, J	1	1	RES/DE/EIB	1	1
	RGN5 FILE 01	1	1			
EXTERNAL:	EG&G GROH, M	5	5	H ST LOBBY WARD	1	1
	LPDR	1	1	NRC PDR	1	1
	NSIC HARRIS, J	1	1	NSIC MAYS, G	1	1

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NRC Form 366 (9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

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TITLE (4)

Rx Scram Caused By Equipment Failure

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
0 7	0 2	8 7	8 7	- 0 2 0	- 0 0	0 8	0 3	8 7		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)	X 50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	0 8 0	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)	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
	AREA CODE
S. L. Washington, Compliance Engineer	5 0 9 3 7 7 - 1 2 0 8 0

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
B	J C	M G	G 0 8 0	Y					
B	J C	J S	G 0 8 0	Y					

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)

The Reactor scrammed on July 2, 1987, at 1216 hours, while operating at 80% power. One minute prior to the scram the motor of the Reactor Protection System (RPS) A Motor Generator Set failed causing the loss of RPS A power. When Plant operators attempted to switch RPS A power to its alternate source, RPS B power was lost. The deenergization of both RPS power buses causes, by design, a Reactor scram, an inboard and outboard isolation of Nuclear Steam Supply Shutoff System (NS^4) Groups 1, 2, 5, 6, and 7, and a Reactor Building Exhaust Plenum Process Radiation System "Z" signal which initiates several Engineered Safety Feature (ESF) systems including Standby Gas Treatment (SGT), Control Room Emergency Filtration System, and a Reactor Building Ventilation System Isolation.

Initially, due to the MSIV closure (NS^4 Group 1), Reactor water level was controlled using the Reactor Core Isolation Cooling System (RCIC), and Reactor pressure was controlled by manually opening Main Steam Line Safety Relief Valves (MSRVs). Within one hour all systems were restored to their normal lineup for Plant conditions and a normal Plant shutdown followed. By 1910 hours on July 2, 1987 the Plant was in Cold Shutdown.

The cause of the motor failure of the RPS "A" Motor Generator set is believed to be a phase to ground short. The cause of the loss of RPS "B" power was a broken "Stop Tab" on the stop plate of the RPS power supply transfer switch used to align either RPS Division (A or B) to the alternate power supply. When the switch was turned to Alternate RPS A power supply position it overtraveled and disconnected the RPS B power supply.

There is no safety significance associated with this event. All safety systems functioned as designed and a normal Plant shutdown followed the event.

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1/1

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

Plant Conditions

a) Power Level - 80%
b) Plant Mode - 1 (Power Operation)

Event Description

On July 2, 1987, at 1216 hours, the Reactor scrammed when the RPS B power supply was disconnected due to equipment failure. One minute prior to the scram operators received indication of an RPS A power supply failure, which put the Plant in a "half scram" condition. The RPS B power supply was disconnected due to equipment failure while Plant operators were attempting to transfer the RPS A power supply to its alternate power source.

The loss of both the A and B RPS power supplies, in addition to a Reactor scram, also causes an inboard and outboard isolation of the Nuclear Steam Supply Shutoff System (NS^4) Groups 1, 2, 5, 6, and 7. NS^4 Group 1 includes the inboard and outboard Main Steamline Isolation Valves (MSIVs). Also, a loss of RPS power causes a Reactor Building Exhaust Plenum Process Radiation System "Z" signal which initiates the Standby Gas Treatment System, starts the Control Room Emergency Filtration System, and causes a Reactor Building Ventilation System Isolation.

Plant operators responded immediately to the event by manually initiating the Reactor Core Isolation Cooling System (RCIC) to control reactor water level and manually opening Main Steamline Safety Relief Valves (MSRVs) to control reactor pressure.

Plant operators completed the RPS recovery, including the re-energization of the RPS power buses, at 1235 hours. The NS^4 Group 2, 5, 6, and 7 isolations and the Process Radiation System "Z" signal actuations were restored, by Plant operators, to their normal lineup by 1240 hours. At 1312 hours the MSIVs were reopened and Reactor pressure and water level control was transfered to the Turbine Bypass Valves and the Condensate/Feedwater System.

Two minor problems occurred during the event. Main Steam Isolation Valve MS-V-28D indicated an intermediate valve position after the MSIV isolation, and the outboard Reactor Water Sample Isolation Valve RRC-V-20, an NS^4 Group 2 isolation valve, maintained an open indication. It was later verified that MS-V-28D had closed and that a limit switch was out of adjustment. The cause of the RRC-V-20 problem could not be determined. After the event, the NS^4 isolation relay for RRC-V-20 was removed and bench-checked by Plant Electricians, no problem was found. The relay was reinstalled and test switches were used to simulate an initiation signal. The relay, valve, and valve position indication all functioned properly.

The root cause of the RPS A power supply failure is believed to be a phase to ground short which developed in the motor of the RPS A Motor Generator set. The motor will be sent to a Supply System Vendor for failure analysis. The loss of the RPS A power supply alone causes ESF actuations. It causes an NS4 outboard isolation of NS^4 Groups 1 (Main Steamline Drains only) 2, 5, 6, and

7, and Reactor Building Exhaust Plenum Process Radiation System "Z" signal actuations. The "Z" signal actuations include starting of the Standby Gas Treatment System, actuation of the Control Room Emergency Filtration System, and a Reactor Building Ventilation System isolation. All these ESF actuations occurred prior to the scram, as designed with the exception of the isolation of RRC-V-20 noted above.

The RPS B power supply disconnect was caused by a broken "Stop Tab" on the RPS power supply transfer switch stop plate. When Plant operators turned the switch to the alternate A position due to the loss of the RPS A M/G set, the switch went past the alternate A position dropping out the power supply contactor which provides power to the RPS B bus. The root cause of the broken stop tab was low cycle fatigue failure.

Immediate Corrective Actions

In response to the loss of the RPS A power supply, Plant Operators (by procedure) attempted to transfer RPS A to its alternate power source. This action normally would have restored RPS A power and terminated the event. However, the RPS power supply selector switch was broken causing loss of the RPS B power supply.

Plant operators manually initiated RCIC to control Reactor water level and manually opened the MSRVs to control Reactor pressure since the Reactor was isolated by the MSIV closure. Plant operators proceeded with the recovery of the RPS power supplies, NS^4 isolations, and the Reactor Building Exhaust Plenum Process Radiation System "Z" signal actuations. These actions were all accomplished within an hour and the normal Plant shutdown procedure was followed to cold shutdown.

Further Corrective Action

The motor of the RPS A Motor Generator Set was replaced with a spare motor. The failed motor will be sent to a Supply System Vendor for failure analysis and rebuilding. The motor was manufactured by General Electric, Model 5K326AN2608P.

The General Electric, Model Number SBM, RPS power supply transfer switch was disassembled and examined by Supply System material engineers. The cause of the failure was a broken stop tab on the switch stop plate due to low cycle fatigue. An investigation determined that this type of failure rarely occurs, and the switch stop plate was replaced with a spare.

The problem with dual indication on MS-V-28D (open and closed indications simultaneously) was determined to be an out-of-adjustment valve indication limit switch. The valve did in fact close on the isolation signal.

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Plant evaluations failed to determine the cause of the open RRC-V-20 valve position indication following an NS^4 isolation signal. The evaluation also could not definitively determine whether the problem was a position indication problem alone or whether the valve did not close. Both the NS^4 isolation relay and the Reactor Water Sampleline Isolation Valve were replaced with a different manufacturer's equipment during the R2 Refueling Outage. The NS^4 isolation relay an Agastat, GPI was replaced with an Agastat, EGPI. The Reactor Water Sampleline Isolation Valve (a Marotta, MV36RP-H3) and was replaced with a Target Rock Model 86Z577-001 valve. Both the relay, valve, and logic system were extensively tested prior to Plant restart on June 19, 1987.

The NS^4 isolation relay was removed from the Plant after the event and bench-checked by Plant Electricians, and no problem with the relay was found. The relay was reinstalled and the isolation system including the valve, valve position indication, and isolation relay was verified operational. On June 3, 1987 the flow isolation capability of the RRC-V-20 valve was successfully demonstrated. Further, on June 6, 1987 another Reactor Scram and NS^4 Group 2 isolation occurred (to be reported in LER 87-022), and RRC-V-20 did close on the isolation signal.

Safety Significance

There is no safety significance associated with this Reactor scram. All Reactor parameters stayed within analyzed boundaries. All systems used for scram recovery functioned normally. All safety actuations occurred as designed with the exception of the outboard Reactor Water Sample Line isolation valve which was protected by the redundant inboard Reactor Water Sample Line isolation valve which operated correctly. This event posed no threat to the health and safety of the public or Plant personnel.

Similar Events

None

EIIS Information

Text Reference	EIIS Reference	
	System	Component
Reactor Protection System (RPS)	JC	
Reactor Protection System Motor Generator Set (RPS MIG)	JC	88
Nuclear Steam Supply Shutoff System (NS^4)	BD	
Reactor Building Exhaust Plenum Process Radiation System	IL	
Standby Gas Treatment System (SGT)	BH	
Control Room Emergency Filtration System	VH	
Reactor Building Ventilation System	VA	

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EIIS Information (Cont'd)

Text Reference	EIIS Reference	
	System	Component
Reactor Core Isolation Cooling RCIC	BN	
Main Steamline Safety Relief Valves (MSRVs)	SB	RV
Main Steamline Isolation Valves (MSIVs)	SB	ISV
Turbine Bypass Valve	TA	PCV
Condensate/Feedwater System COND/RFW	SD	
Reactor Water Sampleline Isolation Valve (RRC-V-20)	BD	ISV

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

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

Docket No. 50-397

August 3, 1987

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

Subject: NUCLEAR PLANT NO. 2
LICENSEE EVENT REPORT NO. 87-020

Dear Sir:

Transmitted herewith is Licensee Event Report No. 87-020 for WNP-2 Plant. This report is submitted in response to the report requirements of 10CFR50.73 and discusses the item 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:lc

Enclosure:
Licensee Event Report No. 87-020

cc: Mr. John B. Martin, NRC - Region V
Mr. R. T. Dodds, 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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