PSE&G

Public Service Electric and Gas Company P.O. Box 236 Hancocks Bridge, New Jersey 08038

Hope Creek Operations

MAY 0 6 1996

LR-N96122

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

Dear Sir:

HOPE CREEK GENERATING STATION
DOCKET NO. 50-354
UNIT 1
LICENSEE EVENT REPORT 96-013-00

This Licensee Event Report entitled "Engineered Safety Feature Actuation: Isolation of the Main Steam Line Drain Inboard Isolation Valve" is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv).

Sincerely,

Clay C. Warren

Mark E. Reddemann
General Manager -
Hope Creek Operations

RAR/tcp
Attachment LER
SORC Mtg. 96-048

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Attachment A

The following item represents the commitment that Public Service Electric & Gas (PSE&G) made to the Nuclear Regulatory Commission (NRC) relative to this LER (354/96-013-00). The commitment is as follows:

The circuit board is being returned to the vendor for further testing. Test results are currently expected by August 1996. The test results will be reviewed to determine if further corrective actions are required.

NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

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HOPE CREEK GENERATING STATION	05000354	

TITLE (4)
Engineered Safety Feature Actuation: Isolation of the Main Steam Line Drain Inboard Isolation Valve

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 NAME	DOCKET NUMBER
04	06	96	96	-- 013 --	00	05	06	96		05000
									FACILITY NAME	DOCKET NUMBER 05000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

OPERATING MODE (9): 1	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(viii)
POWER LEVEL (10): 98	20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(x)
	20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
	20.2203(a)(2)(ii)	20.2203(a)(4)	X 50.73(a)(2)(iv)	OTHER
	20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Robin Ritzman, HCGS Operational Licensing	(609) 339-1445

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
X	JC	BKR	G082	Y					

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	X NO		XX	XX	XX

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On 4/6/96, at 1300, the 'A' Reactor Protection System (RPS) Motor Generator (MG) set output Electrical Protection Assembly (EPA) Breaker tripped. The RPS MG Set Output Breaker trip caused a Channel 'A' and 'C' Nuclear Steam Supply Shutoff System (NSSSS) trip and the isolation of the Main Steam Line Drain Inboard Isolation Valve and the Reactor Water Cleanup (RWCU) system. This isolation is an Engineered Safety Feature (ESF) actuation and is reportable in accordance with 10CFR50.73(a)(2)(iv). A four hour report was made at 1559 in accordance with the requirements of 10CFR50.72(b)(2)(ii), due to the ESF actuation. Operator actions were satisfactorily completed in accordance with procedures. The expected isolations and trips were verified to have occurred. The power supply was switched to the alternate feed and RPS and NSSSS were reset. The Main Steam Line drain valve and the RWCU system were returned to their normal alignment. The cause of the ESF actuation was the tripping of the 'B' EPA breaker of the 'A' RPS MG set. The most likely cause of the breaker trip was a spurious signal initiated within the circuit board. The circuit board was replaced and has been tested. The circuit board will be returned to the vendor for further analysis.

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

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor (BWR/4)
Reactor Protection System (SB), EIIS Identifier: JC

IDENTIFICATION OF OCCURRENCE

Discovery Date: April 6, 1996
Report Date: May 6, 1996
Problem Report: 960406076 and 960406077

CONDITIONS PRIOR TO OCCURRENCE

Plant in OPERATIONAL CONDITION 1 (POWER OPERATIONS)
Reactor Power at 98%

DESCRIPTION OF OCCURRENCE

On April 6, 1996, at 1300, the 'A' Reactor Protection System (RPS) Motor Generator (MG) set output Electrical Protection Assembly (EPA) Breaker tripped. The RPS MG Set Output Breaker trip caused a loss of the 'A' RPS bus, tripping the 'A1' and 'A2' RPS channels, resulting in a half-scram. This trip also caused a Channel 'A' and 'C' Nuclear Steam Supply Shutoff System (NSSSS) trip and the isolation of the Main Steam Line Drain Inboard Isolation Valve and the Reactor Water Cleanup (RWCU) Inboard Isolation Valve. Other valves, including the Inboard Residual Heat Removal (RHR) Shutdown Cooling Suction Isolation Valve and the Inboard RHR Reactor Head Spray Isolation Valve, received the isolation signal but did not change state because they were already in the required position. The Main Steam Isolation Valves received a half-isolation signal. Only the 'A' RPS lost power during this event. The isolation of the Main Steam Line Drain Inboard Isolation Valve is an Engineered Safety Feature (ESF) actuation and is reportable in accordance with 10CFR50.73(a)(2)(iv). A four hour report was made at 1559 in accordance with the requirements of 10CFR50.72(b)(2)(ii) due to the ESF actuation.

Operator actions were satisfactorily completed in accordance with procedures. The expected isolations and trips were verified to have occurred. The power supply was switched to the alternate feed and RPS and NSSSS were reset. The MSL drain valve and the RWCU system were returned to their normal alignment.

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

ANALYSIS OF OCCURRENCE

RPS is designed to automatically shut down the reactor when specific variables exceed predetermined limits. In addition, the RPS is part of the isolation actuation instrumentation for the NSSSS. Each logic channel is designed to close assigned valves during a design basis event.

The Main Steam Line Drain Inboard Isolation Valve is one of the valves within the NSSSS that is utilized to isolate the primary containment and to limit the release of radioactive materials to the environment in the event of a design basis accident. When the MG set output breaker tripped, the logic deenergized and the valve isolated as designed. No other reportable ESF isolation valves changed state because they were already in the required position.

The investigation showed that the undervoltage light was illuminated and the output power indicating light was extinguished on the 'B' EPA breaker. No other abnormalities were noted during a visual inspection of the MG set. The leads and circuit board connectors were checked, all appeared to be satisfactory. Output voltage at the MG set was verified to be within the design value.

The EPA breakers are designed to protect the downstream loads from overvoltage, undervoltage, and underfrequency conditions. Nominal output voltage is 120 VAC. Subsequent to the event, the output voltage was measured and determined to be 120.9 VAC. Based on a review of the latest previous surveillance test data, the 'A' breaker was determined to trip at 113.89 VAC with a time delay of 0.85 seconds, the 'B' breaker was determined to trip at 112.79 VAC with a time delay of 0.70 seconds. The troubleshooting effort discovered that the 'B' breaker tripped, the 'A' breaker did not. The 'B' breaker was tested after the trip, at that time it tripped at 113.03 VAC with a time delay of 0.69 seconds. It has been concluded that the trip was caused either by the 'B' breaker sensing a voltage signal of less than 113.03 VAC that lasted less than 0.85 seconds, or by a spurious signal initiated within a circuit card in the EPA. The circuit board has been bench tested; however, the spurious signal could not be re-created. Prior to the event, the operation of the plant was normal; there were no unusual pump or motor starts or stops, no valves were opened or closed, and no new alarms annunciated.

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

ANALYSIS OF OCCURRENCE

The root cause analysis investigation has determined that the most likely cause of the breaker trip was a spurious signal. The suspect circuit board has been replaced, and the MG set returned to service. Internal and industry experience regarding these circuit boards suggest susceptibility to spurious trips. The circuit board is being returned to the vendor for further analysis.

PRIOR SIMILAR OCCURRENCES

LER 94-006 describes an RPS MG set trip that resulted in an ESF actuation; closure of Main Steam Line Drain valves. The cause of that occurrence was attributed to a short circuit in a radwaste system tank heater that resulted in a ground fault trip of the feeder breaker for the motor control center that powers the MG set. The corrective actions taken as a result of that event were to replace the heater and to review the ground fault protection scheme. The corrective actions from that event could not have been expected to prevent this event from occurring.

CAUSE OF OCCURRENCE

The cause of the ESF actuation was the tripping of the 'B' EPA breaker of the 'A' RPS MG set. The root cause determination process determined that the most likely cause of the breaker trip was a spurious signal initiated within the circuit board. This determination is based on post-event monitoring of the RPS MG set, the MG set output voltage, and post-event troubleshooting, including verification of the proper undervoltage trip setpoint for the tripped breaker. Internal and industry experience regarding these circuit boards suggest susceptibility to spurious trips.

ASSESSMENT OF SAFETY CONSEQUENCES AND POTENTIAL IMPLICATIONS

The RPS is designed to perform its safety function in the event of a loss of logic power. Upon loss of power during this event, plant systems functioned as expected and there were no serious transients experienced during the event. There were no safety consequences or implications associated with this event.

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

CORRECTIVE ACTIONS

1. The MG set was inspected and found to be satisfactory. The equipment was restored to the normal lineup.

2. The NSSSS and RPS logic was reset.

3. A functional test was satisfactorily performed on the tripped breaker.

4. The suspect circuit board was replaced.

5. The circuit board is being returned to the vendor for further testing. Test results are currently expected by August 1996. The test results will be reviewed to determine if further corrective actions are required.