PSE&G

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

Salem Generating Station

December 8, 1982

Mr. R. C. Haynes
Regional Administrator
USNRC
Region 1
631 Park Avenue
King of Prussia, Pennsylvania 19406

Dear Mr. Haynes

LICENSE NO. DPR-70
DOCKET NO. 50-272
REPORTABLE OCCURRENCE 82-064/03X-1
SUPPLEMENTAL REPORT

Pursuant to the requirements of Salem Generating Station Unit No. 1 Technical Specifications, Section 6.9.1.9.b, we are submitting supplemental Licensee Event Report for Reportable Occurrence 82-064/03X-1.

Sincerely yours,

H. J. Midura
General Manager -
Salem Operations

RH:ks 947

CC: Distribution

Report Number: 82-064/03X-1

Report Date: 12-08-82

Occurrence Date: 08-16-82

Facility: Salem Generating Station, Units 1 and 2
Public Service Electric & Gas Company
Hancocks Bridge, New Jersey 08038

IDENTIFICATION OF OCCURRENCE:

Solid State Protection System - Possible Undetectable Failure.

This report was initiated by Westinghouse Report NS-EPR-2638.

CONDITIONS PRIOR TO OCCURRENCE:

Not Applicable.

DESCRIPTION OF OCCURRENCE:

On August 4, 1982, Westinghouse verbally notified Public Service Electric and Gas (PSE&G) Company of a potential problem associated with the Solid State Protection System (SSPS) in service at Salem Station Units 1 and 2. During review of a schematic diagram of the SSPS, Westinghouse engineers discovered a potential undetectable failure which could exist in on-line testing circuits for relays in the system. Westinghouse issued a report, (NS-EPR-2638), on August 16, 1982, on this potential problem.

DESIGNATION OF APPARENT CAUSE OF OCCURRENCE:

Not Applicable.

ANALYSIS OF OCCURRENCE:

The Solid State Protection System (SSPS) consists of two redundant systems, Train A and Train B, identical in function, to provide protection for the Nuclear Reactor Systems. Each Train cabinet has an input relay bay, a logic bay, and an output relay bay. Each train of the system has two types of protective outputs, one to trip the reactor and one to actuate safeguard systems to protect the plant.

A decision to trip the reactor is based on error signal inputs to the SSPS logic. If a particular combination of one or more trip conditions exists, the logic system will open the reactor rod control system trip breakers and bypass breakers, causing an automatic control rod trip and a reactor shutdown.

ANALYSIS OF OCCURRENCE: (continued)

The safeguard outputs of the SSPS will operate the valves and motors required to place the reactor and plant in a safe shutdown condition. Master relays in the output cabinet operate slave relays to provide these outputs.

The Westinghouse investigation of the problem disclosed that periodic testing of the SSPS includes actuation of master relays which actuate Safeguards systems. When a preselected master relay is energized, a proving lamp in series with the output (slave) relay coil confirms electrical continuity. Operation of the relay is preverted by reducing the circuit voltage from 120 vac to 15 vdc during testing. Subsequent tests from the Safeguards Test Cabinets energize (120 vac) each output relay to confirm actuation of the Safeguards device. In those instances where actuation of the final device cannot be tolerated, a proving lamp in the Safeguards test circuits verifies relay contact movement, field wiring and electrical continuity through the final device.

The output relay coil continuity is confirmed at the SSPS, without operating the relay, by reducing the circuit voltage to 15 vdc from 120 vac. Operation of the master relay by means of the pushbutton test switch also removes the shunt from the SSPS proving lamp and allows the 15 vdc to energize it to confirm the continuity of the output relay coil.

Upon completion of the master relay and output relay coil continuity tests, 120 vac circuit voltage is restored. However, if the switch contacts which shunt the proving lamp should fail to reclose as expected, 120 vac would be applied to the lamp in the event that the system were called upon to operate. Depending on the output relay coil impedance and the number of output relays being operated by the master relay contacts, the current through the lamp could cause it to burn open before the output relay(s) energized. In such an instance, associated Safeguards devices in the affected train would not actuate. Since, during circuit analysis, all identified nondetectable failures must be assumed to have occurred, the redundant Safeguards actuation train must be assumed to be similarly, if not identically, failed.

Although failure of the subject test switch contacts is highly improbable, Westinghouse has recommended a minor revision to test procedures conducted from the Safeguards Test Cabinets where operation of the SSPS output relays is verified. The revision will ensure that the relay test circuits in the SSPS operated properly when the system was returned to its normal operating mode.

ANALYSIS OF OCCURRENCE: (continued)

This occurrence involved the potential of conditions leading to operation in a degraded mode permitted by a limiting condition for operation, or plant shutdown required by a limiting condition for operation, and is reportable in accordance with Technical Specification 6.9.1.9.b.

CORRECTIVE ACTION:

The Westinghouse report was evaluated by the Nuclear Engineering Department. According to the results of the evaluation, the SSPS system in use at Salem is sufficiently different from the Westinghouse design that the Westinghouse proposed solution would be difficult to implement. However, a permanent change which has been made to the SSPS Functional Test Procedure precludes the problem indentified by Westinghouse.

FAILURE DATA:

Not Applicable

Prepared By R. Heller

General Manager -
Salem Operations

SORC Meeting No. 82-109