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Electric and Gas
Company

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United States Nuclear Regulatory Commission
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Gentlemen:

10CFR21 NOTIFICATION, HIGH STEAM LINE FLOW SI INSTRUMENTATION - SIGNAL SUMMATORS PM-505B & 506B
SALEM GENERATING STATION UNIT NOS. 1 AND 2
DOCKET NOS. 50-272 AND 50-311

Pursuant to the notification requirements of 10CFR21, Public Service Electric and Gas Co. (PSE&G) hereby provides the attached report concerning a deficiency in signal summators 505B & 506B which provide the setpoint signal to high steam line flow comparators that initiate Safety Injection on High Steam Line Flow coincident with Low-Low Tave. or Low Steam Line Pressure. This deficiency was reported to the NRC Operations Center on June 30, 1994.

If there are any questions regarding the information provided in Attachment 1, please contact us.

Sincerely,

Attachment

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ATTACHMENT 1

Introduction

The following is a summary of the results of PSE&G'S evaluation in accordance with 10CFR21 concerning a deficiency in signal summators PM-505B and PM-506B. These signal summators were found to saturate high when the summators lose power and are then reenergized. These signal summators provide the setpoint signal to high steam line flow comparators that generate the high steam line flow Safety Injection (SI) signal to Reactor Protection System Trains A and B. SI actuation occurs as a result of high steam line flow coincident with Low-Low Tave or Low Steam Line Pressure.

Background

Due to the recent spurious SI event on April 7, 1994, testing of signal summators PM-505B and 506B was initiated to determine if, on reactor trip, the signal summators setpoint would undershoot below the 40% steam flow setpoint. It was believed that the undershooting of the setpoint may have been a contributor to the inadvertent SI event on April 7 which was initiated on High Steam Line Flow coincident with Low-Low Tave. During this testing, it was identified that should the signal summators lose power, upon reenergizing, the summators setpoint output would saturate high. Technical Specifications define the High Steam Line Flow setpoint at 110%, and following a reactor trip, the setpoint is automatically reduced to 40%. As a result of the setpoint output saturating to a setpoint significantly greater than the setpoint limit allowed by Technical Specifications, a high steam line flow SI signal would not be generated by the flow comparators. The period of time that the summators would saturate high following a loss of power and subsequent reenergizing has not been estimated. The summators are powered from independent vital instrument busses (uninterruptable power supplies) and inverters.

Safety Evaluation

Each vital instrument bus and its inverter are required to be operable in accordance with Technical Specification 3.8.2.1 during Modes 1-4. Upon a loss of normal AC power to a vital instrument bus (i.e., LOP), the inverter is designed to transfer to the vital DC power supply with no significant interruption in power to the bus loads. Should an inverter failure occur such

that power is lost and not restored, the affected protection channel fails in the safe position satisfying the High Steam Flow coincidence logic. However, should an inverter failure or power transient occur to the summator power supply, with power subsequently restored, the signal summator would saturate which would render the summator inoperable. Assuming that saturation of the signal summator pre-exists, in the event of a design basis accident that would require the initiation of a SI signal on High Steam Flow coincident with either Low-Low Tave or Low Steam Line Pressure (e.g., Main Steam Line Break), this reactor protective function could be lost considering a single active failure in the remaining operable instrument channel. Therefore, PSE&G has concluded that this deficiency is reportable in accordance with 10CFR21.

Corrective Actions

Prior to restart of Salem Unit 1 following the April 7 event, design changes had been implemented to correct this deficiency.

Following identification of this deficiency, an Engineering Evaluation (EE) and supporting 10CFR50.59 safety evaluation were completed to demonstrate that the High Steam Line Flow SI signal channels to the Reactor Protection System were fully functional and operable. The EE and safety evaluation concluded that Unit 2 could continue to operate safely until the next refueling outage or forced outage of sufficient duration to implement a design change similar to Unit 1. While Unit 2 was shutdown recently to allow dredging at the Circulating Water Intake Structure, PSE&G corrected the saturation deficiency with a design change similar to that previously implemented on Unit 1.