Public Service
Electric and Gas
Company

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Dr. Thomas E. Murley, Administrator
U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region I
631 Park Avenue
King of Prussia, Pennsylvania 19406

Dear Dr. Murley:

SIGNIFICANT CONSTRUCTION DEFICIENCY
INDUCED VOLTAGE ACTUATIONS IN LOGIC MODULES
HOPE CREEK GENERATING STATION

On September 14, 1984, a verbal report was made to Region I, Office of Inspection and Enforcement representative, Mr. J. Strosnider, advising of a potentially significant construction deficiency concerning induced voltage actuations of the logic system supplied by Bailey Controls Company. The following final report is provided in accordance with 10CFR50.55(e).

Description of the Deficiency

During preoperational testing performed by Public Service Startup Group, incorrect actuations of Bailey Controls Company Model 862 digital logic modules were noted in 1E and non-1E circuits. Field test results indicate that voltages were induced in the non-energized conductors by energized conductors in the same or adjacent cables. As presently designed, the logic module circuitry does not adequately suppress or filter the induced voltages.

The voltage sources causing the misoperations are identified as steady state 120VAC power and voltage spikes from deenergizing coils used in circuit breakers. Induced AC voltages varied from 30 to 90 VAC RMS. Investigations indicate that the induced voltage levels are sensitive to the number of

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conductors energized in a multiconductor cable and several times less sensitive to adjacent energized cables. It was found that the voltage spike induced by deenergizing the DC coils had a maximum peak amplitude of 200-300 volts and the dampened discharge waveform had a duration of not more than 30 milliseconds.

A total of 2,248 Model 862 logic modules, each with a maximum capacity of 8 inputs, are potentially affected. Public Service has issued Startup Deviation Reports to document and control this design deficiency.

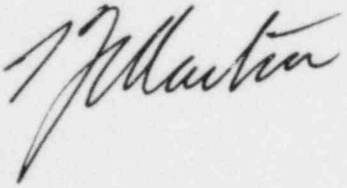
Safety Analysis

At Hope Creek the Bailey Controls Company Model 862 digital logic modules are used for input signal isolation for various safety related systems to include the Residual Heat Removal and Core Spray systems. Had the problem gone uncorrected, inappropriate system actuation could have adversely affected the safe shutdown capability of the plant. We therefore consider this condition to be reportable in accordance with 10CFR50.55(e).

Corrective Action

Bailey Controls Company has developed a circuit modification to the input signal isolation on the Model 862 logic card to discriminate between valid signals and induced voltages. The modification consists of the addition of electronic components to the filtering network (e.g., resistors, diodes, capacitors). All Model 862 logic modules will be modified.

Very truly yours,



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