

SOUTH CAROLINA ELECTRIC & GAS COMPANY

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January 27, 1982

USNRC REGION II
ATLANTA, GEORGIA

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T. C. NICHOLS, JR.
VICE PRESIDENT AND GROUP EXECUTIVE
NUCLEAR OPERATIONS

James P. O'Reilly, Director
U. S. Nuclear Regulatory Commission
Region II, Suite 3100
101 Marietta Street, N. W.
Atlanta, GA 30303

Subject: V. C. Summer Nuclear Station
Docket No. 50/395
O'Brien Connectors on Valcor
Engineering Corp. Valves
NE File: 3.1051

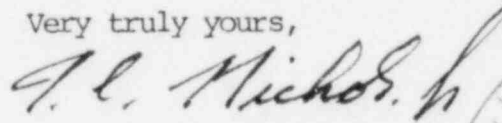
Dear Mr. O'Reilly:

On March 10, 1981 Mr. Paul Kellog of NRC Region II was notified of a potential significant deficiency or potential substantial safety hazard concerning corroded plug assemblies associated with solenoid valves. On April 8, 1981 an interim report was sent to Mr. O'Reilly.

The corrosion problem was a combined effect from the application of the valve and connector. Circuit design changes, potting materials and new material were added to the connector and valve to eliminate the problems.

The item is being reported as a significant deficiency under 10CFR50.55 (e). The details of the item are attached. This is considered a final report of the matter.

Very truly yours,



T. C. Nichols, Jr.



TB:TCN:tdh

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10CFR50.55(e) - SIGNIFICANT DEFICIENCY

1. Identification of Nonconformance

Corroded plug assembly - a D. G. O'Brien connector connected to a Valcor Engineering Corp. solenoid valve.

2. Number and Location of Nonconformance

Valves 9398B, 9350B, 9365B, 9365C Auxiliary building 412 level near to containment building

3. Significant Deficiency Created and Evaluation

Energized to open solenoid valves supplied by Valcor Engineering Corp. are used as containment isolation valves in sampling applications. The valves were qualified to IEEE 323 1974 with interface wiring piped to the outside of the test autoclave. In order for this qualification to be applicable to their installed locations within harsh environments, qualified hermetic connectors supplied by D. G. O'Brien are used as entrance fittings. During the investigation of a solenoid valve failure to operate, corrosion products were found at the connector pins where the wires enter from the solenoid. The corrosion products caused electrical short circuits.

On 3/13/81, tests to determine the corrosive products were performed by Arnold Greene Testing Laboratories Incorporated for D. G. O'Brien, Inc. The contaminants were identified by scanning electron microscopic/energy-dispersive x-ray spectroscopic techniques as corrosion desposite typical of stainless steel, the same as the connector. The contaminants consisted of chromium oxide, ferrous oxide, nickel oxide, silica oxide and a percentage of unknown materials.

Gilbert Associates, Valcor Engineering, Inc. and D. G. O'Brien Corp. visted the V. C. Summer site and met with SCE&G Nuclear Engineering on March 31, 1981 to discuss the corrosion problem. During the visit, a number of Valcor valves and O'Brien connector assemblies were disassembled and viewed.

On 4/8/81, Valcor Engineering Corporation recommended that SCE&G add a voltage and current reducing control panel to the power feeds to the Valcor valve which would lower the effective holding power and thereby reduce the Valcor valve coil temperature, at an ambient of 120°F, from approximately 294°F to approximately 160°F. Also, to eliminate the possibility of mositure from getting into the pins, the back of the connector should be potted and a sealent should be used to eliminate leaks in the nipple threads. D. G. O'Brien recommended the use of Dow Corning DC 170 potting compound for the back of the connector.

On 5/29/81, SCE&G Nuclear Engineering contracted Valcor Engineering Corp. to have Gollob Analytical Service identify and quantify the gases which were given off from the Valcor solenoid coils. The results of tests dated 10/8/81 and 11/19/81 showed that at operating temperatures gases were given off but no conclusions could be reached that the gases caused the corrosion problem.

SCE&G Nuclear Engineering reviewed the recommendation of D. G. O'Brien, Valcor Engineering Corp. and Gilbert Associates, Inc. to arrive at the solution of the problem and to report the item to the NRC. The short results in loss of the solenoid valve and will prevent the valve from opening if its needed. The valves are used for post-accident sampling and are necessary to obtain samples in a timely manner after an accident. Samples should be analyzed within an hour after an accident. Loss of the use of the sampling system is considered to be a significant deficiency. No loss of fluid or spills are expected from the above problem.

4. Corrective Action

- A. To every safety related Valcor valve a voltage reducing circuit will be added to lower the holding voltage of the solenoid coil, thus reducing the heating of the solenoid coil, and potential offgasing.
- B. DC 170 potting compound will be used to seal the wires and protect the O'Brien connector pins from any moisture or corrosive products.
- C. Stainless steel nipples will be used instead of galvanized nipples to preclude any material interaction.
- D. Water tight connections between the O'Brien connector, the nipple and the Valcor valve body will be accomplished by using Graphoil tape on the threaded connections.