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September 27, 1988

Docket No. 50-213 B13028 Re: 10CFR21

Mr. William T. Russell Regional Administrator, Region I U.S. Nuclear Regulatory Commission 475 Allendale Road King of Prussia, PA 19406

Gentlemen:

## Haddam Neck Plant Report of Substantial Safety Hazard

In conformance with 10CFR21, Connecticut Yankee A omic Power Company (CYAPCO) hereby provides notification of a Substantial Safety Hazard (SSH) at the Haddam Neck Piant.

Mr. Ebe McCabe of the NRC Region I Office was verbally notified September 23. 1988 that corrosion has been found on the soldered wire connections of the electrical connectors of redundant safety-related valves and that this corrosion has caused electrical grounds to occur. A short circuit between adjacent pins (not involving ground) could result in dual indication (open and closed lights both on) or a disabling of the valve. Two valves are used in series in redundant flow paths for the reactor head vents and the pressurizer vents. Grounds or shorts at the soldered wire connectors would t be detected until the valves were used because the power and control ci, \_\_\_\_\_ are normally de-energized and isolated by open circuit breakers during power operation. No credit is given in any accident analysis for operation of these valves at the Haddam Neck Plant. However, it can be postulated that for plants with similar circuits normally energized, multiple grounds due to corrosion, combined with a single independent failure, could result in the spurious operation of two valves and the potential loss of reactor coolant inventory.

The valves in question are one-inch two-way direct lift solenoid operated valves (SOVs), models V526-6042-3A (Part No. 214130001), V526-6043-3A (Part No. 21413003) and V526-6043-4A (Part No. 214140002), manufactured by Valcor Engineering Corporation of Kenilworth, New Jersey. Mounted on these Valcor supplied valves is an electrical connector receptacle, Model CIR02VI-20-15P, supplied by Litton Precision Products International. The connector is utilized for the electric circuits providing motive power and position indication. The valves are configured with two (2) valves in series in each of two (2) redundant flow paths, on both the reactor head vents and pressurizer vents.

8810030360 880927 PDR ADOCK 05000213 U.S. Nuclear Regulatory Commission B13028/Page 2 September 27, 1988

The following information applicable to this SSH is provided as outlined by 10CFR21.21(b)(3), i through viii:

(i) Name and Address of Individual Informing the Commission

E. J. Mroczka, Senior Vice President, Connecticut Yankee Atomic Power Company, P.O. Box 270, Hartford, CT 06141-0270.

(ii) Identification of Basic Component

Normally closed, 2-way Solenoid Valve. Model V526-6042-3A

(iii) Identification of Firm Supplying the Basic Component

Valcor Engineering Corporation, Kenilworth, N.J.

(iv) Nature of Failure

Since these valves were first placed in service in 1980, isolated cases of corrosion were observed on the wire connections of some of these valves on the reactor head. The specific corrosion concern in 1980 was attributed to a borated water leak. Maintenance practices were used to clean the corrosion in each case. In early 1988, during the refueling outage, corrosion on the wire connection of all four pressurizer vent SOVs raised concerns that there may be other corrosion mechanisms generic in nature and potentially have substantial safety implications.

The corrosion found during the 1988 refueling outage on the pins of the electrical connectors is believed to have been caused by residual solder flux. Investigative efforts are continuing to establish if there may other mechanisms contributing to the occurrence of the corrosion being found within the valve housings.

A short circuit between adjacent pins (not involving ground) could result in dual indication (open and closed lights both on) or a disabling of the valve. Grounds or shorts would not be detected until the valves were used because the circuits are normally de-energized and isolated by open circuit breakers during power operation. It can be postulated that for plants with similar circuits that are normally energized, grounds due to corrosion, combined with a single independent failure, could result in the spurious operation of two valves and the potential loss of reactor coolant inventory.

## (v) Date on Which Information of Failures Was Obtained

The corrosion was discovered during the last refueling outage, on or about March 10, 1988. Evaluations have been conducted since then on the nature, cause, and potential significance if an actual valve failure were to occur. These evaluations led to a conclusion September 22, 1988 that the concern is an SSH. U.S. Nuclear Regulatory Commission B13028/Page 3 September 27, 1988

(vi) <u>Number and Location of all Such Valves</u>

Eight of these solenoid valves are used at Haddam Neck Plant.

PR-SOV-552A, B, C, and D function as Pressurizer vents RC-SOV-596A, B, C, and D as Reactor Head vents

Eight of these valves are also used at Millstone Nuclear Power Station, Unit No. 2 in similar applications.

## (vii) Corrective Action, Responsible Organization

The corrosion and solder flux on the four pressurizer vent SOVs has been removed. The reactor head SOVs were replaced during the last refueling outage for other reasons. Two of the four reactor head SOVs have been inspected to verify the absence of corrosion or solder flux. The other two new SOVs were not inspected because of high radiation exposure and the absence of corrosion on the two valves that were inspected.

CYAPCO has revised station procedures to include a visual inspection of all electrical connections within these valve housings during each refueling outage. Because corrosion is a slow mechanism, this will assure any incipient corrosion is found and cleaned before there are any adverse consequences.

Although no credit is given for operation of these valves in any accident analysis, we have concluded the valves are operable in a normal and accident environment. We are evaluating other aspects of this, such as the cause of the corrosion and the qualification of the SOVs, and expect to reach conclusions by January 10, 1989.

## (viii) Advice Related to Failure Given to Licensees

(Not applicable-refers to supplier.)

I trust this fulfills reporting obligations in accordance with 10CFR21 and is fully responsive to your needs for such information.

Very truly yours,

CONNECTICUT YANKEE ATOMIC POWER COMPANY

E. J. Mroczka

Senior Vice President

By: R. P. Werner Vice President U.S. Nuclear Regulatory Commission B13028/Page 4 September 27, 1988

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cc: J. T. Shedlosky, NRC Senior Resident Inspector, Haddam Neck Plant A. Asars, NRC Resident Inspector, Haddam Neck Plant A. 3. Wang, NRC Project Manager, Haddam Neck Plant T. E. Murley Director, Office of Nuclear Reactor Regulation (3 Copies) E. C. McCabe, NRC Chief, Reactor Projects U.S. Nuclear Regulatory Commission, Document Control Desk

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