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SUBJECT: Forwards info re ECCS single-failure analysis.

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U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Reference: (1) E. J. Mroczka letter to U.S. Nuclear Regulatory Commission, Information Regarding ECCS Single Failure Analysis, dated May 12, 1988.

Gentlemen:

Millstone Nuclear Power Station
Unit Nos. 2 and 3
Information Regarding ECCS Single-Failure Analysis

As a result of valve failure (CH-MOV-257, located between the volume control tank [VCT] and the charging pump suction header) identified during in-service testing on May 2, 1988, Connecticut Yankee Atomic Power Company (CYAPCO) evaluated the cause and potential implication of such a failure and noted a potential single-failure vulnerability in one portion of the Haddam Neck Plant emergency core cooling system (ECCS), specifically the charging system. In Reference (1), CYAPCO provided the NRC with information on the single-failure analysis of the Haddam Neck Plant ECCS.

As a prudent measure, Northeast Nuclear Energy Company (NNECO) conducted a review of the above information for applicability to Northeast Utilities' other nuclear plants (PWRs only), namely, Millstone Unit Nos. 2 and 3. The purpose of this letter is to forward to the Staff the results of our review.

Millstone Unit No. 2

Emergency core cooling at Millstone Unit No. 2 is accomplished using high-pressure safety injection (HPSI), low-pressure safety injection (LPSI), containment spray (CS), shutdown cooling heat exchangers, SI accumulators, charging pumps, and associated piping instrumentation and valves. Millstone Unit No. 2 has three positive displacement charging pumps rated at 44 gpm per pump. The "A" and "C" pumps are connected to emergency electrical bus 22E and

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22F, respectively. The "B" pump is an installed spare which can be aligned to either emergency bus.

The charging pumps are normally aligned to take suction from the VCT. Upon receipt of a safety injection actuation signal (SIAS), suction is transferred from the VCT to the boric acid storage tanks (BASTs). The VCT is isolated by a gate valve (2-CH-501) and a check valve (2-CH-118). Fluid from the BASTs is delivered to the charging pump suction by either of two boric acid transfer pumps or a gravity feed (valve 2-CH-508 or 2-CH-509) from each of the two tanks.

Both boric acid transfer pumps are on emergency electrical bus 22F (MCC B61) and valves 2-CH-501, 2-CH-508, and 2-CH-509 are on emergency bus 22E (MCC B51). Therefore, if bus 22E (MCC B31) were to fail or valve 2-CH-501 were to fail to close, the discharge pressure of the boric acid transfer pumps would hold check valve 2-CH-118 in the closed position and effectively isolate the VCT. Conversely, if bus 22F (MCC B61) were to fail, both boric acid transfer pumps will fail to start. However, valve 2-CH-501 will close on SIAS and valves 2-CH-508 and 2-CH-509 will open to provide the path from BASTs to the charging pump suction. The charging pumps are not required during sump recirculation nor are they required once the water supply in the BASTs is exhausted. It has therefore been concluded that the Millstone Unit No. 2 charging system is not subject to a limiting single failure similar to the recently identified problem at the Haddam Neck Plant.

Millstone Unit No. 3

Emergency core cooling for Millstone Unit No. 3 is accomplished by the centrifugal charging (CHS), safety injection (SI), and residual heat removal (RHS) pumps, accumulators, containment recirculation (CR) pumps, CR coolers, RHS heat exchangers, and the refueling water storage tank (RWST), along with the associated piping, valves, instrumentation, and other related equipment as applicable. Among the ECCS functions is the automatic delivery of borated water to the reactor vessel for cooling the core following a loss-of-coolant accident (LOCA). In the case of the charging system, delivery of water to the core occurs by transferring charging pump suction from the VCT to the RWST. Specifically, on a safety injection signal (SIS), the normal charging supply from the VCT is isolated by two series isolation valves (3CHS*LCV112B and C) and two normally closed (3CHS*LCV112D and E), parallel, motor-operated gate valves open to align the RWST to the charging pump suction. These valves (3CHS*LCV112D and E) stay open until the operator realigns the system for the recirculation phase of ECCS operation. A failure mode and effects analysis is presented in the Millstone Unit No. 3 FSAR Table 6.3-10. This analysis demonstrates that not only this portion of ECCS can sustain the failure of any single active component, but overall ECCS can sustain the failure of any single active component in either the short or long term and still meet the level of performance for core cooling.

In summary, the Millstone Unit Nos. 2 and 3 charging systems are not subject to a potential single-failure vulnerability similar to the recently identified problem at the Haddam Neck Plant.

If there are any questions regarding this submittal, please contact our licensing representative directly.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

E. J. Mroczka
Senior Vice President

cc: W. T. Russell, Region I Administrator
D. H. Jaffe, NRC Project Manager, Millstone Unit Nos. 2 and 3
W. J. Raymond, Senior Resident Inspector, Millstone Unit Nos. 1, 2, and 3