VERMONT YANKEE
NUCLEAR POWER CORPORATION

Ferry Road, Brattleboro, VT 05301-7002

REPLY TO
ENGINEERING OFFICE
580 MAIN STREET
BOLTON, MA 01740
(508) 779-6711

December 30, 1994
BVY 94 - 130

United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

References: a. License No. DPR-28 (Docket No. 50-271)
b. USNRC Generic Letter 90-05, "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1,2 and 3 Piping", dated 6/15/90.

Subject: Temporary Non-Code Repair of Service Water Piping

In accordance with Generic Letter 90-05 and 10CFR50.55a(g)(6)(i), this letter is being submitted to document actions taken by Vermont Yankee to evaluate, without immediate code repair, two pinhole through-wall flaws in the service water piping at the Vermont Yankee Nuclear Power Station, and to request relief from the requirement to perform an immediate code repair.

On November 30, 1994, during a routine Operations Department tour of the plant, leakage was detected originating from a 4-inch schedule 40 Service Water (SW) pipe at the outlet of the "A" Reactor Building Closed Cooling Water System (RBCCW) heat exchanger (E-8-1A). The pipe contains a 4-inch globe valve (V70-92D), which is used as a bypass for 12-inch valve (V70-92A). The bypass is used for throttling of service water flow from the RBCCW heat exchanger under conditions of low heat load. Refer to Figure 1 attached and FSAR Figure 10.6-1a for the flow diagram and arrangement of these components.

Upon inspection, the leak originated from a pinhole perforation in the branch connection where the 4-inch bypass line returns to the 12-inch line. The perforation is located in the weld between the 4-inch weldolet and the 12-inch pipe. The leak consists of a light spray of water less than 1/64-inch in diameter. Nominal wall thickness of the 4-inch pipe is 0.237 inches, and nominal wall thickness for the 12-inch pipe is 0.375 inches. Required minimum wall thicknesses are 0.019 inches and 0.053 inches, respectively.

During post-maintenance testing of an RHRSW pump on December 1, 1994, a second leak was identified in a weld approximately two feet upstream of the first leak on the 4-inch pipe section. This second leak is located in the weld between the weld neck flange and the 4-inch pipe immediately downstream of valve V70-92D. This is attributed to the increase in system pressure resulting from operation of the RHRSW pump.

Ultrasonic examination of both locations was performed. No significant wall loss was observed in either the welds or the adjacent piping. There were no indications observed except at the locations of the leaks. The locations of the leaks are characterized as rounded in nature (much like porosity). Neither indication appears crack-like. When under pressure, both indications emit a pinhole stream of water no greater than 1/64 inch.

A047 1/1

Per Enclosure 1 of Generic Letter 90-05, augmented inspections have been performed. As the exact root cause of both flaws is not known, the scope of the augmented inspection was increased from the minimum required 10 inspections (five for each flaw) to 23 inspection locations. These locations included all welds and adjacent piping on both 4-inch service water bypass lines on the discharge of the "A" and "B" RBCCW heat exchanger, as well as in locations of similar configuration throughout the service water system. No other relevant flaws or significant pipe wall loss were identified as a result of these augmented inspections.

Engineering analyses were performed using design basis values for deadweight, pressure, thermal and seismic loading. Structural margin was determined to be adequate to ensure the integrity of the piping system. The analyses have been documented via a formal calculation (VYC-1207, Revision 1) in accordance with our approved QA Program.

The "through-wall flaw approach" in Enclosure 1 of Generic Letter 90-05 was utilized to demonstrate the structural integrity of the piping containing the two flaws described above. The limiting flaw size for the 4-inch pipe was shown to be 0.375 inches and for the 12-inch pipe was shown to be 0.5 inches, demonstrating significant margin over the as-found flaw sizes. Additional Linear Elastic Fracture Mechanics (LEFM) analyses were performed to supplement the generic letter hand calculations.

Although the exact root cause of these failures is unknown, the root cause of the first leak appears to be Microbiologically-Induced Corrosion (MIC). Due to the accelerated nature of the second leak (affected weld is less than two years old), MIC is not thought to be the root cause. It is possible that the flaw was a result of fabrication flaws combined with vibration.

Throttled operation of valve V70-92D appeared to be causing significant vibration in the adjacent piping. Vibration measurements were taken at the locations of the flaws and adjacent piping. Cyclic stresses at the flaw locations were calculated based on these measurements. Crack growth analyses using ASME Section XI, Appendix A criteria were performed. This evaluation concluded that both flaws will remain significantly below critical flaw size for the duration of the present operating cycle (until the scheduled 1995 refueling outage).

A detailed root cause evaluation, including destructive testing, will be performed at the time of the code repair to definitively ascertain the cause of both leaks. The results of evaluations performed at the time of the Code repair will be assessed for potential impacts on other systems.

A plant walkdown was conducted to assess the impact of potential flooding or water spray should the leaking pipe rupture. All floor penetrations, except for the floor drains, stairway and elevator shaft, are bermed to prevent uncontrolled cascading to lower levels. This ensures that flooding is not a concern (as previously evaluated and documented in the Vermont Yankee flooding study). Additionally, we have concluded that there is no critical equipment within the vicinity of the leak that could be negatively impacted by water spray.

The two through-wall flaws are located in a moderate energy Safety Class 3 piping system (design temperature of 150°F and a design pressure of 125 psig, with normal operating pressure at this elevation in the reactor building being less than 30 psig). Implementation of a code repair would require a plant shutdown. Engineering evaluations have demonstrated that the structural integrity of the piping system remains unaffected. The operability of the service water system would not be impacted.

Vermont Yankee concludes that relief from immediate code repair will present no undue risk to the health and safety of the public. We request that the USNRC grant relief to allow deferral of a

code repair until the scheduled 1995 refueling outage, which is scheduled to begin on March 18, 1995. A code repair will be implemented prior to startup from the refueling outage. Vermont Yankee does not foresee the need to implement any leak-mitigating measures for this situation. For the interim period until a code repair can be implemented, Vermont Yankee plans to perform daily qualitative evaluation of leakage rate and monthly ultrasonic examination of the welds containing these flaws.

Should you have any further questions or require additional information with regard to this issue, please contact this office.

Sincerely,

VERMONT YANKEE NUCLEAR POWER CORPORATION

Leonard A. Tremblay, Jr.

Leonard A. Tremblay, Jr., P.E.
Senior Licensing Engineer

cc: USNRC Region I Administrator
USNRC Resident Inspector - VYNPS
USNRC Project Manager - VYNPS

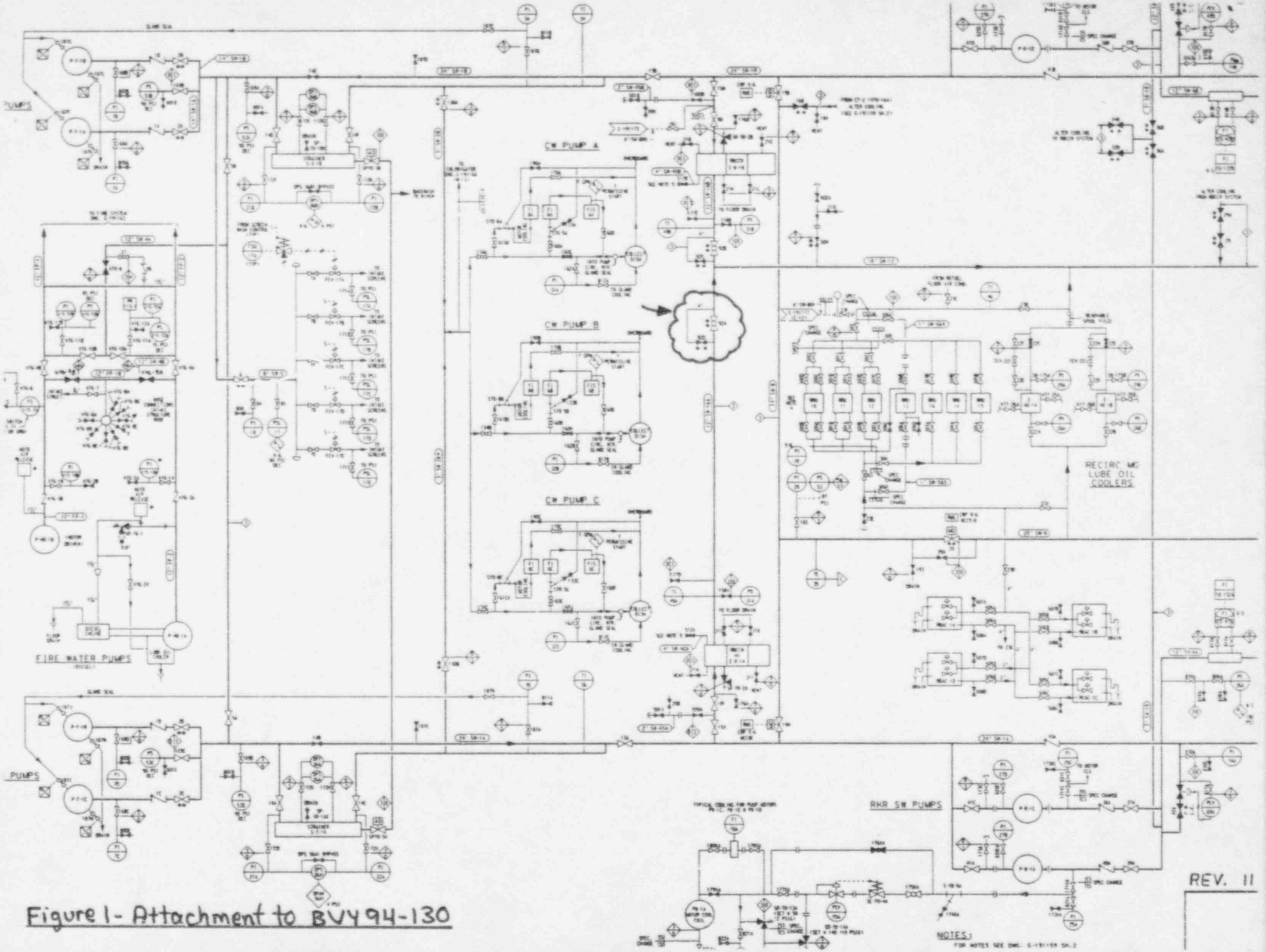

Figure 1- Attachment to BV494-130