VERMONT YANKEE
NUCLEAR POWER CORPORATION

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REPLY TO:
ENGINEERING OFFICE
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FRAMINGHAM, MASSACHUSETTS 01701
TELEPHONE 617-872-8100

September 14, 1984
FVY 84-110

United States Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Office of Nuclear Reactor Regulation
Mr. Domenic B. Vassallo, Chief
Operating Reactors Branch No. 2
Division of Licensing

References:
(a) License No. DPR-28 (Docket No. 50-271)
(b) Letter, T. J. Dente (BWROG) to D. G. Eisenhut (USNRC), BWROG-8408, dated April 6, 1984
(c) General Electric SIL No. 402, dated February 14, 1984
(d) IE Bulletin 84-01, dated February 3, 1984

Subject: Documentation of Vermont Yankee Actions- In Response To General Electric SIL No. 402

Dear Sir:

Reference (b) provided documentation of the Regulatory Response Group's (RRG) investigation into the cause of the Hatch-2 torus vent header crack. Vermont Yankee provided information verbally to the RRG to support that investigation and later to the NRC to confirm that the issue was being addressed by Vermont Yankee. In addition, Reference (d) requested that certain inspections be performed relative to the Hatch event, and the requirements of that Reference have been fulfilled by Vermont Yankee.

We have recently been contacted by your Staff and requested to provide written documentation of our actions taken in response to the General Electric SIL related to the Hatch event [Reference (c)]. This information is provided in the attachment to this letter. It should be noted that the scope of actions described in the attachment were discussed with your Staff prior to our 1984 refueling outage.

We trust that this information will be sufficient for your needs; however, should you need additional information, please contact us.

Very truly yours,

VERMONT YANKEE NUCLEAR POWER CORPORATION

R. W. Capstick

R. W. Capstick
Licensing Engineer

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Attachment

ATTACHMENT

Vermont Yankee Response to General Electric SIL No. 402

1. Evaluate Inerting System Design

Evaluate the design of the Nitrogen Inerting System. Investigate the potential for introducing cold (less than 40°F) nitrogen and the orientation of the nitrogen port relative to the vent header, downcomers, or other equipment in the wetwell and drywell which may be in the path of the injected nitrogen. Assure that the temperature monitoring devices, the low temperature shutoff valve, and overall system design are adequate to prevent the injection of cold nitrogen into the containment.

Response

Vermont Yankee's Inerting System design utilizes large ambient vaporizers (as opposed to a steam vaporizer) and long feed lines as passive protection features to assure complete vaporization of liquid nitrogen. The potential for introduction of cold (less than 40°F) nitrogen is remote and would require multiple system failures including the failure of both primary and secondary temperature cutoff valves.

At Vermont Yankee, the 20" nitrogen supply line enters the torus at a 90° angle from horizontal but 9'-6" off the torus centerline (torus radius is 13'-8"). This means that the ring header and downcomers do not line up with the nitrogen injection port and therefore are not subject to direct impingement of low temperature nitrogen as was the case with Hatch-2.

Vermont Yankee has reviewed its Inerting System design and concludes that it is adequate to prevent the injection of cold nitrogen into the containment.

2. Evaluate Inerting System Operation

Review the operating experience of the Inerting System to assure that the vaporizer, the low temperature shutoff valve and the temperature indicators have functioned properly. Evaluate the plant calibration, maintenance and operating procedures for the Inerting System. Assure that cold nitrogen injection would be detected and prevented.

Response

A review of system maintenance records has been conducted showing that no significant maintenance has been required since system startup. This indicates that all system components have functioned properly. An evaluation of the associated calibration, maintenance, and operating procedures has been completed. We conclude that the procedures are adequate and that cold nitrogen injection would be detected and prevented using the existing procedures.

3. <u>Test for Drywell/Wetwell Bypass Leakage</u>

Perform a bypass leakage test as soon as convenient to confirm the integrity of the Vent System. This test should be conducted during plant operation following normal plant procedures. If no procedures exist, the following is a general guide for preparing your procedure: pressurize the drywell to approximately 0.75 psi above the wetwell pressure, maintain this drywell pressure and measure the pressure buildup in the wetwell. Any bypass leak area can then be calculated (and is limited by Technical Specifications on many plants) from the wetwell pressure and the drywell-wetwell pressure difference. This will provide an indication that the Vent System integrity is intact and that no gross failure exists.

<u>Response</u>

Vermont Yankee contacted General Electric to discuss this recommendation, and was informed that, for plants which maintain a drywell to torus pressure differential, an alternative action would be suitable. This action entailed reviewing the amount of nitrogen required to be added to the drywell to maintain the pressure differential required by the Technical Specification during operation. A change in the make-up rate would indicate increased drywell to torus leakage (possibly a crack). Such a review was conducted and no abnormal changes were noted. We believe this action meets the intent of the above recommendation.

It should be noted that to conduct the recommended test would have entailed violating Vermont Yankee Technical Specifications, which require that the drywell to torus pressure differential be maintained at greater than 1.7 psi during operation.

4. <u>Inspect Nitrogen Injection Line</u>

Conduct an Ultrasonic Test (UT) as soon as convenient of all accessible welds in the nitrogen injection line from the last isolation valve to the wetwell and drywell penetrations. Also UT the containment penetrations and the containment shell within 6 inches of the penetration. UT is recommended because cracks would be most likely to initiate on the inside of the pipe or on the side of the metal in contact with cold nitrogen.

<u>Response</u>

Liquid N_2, if entrained in the flowing stream, would warm up as it traveled down the piping system. Any entrained liquid would impinge at the first elbow (or next elbow) encountered. Therefore, the last place to find carbon steel embrittlement damage would be at the torus penetration.

VY's Inerting System is located outdoors and approximately 200' or more away from any safety class piping. The 6" purge line connecting the inerting skid with the safety class piping is carbon steel. Therefore, any one of the carbon steel elbows before the torus penetration would better represent embrittlement damage than at the torus itself and would be a more severe test.

For the above reasons, Vermont Yankee performed a visual inspection of an elbow upstream of the torus penetration. A boroscope was used to inspect the inside of the elbow, and a regular visual inspection of the outer surface was performed. No evidence of liquid nitrogen carryover was found. A visual inspection of the containment penetration (inside and out) and the containment shell within six inches of the penetration was performed. Again, no evidence of liquid nitrogen carryover was found. In addition, Appendix J leak rate testing of the valves in the inerting feed line showed no abnormal leakage.

5. Inspect Containment

During the next planned outage, perform a visual inspection of the vent header, downcomers, and other equipment in the containment which might be expected to be affected by the injection of cold nitrogen. The vent header should be inspected on the outside and the inside. Also, inspect the containment shell or steel liner for at least 6 inches around the nitrogen penetration.

Response

An inspection of the area surrounding the penetration was performed during Vermont Yankee's 1984 refueling outage. No evidence of liquid nitrogen carryover was found. Because the nitrogen point does not impinge on the ring header or downcomers as discussed in the response to Item 1 above, the detailed inspection of the ring header and downcomers was not conducted.