VERMONT YANKEE
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REPLY TO:
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October 31, 1984
FVY 84-128

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, USNRC to All Licensees, Generic Letter 84-09, dated May 8, 1984
(c) Letter, VYNPC to USNRC, FVY 84-104, dated August 24, 1984

Subject: Recombiner Capability Requirements of 10CFR50.44(c)(3)(ii)

Dear Sir:

By letter dated August 24, 1984 [Reference (c)], Vermont Yankee committed to provide the results of our detailed engineering evaluation of potential oxygen addition to the primary containment which was conducted to ensure that we satisfy the three NRC criteria provided by Generic Letter 84-09 [Reference (b)]. Enclosed please find the results of our review which demonstrate that Vermont Yankee satisfies the NRC criteria on containment oxygen addition and therefore meets the conditions necessary for taking credit for the BWR Mark I Owners Group generic studies regarding the technical basis for not needing hydrogen recombiner capability, as presently required by 10CFR50.44(c)(3)(ii).

As stated in Reference (c), Vermont Yankee intends to convert the existing air CAD system to a system which provides for a nitrogen purge and repressurization capability before start-up from our next refueling outage scheduled to begin in September 1985. This design change will eliminate the CAD system as a potential source of oxygen in the containment; in the interim, new procedural controls to restrict operation of the CAD system will be provided.

We trust that the enclosed information is deemed acceptable; however, should you have any questions regarding this submittal, please contact us.

Very truly yours,

W P Murphy

W. P. Murphy
Vice President and Manager of Operations

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Vermont Yankee's Review of Potential Oxygen Addition to the Primary Containment in Accordance with NRC Criteria Specified in Generic Letter No. 84-09, Dated May 8, 1984

Criterion 1

The plant has Technical Specifications (limiting conditions for operation) requiring that, when the containment is required to be inerted, the containment atmosphere be less than 4% oxygen.

Response

Vermont Yankee Technical Specification 3.7.A.7 requires the containment atmosphere to be less than 4% oxygen when the containment is required to be inerted.

Therefore, Vermont Yankee satisfies Criterion 1.

Criterion 2

The plant has only nitrogen or recycled containment atmosphere for use in all pneumatic control systems within containment.

Response

Vermont Yankee's pneumatic supply for drywell instruments can be provided from three sources:

(a) Nitrogen Supply System - A once-through source of nitrogen gas from a large on-site liquid nitrogen storage and vaporizing facility.

(b) Containment Air System - A closed loop system that recycles the containment atmosphere and supplies instruments utilizing a containment air compressor.

(c) Plant Instrument Air System - A compressed air source that can be cross-connected to the Nitrogen Supply System piping.

During power operation, the Nitrogen Supply System is normally inservice and the Containment Air System is available for backup. Operation of either of these systems does not present an oxygen intrusion potential to the containment.

The Plant Instrument Air System is normally isolated from the Nitrogen Supply System by blind flanges during power operation. The blind flanges provide positive leak proof separation of the two systems.

The Nitrogen Supply System is considered quite reliable. Its simple design consists of very few active components and in addition to the liquid nitrogen tank, an external connection is provided for nitrogen supply to the system. Therefore, the need to utilize the Plant Instrument Air System during power operation would not be expected.

Procedural controls are in place that restrict the use of the Plant Instrument Air/Nitrogen Supply cross-connection during power operation.

Therefore, Vermont Yankee satisfies Criterion 2.

Criterion 3

There are no potential sources of oxygen in containment other than that resulting from radiolysis of the reactor coolant. Consideration of potential sources of inleakage of air and oxygen into containment should include consideration of not only normal plant operating conditions but also postulated loss-of-coolant accident conditions. These potential sources of inleakage should include Instrument Air Systems, Service Air Systems, MSIV Leakage Control Systems, purge lines, penetrations pressurized with air and inflatable door seals.

Response

An engineering review to identify any potential sources of oxygen in containment other than that resulting from radiolysis has been completed.

No potential sources of oxygen have been found that could jeopardize primary containment integrity post-accident.

The following areas were addressed in our review:

(a) Instrument Air System - As discussed under our response to Criterion 2, Instrument Air is normally isolated from the primary containment instrument nitrogen supply by blind flanges during power operation. In addition, Instrument Air can be cross-connected to the Traversing In-Core Probe (TIP) purge nitrogen supply and the containment nitrogen makeup piping. During power operation, all three (3) Instrument Air System/Primary Containment cross-connection points are isolated by a positive leak-proof design.

Procedural controls are in place that restrict the use of these Instrument Air cross-connections during power operation.

(b) Service Air System - The Service Air piping penetration to the drywell is disconnected and capped. Positive isolation between the Service Air System and the containment is thereby assured.

(c) MSIV Leakage Control System - Vermont Yankee is not equipped with an MSIV Leakage Control System.

(d) Purge Lines - The Primary Containment Atmosphere Control (PCAC) System includes purge and vent lines connected to the containment via redundant primary containment isolation valves. Although normal purging operations admit air from normal Reactor Building ventilation to the containment through the purge lines, the PCAC purge and vent lines automatically isolate (if open) under accident conditions.

Each line has two (2) PCAC primary containment isolation valves in series which undergo 10CFR50, Appendix J leakrate testing. Therefore, PCAC purge and vent lines do not provide a potential oxygen source post-accident.

(e) Penetrations Pressurized with Air and Inflatable Door Seals - Vermont Yankee is not equipped with any primary containment inflatable door seals or penetrations that are pressurized with air during normal power operations.

The electrical penetrations are pressurized with nitrogen gas during power operation.

Various pipe penetration expansion bellows, double-gasket seals, and the personnel air lock are pressurized with air during leak rate testing only.

Therefore, primary containment penetrations do not provide a potential oxygen source post-accident.

(f) Containment Atmosphere Dilution (CAD) System - Vermont Yankee's CAD System is presently designed to inject air from the Reactor Building into the primary containment to reduce postulated post-accident hydrogen concentration. As stated in Reference (b), Vermont Yankee plans to convert the existing air CAD System to a system which provides for a nitrogen purge and repressurization capability. This design change will eliminate the CAD System as a potential source of oxygen in the containment.

In the interim period until the CAD System is modified, procedural controls will be provided to restrict the use of the existing air CAD System.

(g) Reactor Building-to-Torus Vacuum Breakers - Vermont Yankee is equipped with vacuum breakers which protect the torus from excessive differential pressure that could result if the primary containment pressure is negative with respect to the Reactor Building. Our review of the potential for a negative primary containment pressure [Reference (c)] indicates that for the full spectrum of loss-of-coolant accidents within the primary containment, with current emergency operating procedures being followed, primary containment vacuum is not predicted.

In addition, new emergency operating procedures are being developed. These procedures will include controls over the use of containment sprays to warn against the remote possibility that excess spraying post-LOCA could lead to negative primary containment pressure.