# Vermont Yankee Proposed Change No. 190

Marked-up Technical Specification pages

## 3.7 LIMITING CONDITIONS FOR OPERATION

e. Minimum Water Volume - 68,000 cubic feet

f. Maximum Water Volume - 70,000 cubic feet

2. Primary containment integrity shall be maintained at all times when the reactor is critical or when the reactor water temperature is above 212°F and fuel is in the reactor vessel except while performing low power physics tests at atmospheric pressure at power levels not to exceed 5 Mw(t).

3. Whenever primary containment is required, the total primary containment leakage rate shall not exceed 0.8 weight percent per day ($L_a$) at a pressure of 44 psig ($P_a$).

4. Whenever primary containment is required, the leakage from any one isolation valve shall not exceed 5 percent of the maximum allowable leak rate ($L_a$) at peak accident pressure ($P_a$) and the leakage from any one main steam line isolation valve shall not exceed 15.5 scf/hr at 44 psig ($P_a$).

If a portion of a system that is considered to be an extension of primary containment, as detailed in the PCLRTP, is to be opened, isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve or blind flange.

## 4.7 SURVEILLANCE REQUIREMENTS

the Primary Containment Leakage Rate Testing Program (PCLRTP)

2. The primary containment integrity shall be demonstrated as required by Appendix J to 10 CFR Part 50. The primary containment shall meet the containment acceptance requirements set forth in that appendix.

   a. Penetrations and seals listed in Table 4.7.1 shall be leak tested at 44 psig (Pa).

   b. Type C tests shall be performed on the isolation valves listed in Table 4.7.2.a.

3. Prior to violating the integrity of a system outside the primary containment, which is connected to any valve listed in Table 4.7.2b, the isolation valves bounding the opening shall have Type C tests performed. If the opening cannot be isolated from the containment by two isolation valves which meet the acceptance criteria of Appendix J (10CFR Part 50), a blank flange shall be installed on the opening.

(Blank)

4. The leakage from any one isolation valve shall not exceed 5% of Ltm. The leakage from any one main steam line isolation valve shall not exceed 11.5 scf/hr at 24 psig (Pt). Repair and retest shall be conducted to insure compliance.

## 3.7 LIMITING CONDITIONS FOR OPERATION

5. Core spray and LPCI pump lower compartment door openings shall be closed at all times except during passage or when reactor coolant temperature is less than 212°F.

### D. Primary Containment Isolation Valves

1. During reactor power operating conditions all containment isolation valves ~~listed in Table 4.7.2~~ and all instrument line flow check valves, listed in the PCLRTP shall be operable except as specified in Specification 3.7.D.2.

## 4.7 SURVEILLANCE REQUIREMENTS

5. The core spray and LPCI lower compartment openings shall be checked closed daily.

### D. Primary Containment Isolation Valves

1. Surveillance of the primary containment isolation valves should be performed as follows:

   a. The operable isolation valves that are power operated and automatically initiated shall be tested for automatic initiation and the closure times specified in Table 4.7.2 at least once per operating cycle.

   b. Operability testing of the primary containment isolation valves shall be performed in accordance with Specification 4.6.E.

   c. At least once per quarter, with the reactor power less than 75 percent of rated, trip all main steam isolation valves (one at a time) and verify closure time.

   d. At least twice per week, the main steam line isolation valves shall be exercised by partial closure and subsequent reopening.

## 3.7 LIMITING CONDITIONS FOR OPERATION

2. In the event any isolation valve specified in Table 4.7.2 becomes inoperable, reactor power operation may continue provided at least one valve in each line having an inoperable valve is in the mode corresponding to the isolated condition.

3. If Specifications 3.7.D.1 and 3.7.D.2 cannot be met, an orderly shutdown shall be initiated and the reactor shall be in the cold shutdown condition within 24 hours.

## 4.7 SURVEILLANCE REQUIREMENTS

2. Whenever an containment isolation valve listed in 4.7.2 is inoperable, the position of at least one other valve in each line having an inoperable valve shall be logged daily.

the PCLRTP

TABLE 4.7.1

PENETRATIONS AND SEALS SUBJECT TO TYPE B TESTING

| Penetration Number | Identification | Number of Penetrations |
|---|---|---|
| X-7A, D | Main Steam Line A, D | 4 |
| X-9A, B | Feedwater Line A, B | 2 |
| X-11 | HPCI Steam Line | 1 |
| X-12 | Shutdown Cooling Supply | 1 |
| X-13A, B | RHR Return to Reactor | 2 |
| X-14 | Supply to Reactor Water Cleanup | 1 |
| X-16A, B | Core Spray to Reactor | 2 |
| X-1 | Equipment Access Hatch | 1 |
| X-3 | Drywell Head Flange | 1 |
| X-4 | Drywell Head Access Hatch | 2 |
| X-6 | CRD Removal Hatch | 1 |
| SLH-A, H | Shear Lug Access Covers | 8 |
| X-202A, H & J, K | Vacuum Relief Access Covers | 10 |
| X-213A, B | Torus Drains | 2 |
| X-200A, B | Torus Manways | 2 |

(Intentionally Blank)

TABLE 4.7.2.

PRIMARY CONTAINMENT ISOLA.ION VALVES

VALVES SUBJECT TO TYPE : LEAKAGE TESTS

| Isolation Group (1) | Valve Identification | Number of Power Operated Valves Inboard | Number of Power Operated Valves Outboard | Maximum Operating Time (sec) | Normal Position | Action on Initiating Signal |
|---|---|---|---|---|---|---|
| 1 | Main Steam Line Isolation (2-80A, D & 2-86A, D) | 4 | 4 | 5 (Note 2) | Open | GC |
| 1 | Main Steam Line Drain (2-74, 2-77) | 1 | 1 | 35 | Closed | SC |
| 1 | Recirculation Loop Sample Line (2-39, 2-40) | 1 | 1 | 5 | Closed | SC |
| 2 | RHR Discharge to Radwaste (10-57, 10-66) | | 2 | 25 | Closed | SC |
| 2 | Drywell Floor Drain (20-82, 20-83) | | 2 | 20 | Open | GC |
| 2 | Drywell Equipment Drain (20-94, 20-95) | | 2 | 20 | Open | GC |
| 3 | Drywell Air Purge Inlet (16-19-9) | | 1 | 10 | Closed | SC |
| 3 | Drywell Air Purge Inlet (16-19-8) | | 1 | 10 | Closed ~~Open~~ | ~~GC~~ SC |
| 3 | Drywell Purge & Vent Outlet (16-19-7A) | | 1 | 10 | Closed* | SC |
| 3 | Drywell Purge & Vent Outlet Bypass (16-19-6A) | | 1 | 10 | Closed | SC |
| 3 | Drywell & Suppression Chamber Main Exhaust (16-19-7) | | 1 | 10 | Closed* | SC |
| 3 | Suppression Chamber Purge Supply (16-19-10) | | 1 | 10 | Closed | SC |
| 3 | Suppression Chamber Purge & Vent Outlet (16-19-7B) | | 1 | 10 | Closed | SC |
| 3 | Suppression Chamber Purge & Vent Outlet Bypass (16-19-6B) | | 1 | 10 | Open | GC |

* Valves 16-19-7 and 16-1?-7A shall have stops installed to limit valve opening to 50° or less.

TABLE 4.7.2.a
(Cont'd)

PRIMARY CONTAINMENT ISOLATION VALVES

~~VALVES SUBJECT TO TYPE C LEAKAGE TESTS~~

| Isolation Group (1) | Valve Identification | Number of Power Operated Valves Inboard | Number of Power Operated Valves Outboard | Maximum Operating Time (sec) | Normal Position | Action on Initiating Signal |
|---|---|---|---|---|---|---|
| 3 | Exhaust to Standby Gas Treatment System (16-19-6) | | 1 | 10 | Open | GC |
| 3 | Containment Purge Supply (16-19-23) | | 1 | 10 | ~~Open~~ closed | ~~GC~~ SC |
| 3 | Containment ~~Purge~~ Makeup ~~(16-20-20,~~ 16-20-22A, ~~16-20-22B)~~ Supply | | ~~2~~ 1 | NA | Closed | SC |
| 5 | Reactor Cleanup System (12-15, 12-18) | 1 | 1 | 25 | Open | GC |
| 6 | HPCI (23-15, 23-16) | 1 | 1 | 55 | Open | GC |
| 6 | RCIC (13-15, 13-16) | 1 | 1 | 20 | Open | GC |
| | Primary/Secondary Vacuum Relief (16-19-11A, 16-19-11B) | | 2 | NA | Closed | SC |
| | Primary/Secondary Vacuum Relief (16-19-12A, 16-19-12B) | | 2 | NA | Closed | Process |
| 3 | Containment Air Sampling (VG 23, VG 26, 109-76A&B) | | 4 | 5 | Open | GC |
| | Feedwater Check Valves (V2-27A, -96A. -28A, -28B) | | | NA | Open | Process |
| 3 | Containment Makeup Supply (add) | | 2 | 5 | Open | GC |

Amendment No. ~~58~~, ~~61~~, ~~74~~, ~~91~~, 122

TABLE 4.7.2.b
(cont'd)

PRIMARY CONTAINMENT ISOLATION VALVES

~~VALVES NOT SUBJECT TO TYPE C LEAKAGE TESTS~~

| Isolation Group (1) | Valve Identification | Number of Power Operated Valves Inboard | Number of Power Operated Valves Outboard | Maximum Operating Time (sec) | Normal Position | Action on Initiating Signal |
|---|---|---|---|---|---|---|
| 2 | RHR Return to Suppression Pool (10-39A, B) | | 2 | 70 | Closed | SC |
| 2 | RHR Return to Suppression Pool (10-34A, B) | | 2 | 120 | Closed | SC |
| 2 | RHR Drywell Spray (10-26A, B & 10-31A, B) | | 4 | 70 | Closed | SC |
| 2 | RHR Suppression Chamber Spray (10-38A, B) | | 2 | 45 | Closed | SC |
| 3 | Containment Air Compressor Suction (72-38A, B) | | 2 | 20 | Open | GC |
| 4 | RHR Shutdown Cooling Supply (10-18, 10-17) | 1 | 1 | 28 | Closed | SC |
| | Standby Liquid Control Check Valves (11-16, 11-17) | 1 | 1 | NA | Closed | Proc. |
| * | Hydrogen Monitoring (109-75 A, 1-4; 109-75 B-D, 1-2) Sampling Valves - Inlet | | 10 | NA | NA | NA |
| * | Hydrogen Monitoring (VG-24, 25, 33, 34) | | 4 | NA | NA | NA |

* These valves are remote manual sampling valves which do not receive an isolation signal. Only one valve in each line is required to be operable.

BASES: 4.7 (Cont'd)

The maximum allowable test leak rate at the peak accident pressure of 44 psig (La) is 0.80 weight % per day. The maximum allowable test leak rate at the retest pressure of 24 psig (Lt) has been conservatively determined to be 0.59 weight percent per day. This value will be verified to be conservative by actual primary containment leak rate measurements at both 44 psig and 24 psig upon completion of the containment structure.

To allow a margin for possible leakage deterioration between test intervals, the maximum allowable operational leak rate (Ltm), which will be met to remain on the normal test schedule, is 0.75 Lt.

As most leakage and deterioration of integrity is expected to occur through penetrations, especially those with resilient seals, a periodic leak rate test program of such penetration is conducted at the peak accident pressure of 44 psig to insure not only that the leakage remains acceptably low but also that the sealing materials can withstand the accident pressure.

The leak rate testing program is based on AEC guidelines for development of leak rate testing and surveillance schedules for reactor containment vessels.

Surveillance of the suppression Chamber-Reactor Building vacuum breakers consists of operability checks and leakage tests (conducted as part of the containment leak-tightness tests). These vacuum breakers are normally in the closed position and open only during tests or an accident condition. Operability testing is performed in conjunction with Specification 4.6.E. Inspections and calibrations are performed during the refueling outages; this frequency being based on equipment quality, experience, and engineering judgment.

The ten (10) drywell-suppression vacuum relief valves are designed to open to the full open position (the position that curtain area is equivalent to valve bore) with a force equivalent to a 0.5 psi differential acting on the suppression chamber face of the valve disk. This opening specification assures that the design limit of 2.0 psid between the drywell and external environment is not exceeded. Once each refueling outage each valve is tested to assure that it will open fully in response to a force less than that specified. Also it is inspected to assure that it closes freely and operates properly.

The containment design has been examined to establish the allowable bypass area between the drywell and suppression chamber as 0.12 $ft^2$. This is equivalent to one vacuum breaker open by three-eighths of an inch (3/8") as measured at all points around the circumference of the disk or three-fourths of an inch (3/4") as measured at the bottom of the disk when the top of the disk is on the seat. Since these valves open in a manner that is purely neither mode, a conservative allowance of one-half inch (1/2") has been selected as the maximum permissible valve opening. Assuming that permissible valve opening could be evenly divided among all ten vacuum breakers at once, valve open position assumed to indication for an individual valve must be activated less than fifty-thousandths of an inch (0.050") at all points along the seal surface of the disk. Valve closure within this limit may be determined by light indication from two independent position detection and indication systems. Either system provides a control room alarm for a nonseated valve.

4. An evaluation of the change, which shows the predicted releases of radioactive materials in liquid and gaseous effluents and/or quantity of solid waste that differ from those previously predicted in the license application and amendments thereto;

5. An evaluation of the change, which shows the expected maximum exposures to member(s) of the public at the site boundary and to the general population that differ from those previously estimated in the license application and amendments thereto;

6. A comparison of the predicted releases of radioactive materials, in liquid and gaseous effluents and in solid waste, to the actual releases for the period prior to when the changes are to be made;

7. An estimate of the exposure to plant operating personnel as a result of the change; and

8. Documentation of the fact that the change was reviewed and found acceptable by PORC.

B. Shall become effective upon review and acceptance by PORC and approval by the Plant Manager.

add

6.15 Primary Containment Leakage Rate Testing Program

A program shall be established to implement the leakage rate testing of the primary containment as required by 10 CFR 50.54(o) and 10 CFR 50, Appendix J, Option B as modified by approved exemptions. This program shall be in accordance with the guidelines contained in Regulatory Guide 1.163, entitled "Performance-Based Containment Leak-Test Program," dated September 1995.

The peak calculated containment internal pressure for the design basis loss of coolant accident, Pa, is 44 psig.

The maximum allowable primary containment leakage rate, La, at Pa, shall be 0.8% of primary containment air weight per day.

Leakage rate acceptance criteria are:

1. Primary containment leakage rate acceptance criterion is ≤ 1.0 La.

2. The as-left primary containment integrated leak rate test (Type A test) acceptance criterion is ≤ 0.75 La.

3. The combined local leak rate test (Type B & C tests) acceptance criterion is ≤ 0.60 La, calculated on a maximum pathway basis, prior to entering a mode of operation where containment integrity is required.

4. The combined local leak rate test (Type B & C tests) acceptance criterion is ≤ 0.60 La, calculated on a minimum pathway basis, at all times when primary containment integrity is required.

5. Airlock overall leakage rate acceptance criterion is ≤ 0.10 La when tested at ≥ Pa.

The provision of the Definition (1.0.Y) for Surveillance Frequency does not apply to the test frequencies specified in the Primary Containment Leak Rate Testing Program.

**Vermont Yankee Proposed Change No. 190**

New Technical Specification pages

| 3.7 LIMITING CONDITIONS FOR OPERATION | 4.7 SURVEILLANCE REQUIREMENTS |
|---|---|
| e. Minimum Water Volume - 68,000 cubic feet | |
| f. Maximum Water Volume - 70,000 cubic feet | |
| 2. Primary containment integrity shall be maintained at all times when the reactor is critical or when the reactor water temperature is above 212°F and fuel is in the reactor vessel except while performing low power physics tests at atmospheric pressure at power levels not to exceed 5 Mw(t). | 2. The primary containment integrity shall be demonstrated as required by the Primary Containment Leak Rate Testing Program (PCLRTP). |
| 3. If a portion of a system that is considered to be an extension of primary containment, as detailed in the PCLRTP, is to be opened, isolate the affected penetration flow path by use of at least one closed and deactivated automatic valve, closed manual valve or blind flange. | 3. (Blank) |
| 4. Whenever primary containment is required, the leakage from any one main steam line isolation valve shall not exceed 15.5 scf/hr at 44 psig ($P_a$). | 4. The leakage from any one main steam line isolation valve shall not exceed 11.5 scf/hr at 24 psig (Pt). Repair and retest shall be conducted to insure compliance. |

## 3.7 LIMITING CONDITIONS FOR OPERATION

5. Core spray and LPCI pump lower compartment door openings shall be closed at all times except during passage or when reactor coolant temperature is less than 212°F.

D. Primary Containment Isolation Valves

1. During reactor power operating conditions all containment isolation valves and all instrument line flow check valves listed in the PCLRTP shall be operable except as specified in Specification 3.7.D.2.

## 4.7 SURVEILLANCE REQUIREMENTS

5. The core spray and LPCI lower compartment openings shall be checked closed daily.

D. Primary Containment Isolation Valves

1. Surveillance of the primary containment isolation valves should be performed as follows:

   a. The operable isolation valves that are power operated and automatically initiated shall be tested for automatic initiation and the closure times specified in Table 4.7.2 at least once per operating cycle.

   b. Operability testing of the primary containment isolation valves shall be performed in accordance with Specification 4.6.E.

   c. At least once per quarter, with the reactor power less than 75 percent of rated, trip all main steam isolation valves (one at a time) and verify closure time.

   d. At least twice per week, the main steam line isolation valves shall be exercised by partial closure and subsequent reopening.

3.7 LIMITING CONDITIONS FOR OPERATION

2. In the event any containment isolation valve specified in the PCLRTP becomes inoperable, reactor power operation may continue provided at least one valve in each line having an inoperable valve is in the mode corresponding to the isolated condition.

3. If Specifications 3.7.D.1 and 3.7.D.2 cannot be met, an orderly shutdown shall be initiated and the reactor shall be in the cold shutdown condition within 24 hours.

4.7 SURVEILLANCE REQUIREMENTS

2. Whenever a containment isolation valve listed in the PCLRTP is inoperable, the position of at least one other valve in each line having an inoperable valve shall be logged daily.

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TABLE 4.7.2

PRIMARY CONTAINMENT ISOLATION VALVES

| Isolation Group (1) | Valve Identification | Number of Power Operated Valves Inboard | Number of Power Operated Valves Outboard | Maximum Operating Time (sec) | Normal Position | Action on Initiating Signal |
|---|---|---|---|---|---|---|
| 1 | Main Steam Line Isolation (2-80A, D & 2-86A, D) | 4 | 4 | 5 (Note 2) | Open | GC |
| 1 | Main Steam Line Drain (2-74, 2-77) | 1 | 1 | 35 | Closed | SC |
| 1 | Recirculation Loop Sample Line (2-39, 2-40) | 1 | 1 | 5 | Closed | SC |
| 2 | RHR Discharge to Radwaste (10-57, 10-66) | | 2 | 25 | Closed | SC |
| 2 | Drywell Floor Drain (20-82, 20-83) | | 2 | 20 | Open | GC |
| 2 | Drywell Equipment Drain (20-94, 20-95) | | 2 | 20 | Open | GC |
| 3 | Drywell Air Purge Inlet (16-19-9) | | 1 | 10 | Closed | SC |
| 3 | Drywell Air Purge Inlet (16-19-8) | | 1 | 10 | Closed | SC |
| 3 | Drywell Purge & Vent Outlet (16-19-7A) | | 1 | 10 | Closed* | SC |
| 3 | Drywell Purge & Vent Outlet Bypass (16-19-6A) | | 1 | 10 | Closed | SC |
| 3 | Drywell & Suppression Chamber Main Exhaust (16-19-7) | | 1 | 10 | Closed* | SC |
| 3 | Suppression Chamber Purge Supply (16-19-10) | | 1 | 10 | Closed | SC |
| 3 | Suppression Chamber Purge & Vent Outlet (16-19-7B) | | 1 | 10 | Closed | SC |
| 3 | Suppression Chamber Purge & Vent Outlet Bypass (16-19-6B) | | 1 | 10 | Open | GC |

* Valves 16-19-7 and 16-19-7A shall have stops installed to limit valve opening to 50° or less.

TABLE 4.7.2
(Cont'd)

PRIMARY CONTAINMENT ISOLATION VALVES

| Isolation Group (1) | Valve Identification | Number of Power Operated Valves Inboard | Number of Power Operated Valves Outboard | Maximum Operating Time (sec) | Normal Position | Action on Initiating Signal |
|---|---|---|---|---|---|---|
| 3 | Exhaust to Standby Gas Treatment System (16-19-6) | | 1 | 10 | Open | GC |
| 3 | Containment Purge Supply (16-19-23) | | 1 | 10 | Closed | SC |
| 3 | Containment Makeup Supply (16-20-22A) | | 1 | NA | Closed | SC |
| 3 | Containment Makeup Supply (16-20-20, 16-20-22B) | | 2 | 5 | Open | GC |
| 5 | Reactor Cleanup System (12-15, 12-18) | 1 | 1 | 25 | Open | GC |
| 6 | HPCI (23-15, 23-16) | 1 | 1 | 55 | Open | GC |
| 6 | RCIC (13-15, 13-16) | 1 | 1 | 20 | Open | GC |
| | Primary/Secondary Vacuum Relief (16-19-11A, 16-19-11B) | | 2 | NA | Closed | SC |
| | Primary/Secondary Vacuum Relief (16-19-12A, 16-19-12B) | | 2 | NA | Closed | Process |
| 3 | Containment Air Sampling (VG 23, VG 26, 109-76A&B) | | 4 | 5 | Open | GC |
| | Feedwater Check Valves (V2-27A, -96A, -28A, -28B) | | | NA | Open | Process |

TABLE 4.7.2
(Cont'd)

PRIMARY CONTAINMENT ISOLATION VALVES

| Isolation Group (1) | Valve Identification | Number of Power Operated Valves: Inboard | Number of Power Operated Valves: Outboard | Maximum Operating Time (sec) | Normal Position | Action on Initiating Signal |
|---|---|---|---|---|---|---|
| 2 | RHR Return to Suppression Pool (10-39A, B) | | 2 | 70 | Closed | SC |
| 2 | RHR Return to Suppression Pool (10-34A, B) | | 2 | 120 | Closed | SC |
| 2 | RHR Drywell Spray (10-26A, B & 10-31A, B) | | 4 | 70 | Closed | SC |
| 2 | RHR Suppression Chamber Spray (10-38A, B) | | 2 | 45 | Closed | SC |
| 3 | Containment Air Compressor Suction (72-38A, B) | | 2 | 20 | Open | GC |
| 4 | RHR Shutdown Cooling Supply (10-18, 10-17) | 1 | 1 | 28 | Closed | SC |
| | Standby Liquid Control Check Valves (11-16, 11-17) | 1 | 1 | NA | Closed | Proc. |
| * | Hydrogen Monitoring (109-75 A, 1-4; 109-75 B-D, 1-2) Sampling Valves - Inlet | | 10 | NA | NA | NA |
| * | Hydrogen Monitoring (VG-24, 25, 33, 34) | | 4 | NA | NA | NA |

* These valves are remote manual sampling valves which do not receive an isolation signal. Only one valve in each line is required to be operable.

BASES: 4.7 (Cont'd)

The maximum allowable test leak rate at the peak accident pressure of 44 psig (La) is 0.80 weight % per day. The maximum allowable test leak rate at the retest pressure of 24 psig (Lt) has been conservatively determined to be 0.59 weight percent per day. This value will be verified to be conservative by actual primary containment leak rate measurements at both 44 psig and 24 psig upon completion of the containment structure.

As most leakage and deterioration of integrity is expected to occur through penetrations, especially those with resilient seals, a periodic leak rate test program of such penetration is conducted at the peak accident pressure of 44 psig to insure not only that the leakage remains acceptably low but also that the sealing materials can withstand the accident pressure.

The Primary Containment Leak Rate Testing Program is based on Option B to 10CFR50, Appendix J, for development of leak rate testing and surveillance schedules for reactor containment vessels.

Surveillance of the suppression Chamber-Reactor Building vacuum breakers consists of operability checks and leakage tests (conducted as part of the containment leak-tightness tests). These vacuum breakers are normally in the closed position and open only during tests or an accident condition. Operability testing is performed in conjunction with Specification 4.6.E. Inspections and calibrations are performed during the refueling outages; this frequency being based on equipment quality, experience, and engineering judgment.

The ten (10) drywell-suppression vacuum relief valves are designed to open to the full open position (the position that curtain area is equivalent to valve bore) with a force equivalent to a 0.5 psi differential acting on the suppression chamber face of the valve disk. This opening specification assures that the design limit of 2.0 psid between the drywell and external environment is not exceeded. Once each refueling outage each valve is tested to assure that it will open fully in response to a force less than that specified. Also it is inspected to assure that it closes freely and operates properly.

The containment design has been examined to establish the allowable bypass area between the drywell and suppression chamber as 0.12 $ft^2$. This is equivalent to one vacuum breaker open by three-eighths of an inch (3/8") as measured at all points around the circumference of the disk or three-fourths of an inch (3/4") as measured at the bottom of the disk when the top of the disk is on the seat. Since these valves open in a manner that is purely neither mode, a conservative allowance of one-half inch (1/2") has been selected as the maximum permissible valve opening. Assuming that permissible valve opening could be evenly divided among all ten vacuum breakers at once, valve open position assumed to indication for an individual valve must be activated less than fifty-thousandths of an inch (0.050") at all points along the seal surface of the disk. Valve closure within this limit may be determined by light indication from two independent position detection and indication systems. Either system provides a control room alarm for a nonseated valve.

4. An evaluation of the change, which shows the predicted releases of radioactive materials in liquid and gaseous effluents and/or quantity of solid waste that differ from those previously predicted in the license application and amendments thereto;

5. An evaluation of the change, which shows the expected maximum exposures to member(s) of the public at the site boundary and to the general population that differ from those previously estimated in the license application and amendments thereto;

6. A comparison of the predicted releases of radioactive materials, in liquid and gaseous effluents and in solid waste, to the actual releases for the period prior to when the changes are to be made;

7. An estimate of the exposure to plant operating personnel as a result of the change; and

8. Documentation of the fact that the change was reviewed and found acceptable by PORC.

B. Shall become effective upon review and acceptance by PORC and approval by the Plant Manager.

6.15 Primary Containment Leakage Rate Testing Program

A program shall be established to implement the leakage rate testing of the primary containment as required by 10CFR50.54(o) and 10CFR50, Appendix J, Option B as modified by approved exemptions. This program shall be in accordance with the guidelines contained in Regulatory Guide 1.163, entitled "Performance Based Containment Leak-Test Program," dated September 1995.

The peak calculated containment internal pressure for the design basis loss of coolant accident, Pa, is 44 psig.

The maximum allowable primary containment leakage rate, La, at Pa, shall be 0.8% of primary containment air weight per day.

Leakage rate acceptance criteria are:

1. Primary containment leakage rate acceptance criterion $\leq$ 1.0 La.

2. The as-left primary containment integrated leak rate test (Type A test) acceptance criterion is $\leq$ 0.75 La.

3. The combined local leak rate test (Type B and C tests) acceptance criterion is $\leq$ 0.60 La, calculated on a maximum pathway basis, prior to entering a mode of operation where containment integrity is required.

4. The combined local leak rate test (Type B and C tests) acceptance criterion is $\leq$ 0.60 La, calculated on a minimum pathway basis, at all times when primary containment integrity is required.

5. Air lock overall leakage rate acceptance criterion is $\leq$ 0.10 La when tested at $\geq$ Pa.

The provision of the Definition (1.0.Y) for Surveillance Frequency does not apply to the test frequencies specified in the Primary Containment Leakage Rate Testing Program.

# Vermont Yankee Proposed Change No. 190

Selected References

# VERMONT YANKEE NUCLEAR POWER CORPORATION

SEVENTY SEVEN GROVE STREET

RUTLAND, VERMONT 05701

REPLY TO:
ENGINEERING OFFICE
1671 WORCESTER ROAD
FRAMINGHAM, MASSACHUSETTS 01701
TELEPHONE 617-872-8100


2.C.2.1
FVY 82-32

March 26, 1982

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[illegible]
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United States Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Office of Nuclear Reactor Regulation
Mr. D. B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

References: (a) License No. DPR-28 (Docket No. 50-271)
(b) Letter, USNRC to VYNPC, dated November 9, 1979
(c) Letter, VYNPC to USNRC, WVY-81-15, dated January 21, 1980
(d) Letter, USNRC to VYNPC, dated September 10, 1980
(e) Letter, VYNPC to USNRC, WVY 80-139, dated October 3, 1980
(f) Letter, USNRC to VYNCP, dated March 3, 1981
(g) Letter, VYNPC to USNRC, FVY 81-83, dated May 21, 1981

Subject: Operation of Purge and Vent Valves Under Inerting Conditions

Dear Sir:

The most recent revision to 10CFR50.44 requires Vermont Yankee to inert its primary containment by May 4, 1982. Installation of the necessary equipment for inerting is in progress, and we intend to meet the May 4, 1982 deadline. Present operation of the purge and vent valves at Vermont Yankee is administratively limited to the minimum usage required to maintain a drywell to torus differential pressure of 1.7 psid. However, after May 4, 1982, with the containment inerted, it will be necessary to modify the operation of the purge and vent valves as described in Enclosure I to this letter. Vermont Yankee's bases for this mode of operation are discussed below.

The NRC requested Vermont Yankee to comply with an interim position on purging and venting in Reference (b). Our compliance was documented in Reference (c) and acknowledged by the NRC in Reference (d). In Reference (e), Vermont Yankee stated that data supplied by the manufacturer of the purge and vent valves demonstrated that these valves are capable of operating as required under the most severe design basis accident flow (LOCA) conditions. Subsequent to that submittal, we received Reference (f) which requested additional information on the subject valves. All of the information available to respond to Reference (f) at that time was submitted via Reference (g). Additional information which has since been developed is presented in Enclosure II to this letter. Vermont Yankee believes that, based on this information, the purge and vent valves are capable of performing their intended function. However, in the interim, for those valves where the flow force tending to resist valve closure is considered potentially significant, the valve position will be limited as dictated by the flow tests applicable to that particular valve. We feel that these interim measures will provide greater assurance of overall safe operation than limiting the use of these valves to a fixed number of hours per year. It is also important to note that the largest of the purge and vent valves at our facility is only 18 inches in diameter, and that all purge and vent valves are located inside our secondary containment. This precludes the possibility of a release directly to the atmosphere in the unlikely event of a failure of one of these valves during a postulated accident.

Vermont Yankee believes that the information presented above and in the attachments to this letter provides a more than adequate basis for our proposed scheme of operation of the purge and vent valves. In addition, we believe that the new requirement for Vermont Yankee to inert, and the subsequent necessity of purging to deinert to provide safe access to the primary containment for maintenance, are acceptable reasons for using these valves as described in Enclosure I. Other remaining questions, such as the seismic qualification of the purge and vent valves are being addressed as part of our long-term program.

As previously stated, Vermont Yankee will have to inert by May 4, 1982. To meet the required date for inerting, we propose to test our system in early April. Therefore, your review of our proposed mode of operation concerning the purge and vent valves is necessary in advance of the May 4, 1982 date. We trust the information transmitted by this letter is acceptable; however, should you have any questions, please contact us.

Very truly yours

VERMONT YANKEE NUCLEAR POWER CORPORATION

Leonard E. Mauntain

ENCLOSURE I

## Vermont Yankee Purge and Vent Valves

Description of Proposed Operating Modes to be used with Inerted Containment.

Objectives:

1. Maintain differential pressure between drywell and torus.
2. Maintain inert atmosphere of nitrogen during power operation.
3. Remove the inert atmosphere to provide a safe environment for personnel access to the drywell.
4. Achieve the requirements of Items 1, 2, and 3 in a timely fashion when needed.

Normal Operation:

1. Reactor at power.
2. Inert atmosphere in drywell and torus.
3. Differential pressure maintained.

These conditions are maintained by:

a. Continuous supply of nitrogen gas through one-inch makeup line and two-inch instrument supply line.

b. Continuous vent of torus through wide open three-inch butterfly valve, to PCAC piping, through eight-inch butterfly SB-6 to Standby Gas Treatment System with fan not running. (This mode of operation was previously approved by the NRC in Reference (d) of the cover letter.) SBGT discharges through piping to the monitored stack. Drywell atmosphere is monitored for radioactive particles and gasses.

Inerting Operation:

1. Reactor at design temperature and pressure after startup from maintenance and/or refueling conditions.
2. Inert atmosphere to be provided.
3. Differential pressure not required for 24 hours after achieving operating temperature and pressure.

Drywell inerting will be achieved as follows:

Gas will be introduced through six-inch piping, through a six-inch butterfly valve, wide open. The gas flows into eighteen-inch piping, through an eighteen-inch valve, wide open, to the drywell; and through an eighteen-inch valve, wide open to the torus.

Air will be exhausted from the drywell through an eighteen-inch butterfly valve, limited to 50° open. Air is exhausted from the torus through an eighteen-inch butterfly valve, wide open. Torus and drywell air flow through PCAC piping and through eighteen-inch SB-7, limited to 50° open. Air then flows through Reactor Transfer Fan 5, then through the building exhaust piping, exhaust fan, and discharge piping to the monitored stack.

Purging Operation:

1. Reactor at full power.

2. Inert atmosphere in drywell and torus to be removed.

3. Differential pressure not required for 24 hours prior to commencing a shutdown.

Purge air will be supplied from the Reactor Building ventilation supply duct which is slightly pressurized by the building supply fans. Air flows from the duct, into the PCAC eighteen-inch piping, through the backup eighteen-inch butterfly valve, through the piping and through an eighteen-inch butterfly valve to the torus, and an eighteen-inch buttefly valve to the drywell. These butterfly valves are wide open.

The exhaust path is similar to that for inerting. Flow from the torus and drywell is through the valves and piping described, but initial exhaust may be through the Standby Gas Treatment System, if required by radiological conditions.

Justification:

1. Per NRC regulations, inerting is required to mitigate potential post-accident conditions.

2. Drywell purging is required to provide a safe atmosphere for personnel performing necessary drywell activities.

3. Allis Chalmers valve tests demonstrate that all the installed butterfly valves can close from full open conditions at design basis containment pressure. This is true with flow through the valves in the post-LOCA direction. However, as an additional conservatism, limit stops will be added to those valves where the flow force that tends to open the valve is potentially significant as dictated by the flow tests applicable to those particular valves.

   Valve position will be limited by a design compatible with the Bettis Robot - Arm actuators.

Valve Usage:

| Inerting Mode | | Position |
|---|---|---|
| V-16-19-23 | | Wide open |
| V-16-19-8 | | Wide open |
| V-16-19-10 | | Wide open |
| V-16-19-7B | | Wide open |
| V-16-19-7A | | Limited to 50° open |
| SB-6 | Only one open | Wide open |
| SB-7 | at any time | Limited to 50° open |

Purging Mode

| | |
|---|---|
| V-16-19-9 | Wide open |
| V-16-19-23 | Closed |

All other purge and vent valves in same position as in Inerting Mode.

D/P Maintenance Mode

| | |
|---|---|
| V-16-19-6B | Wide open |
| SB-6 | Wide open |

All other valves which are open in this mode are 3 inches or smaller and connect to lines designed for containment pressure or higher (i.e., instrument air).

ENCLOSURE II

Vermont Yankee Purge and Vent Valves
(Question Numbers refer to NRC letter to VYNPC dated March 3, 1981. The previous response indicated is a Vermont Yankee letter to NRC dated May 21, 1981.)

Question 2: What are identified as the critical parts in these valves (shaft, disc to shaft pins, other)? What were the stresses calculated? Do they include simultaneous seismic loading? What are the design allowable stresses? What code or standards are the valves designed to?

Information on 6" SB-16-19-23 is provided based on information supplied by the vendor. Additional information will be developed and reported as part of our long-term program.

| Valve | Critical Part | Calculated Stress Due to Pressure | Design Allowable |
|---|---|---|---|
| 6" SB-16-19-23 | | | |
| | Disc-bending | 5140 psi | 17,500 psi |
| | Shaft | 3915 psi | 30,000 psi |
| | Bearings | 1050 psi | 20,000 psi |
| | Operator Mounting Bolts | Shear 1817 psi<br>Tensile 2282 psi | 54,000 psi |

Question 4: Is there sufficient torque margin available from the operator to overcome the torques developed that tend to oppose valve closure as the valve strokes from its initial open position to the fully seated position? What is the minimum margin available, and at what disc angle does this minimum exist?

For Valve 16-19-7B

| | |
|---|---|
| Angle at minimum margin | 70° |
| Margin (available torque-opposing torque) | 283 ft-lb |

Question 7: (Dealt with environmental qualification of pilot solenoids.)

Since May, 1981, all these solenoids have been replaced or determined to be qualified for their intended use.

Question 8: Describe the extent to which the operators are seismically qualified and environmentally qualified for long-term exposure to the normal plant environment. If the purge valves are to be operative post-LOCA, describe the extent to which the operators are environmentally qualified for the LOCA environment. Do the elastomeric parts in the operator have a qualified design life where periodic replacement is required?

The previous response referred to the answer to Question 7 which dealt with the operators' solenoids. Please replace it with the following:

All these valves were purchased for, and are located in, the reactor building in areas of mild environmental conditions. In the nearly ten years of plant operation, to date, there has been no evidence of environmental impairment of these valves' functions. These valves are not required to be operative post-LOCA in the long-term. If open, they would close immediately to isolate the containment. Thereafter, they would remain closed. These valves are all held closed by springs. Vermont Yankee has specified operability of the valves at the end of a year following a TMI-type accident in the scenario used for determining electrical equipment qualification (I&E Bulletin 79-01B). At that time, the valves would be opened to purge the primary containment and begin post-accident cleanup. Were these valves not to be operable, the reactor buiding would be entered and the valves repaired. These valves are all located outside the primary containment. The post-LOCA environment would consist of the building heatup and radiation cloud. Disc seat material was specified for 300°F.

The operators contain rubber (HYCAR) cylinder rod and piston seals good for $2 \times 10^6$ rads. Periodic replacement is not required.

Valves will normally be closed during inerted operation, and are spring closed. Therefore, capability of pneumatic parts to open the valves is not safety-related.

Final resolution of seismic qualification will be part of our long-term program.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

J. E. Tribble
D. E. Vandenburgh
L. H. Heider
D. W. Edwards/R. E. Helfrich
E. W. Jackson-2
R. L. Smith
J. D. Haseltine
L. D. Marsolais
A. M. Shepard-2
W. P. Murphy-2
D. A. Reid
J. P. Pelletier
R. Kenney
B. Jwaszewski
J. G. Robinson
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Docket No. 50-271

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May 3, 1982
NVY 82-60

Mr. Robert L. Smith
Licensing Engineer
Vermont Yankee Nuclear Power
Corporation
1671 Worcester Road
Framingham, MA 01701

Responsibility: J.D. Haseltine
Response Due: 5/27/82

Dear Mr. Smith:

Subject: Operation of Purge and Vent Valves Under Inerted Conditions

Reference: Letter March 26, 1982 from Vermont Yankee Nuclear Power Corporation (Vermont Yankee Nuclear Power Station)

In your letter dated March 26, 1982 you informed us of the manner in which you propose to operate the containment purge and vent valves in complying with the requirements of 10 CFR 50.44 to operate with an inerted containment by May 4, 1982 and asked that we review your proposal.

Our review of your proposal considered only the changes between your previous manner of operation and your proposed manner of operation. However, other requirements may develop upon completion of our long-term review of the containment purge and vent issue.

We conclude that operation in the manner you describe is acceptable, except that during modes other than cold shutdown or refueling valve SB-16-19-9 is required to be sealed closed, as defined in Standard Review Plan Section 6.2.4, Item II.6.f. The reason for this requirement is that we have information from the valve manufacturer that leads us to believe that for this valve in its present orientation high torques could exist even in the very low angles of opening. This indicates the interim position of partially blocking the valve to a maximum opening of between 35$^{\circ}$ and 50$^{\circ}$ may not sufficiently reduce the high torques imposed on this valve from a LOCA. You should provide justification by means of additional test/analysis work in order to use valve SB-16-19-9 in its present orientation or reorient this valve.

Our conclusion is based on our understanding from discussions with your staff that your proposed manner of operation involves no changes in logic or circuitry. Please inform us if this is not correct.

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VERMONT YANKEE

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In addition, please provide us with your estimate of the maximum number of hours per year you expect to purge (or vent) and the estimated amount of radioactivity release during the time required to close the valve(s) following a LOCA as compared to 10 CFR Part 100 guidelines. Please provide this information within 30 days of receipt of this letter.

The reporting and/or recordkeeping requirements contained in this letter affect fewer than ten respondents; therefore, OMB clearance is not required under P.L. 96-511.

Sincerely,

D B Vassallo

Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

cc: See next page