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BVY 10-045

August 19, 2010

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

SUBJECT: Technical Specifications Proposed Change No. 289
Suppression Chamber-Drywell Vacuum Breakers and Differential Pressure
Vermont Yankee Nuclear Power Station
Docket No. 50-271
License No. DPR-28

Dear Sir or Madam:

In accordance with 10CFR50.90, Entergy Nuclear Operations, Inc. (ENO) is proposing an amendment to Operating License DPR-28 for Vermont Yankee Nuclear Power Station (VY).

The proposed changes would revise the VY Technical Specifications (TS) to be consistent with Standard Technical Specifications 3.6.1.8 "Suppression Chamber-to-Drywell Vacuum Breakers" and 3.6.2.5 "Drywell-to-Suppression Chamber Differential Pressure," along with the associated Bases, of NUREG-1433, Revision 3, "Standard Technical Specifications General Electric Plants, BWR/4," modified to account for plant specific design details. The proposed changes also include two administrative changes.

ENO has reviewed the proposed amendment in accordance with 10CFR50.92 and concludes it does not involve a significant hazards consideration. In accordance with 10CFR50.91, a copy of this application, with attachments, is being provided to the State of Vermont, Department of Public Service.

Attachment 1 to this letter provides a detailed description and evaluation of the proposed change. Attachment 2 contains a markup of the current TS and Bases pages. Attachment 3 contains the retyped TS and Bases pages. Bases changes are provided for information only.

ENO requests review and approval of the proposed license amendment by September 1, 2011 and a 60 day implementation period from the date of the amendment approval.

There are no new regulatory commitments made in this letter.

If you have any questions on this transmittal, please contact Mr. Robert Wanczyk at 802-451-3166.

A001
NRR

I declare under penalty of perjury that the foregoing is true and correct.

Executed on August 19, 2010.

Sincerely,

MJC/PLC

Attachments
1. Description and Evaluation of the Proposed Changes
2. Markup of the Current Technical Specifications and Bases Pages
3. Retyped Technical Specifications and Bases Pages

cc: Regional Administrator, Region 1
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Attachment 1

Vermont Yankee Nuclear Power Station

Proposed Change 289

Description and Evaluation of Proposed Changes

1. SUMMARY DESCRIPTION

This evaluation supports a request to amend Operating License DPR-28 for Vermont Yankee Nuclear Power Station (VY).

The proposed amendment would revise the VY Technical Specifications (TS) by:

1. Updating VY TS 3/4.7.A.6 "Pressure Suppression Chamber-Drywell Vacuum Breakers" and 3/4.7.A.10 "Drywell/Suppression Chamber d/p" to be consistent with Standard Technical Specifications (STS) 3.6.1.8 "Suppression Chamber-to-Drywell Vacuum Breakers" and 3.6.2.5 "Drywell-to-Suppression Chamber Differential Pressure" of NUREG-1433, Revision 3, "Standard Technical Specifications General Electric Plants, BWR/4," modified to account for plant specific design details.

2. Replacing the words "cannot be met" with "is not met" in TS 3.7.A.10.c in relation to meeting the required conditions for drywell to suppression chamber differential pressure. The revised wording would still require that reactor thermal power be less than 15% within 12 hours if the applicable specifications are not met. This proposed change is considered to be administrative in that it aligns the wording with 10CFR50.36(c)(2)(i) and does not materially change any technical requirement.

3. Updating the Table of Contents (TOC) as a result of changes made by License Amendment 197. This proposed change is considered administrative in nature and does not materially change any technical requirement.

2. DETAILED DESCRIPTION

The following changes are proposed to TS Section 3/4.7.A.6 "Pressure Suppression Chamber-Drywell Vacuum Breakers" and 3/4.7.A.10 "Drywell/Suppression Chamber d/p":

Current TS 3.7.A.6	Proposed TS 3.7.A.6
a. When primary containment is required, all suppression chamber-drywell vacuum breakers shall be operable except during testing and as stated in Specifications 3.7.A.6.b and c, below. Suppression chamber-drywell vacuum breakers shall be considered operable if: (1) The valve is demonstrated to open fully with the applied force at all valve positions not exceeding that equivalent to 0.5 psi acting on the suppression chamber face of the valve disk. (2) The valve can be closed by gravity, when released after being opened by remote or manual means, to within not greater than the equivalent of 0.05 inch at all points along the seal surface of the disk.	a. Eight suppression chamber-drywell vacuum breakers shall be OPERABLE for opening and ten suppression chamber-drywell vacuum breakers shall be closed, except when performing their intended function when the reactor is in the HOT SHUTDOWN, STARTUP and RUN MODES or as specified below. (1) If one of the eight required suppression chamber-drywell vacuum breakers is inoperable for opening then restore one vacuum breaker to OPERABLE status within 72 hours. (2) If one of the ten suppression chamber-drywell vacuum breakers is not closed then close the open vacuum breaker within 2 hours. (3) If Specifications 3.7.A.6.a.(1) or

(3) The position alarm system will annunciate in the control room if the valve opening exceeds the equivalent of 0.05 inch at all points along the surface of the disk. b. Up to two (2) of the ten (10) suppression chamber-drywell vacuum breakers may be determined to be inoperable provided that they are secured, or known to be, in the closed position. c. Reactor operation may continue for fifteen (15) days provided that at least one position alarm circuit for each vacuum breaker is operable and each suppression chamber-drywell vacuum breaker is physically verified to be closed immediately and daily thereafter.	3.7.A.6.a.(2) are not met, the reactor shall be in HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within 36 hours.
Current TS 4.7.A.6 a. <u>Periodic Operability Tests</u> Operability testing of the vacuum breakers shall be in accordance with Specification 4.6.E and within 12 hours after any discharge of steam to the suppression chamber from the safety/relief valves and within 12 hours following an operation that causes any of the vacuum breakers to open. Operability of the corresponding position switches and position indicators and alarms shall be verified monthly and following any maintenance. b. <u>Refueling Outage Tests</u> (1) All suppression chamber-drywell vacuum breaker position indication and alarm systems shall be calibrated and functionality tested. (2) Deleted (3) A drywell to suppression chamber leak rate test shall demonstrate that with an initial differential pressure of not less than 1.0 psi, the differential pressure decay rate shall not exceed the equivalent of	Proposed TS 4.7.A.6 a. ----------NOTE---------- Not required to be met for vacuum breakers that are open during Surveillances ---------- Verify each vacuum breaker is closed every 14 days <u>and</u> within 2 hours after any discharge of steam to the suppression chamber from the safety/relief valves or any operation that causes the drywell-to-suppression chamber differential pressure to be reduced by ≥ 0.5 psid. b. Perform an operability test of each required vacuum breaker in accordance with Specification 4.6.E.2 <u>and</u> within 12 hours after any discharge of steam to the suppression chamber from the safety/relief valves <u>and</u> within 12 hours following an operation that causes any of the vacuum breakers to open. c. Verify the opening setpoint of each required vacuum breaker is ≤ 0.5 psid every 18 months. d. A drywell to suppression chamber leak

the leakage rate through a 1-inch orifice.	rate test shall demonstrate that with an initial differential pressure of not less than 1.0 psi, the differential pressure decay rate shall not exceed the equivalent of the leakage rate through a 1-inch orifice every 18 months.
Current TS 3.7.A.10 a. Differential pressure between the drywell and suppression chamber shall be maintained ≥1.7 psid while in the RUN MODE during the time period: i. From 24 hours after thermal power is greater than 15% rated thermal power following startup, to ii. 24 hours prior to reducing thermal power to less than 15% rated thermal power prior to the next shutdown, iii. Except as specified in 3.7.A.10.b. b. The differential pressure may be reduced to <1.7 psid for a maximum of four hours (period to begin when the ΔP is reduced to <1.7) during required operability testing of the HPCI system pump, the RCIC system pump, the drywell-suppression chamber vacuum breakers, and the suppression chamber-reactor building vacuum breakers, and SGTS testing. c. If Specification 3.7.A.10.a cannot be met, and the differential pressure cannot be restored within the subsequent eight hour period, reactor thermal power shall be less than 15% rated thermal power within the next 12 hours.	Proposed TS 3.7.A.10 a. Differential pressure between the drywell and suppression chamber shall be maintained ≥1.7 psid while in the RUN MODE during the time period: i. From 24 hours after thermal power is greater than 15% rated thermal power following startup, to ii. 24 hours prior to reducing thermal power to less than 15% rated thermal power prior to the next shutdown. b. Deleted c. If Specification 3.7.A.10.a is not met, and the differential pressure is not restored within the subsequent eight hour period, reactor thermal power shall be less than 15% rated thermal power within the next 12 hours.
Current TS 4.7.A.10 a. The differential pressure between the drywell and suppression chamber shall be recorded once per shift. b. The operability of the low differential pressure alarm shall be verified once per week.	Proposed TS 4.7.A.10 a. Verify drywell-to-suppression chamber differential pressure is within limit every 12 hours.

Proposed TS 3/4.7.A.6 and 3/4.7.A.10 will incorporate the required actions and surveillance requirements contained within STS 3.6.1.8 and 3.6.2.5, respectively, with the following changes to address plant specific configuration:

a. The brackets have been removed and the proper plant specific information/value has been provided. VY has ten suppression chamber-drywell vacuum breakers by design. Both current and proposed TS require that eight be operable. The required drywell to suppression chamber differential pressure is ≥ 1.7 psid for VY.

b. For consistency with the convention used in the VY TS, the terms RUN, STARTUP and HOT SHUTDOWN are used in lieu of MODES 1, 2 and 3, respectively. These term equivalencies are consistent with Table 1.1-1 of NUREG-1433, Rev. 3.

c. The STS are rewritten to accommodate the format of the VY TS. The proposed TS are equivalent to the STS.

d. Proposed TS 3.7.A.6.a(1) has added words to clarify the number of required operable vacuum breakers (eight) and proposed TS 3.7.A.6.a(2) has added words to clarify the total number of vacuum breakers that are to be closed (ten).

e. The words "or as specified below" are added to proposed TS 3.7.A.6 for clarification in the use of proposed TS 3.7.A.6.a(1)-(3).

The following deviations from STS SR 3.6.1.8.2 are proposed:

a. Proposed TS 4.7.A.6.b uses the term operability test in place of functional test to be consistent with the guidance of NRC Inspection Manual Part 9900: Technical Guidance, dated 4/16/08, for Systems, Structures and Components required to be operable by TS.

b. Performance of operability testing of the vacuum breakers is proposed to be continued in accordance with the VY Inservice Testing (IST) program (VY TS 4.6.E) instead of the 31 day frequency of STS SR 3.6.1.8.2. Currently, the operability testing is performed on a quarterly basis in accordance with the VY IST program.

A change to the TOC is proposed to reflect that TS 3/4.7.C starts on page 155a, not page 155. TS 3/4.7.C was moved from page 155 to 155a as part of License Amendment 197 (Reference (a)).

3. TECHNICAL EVALUATION

The pressure suppression chamber-drywell vacuum breakers and drywell-suppression chamber differential pressure requirements are part of the Primary Containment System. The safety objective of the Primary Containment System, in conjunction with core standby cooling systems, is to provide the capability, in the event of the postulated loss-of-coolant accident, to limit the release of fission products to the plant environs so that off-site doses would be below the values specified in 10CFR50.67.

3.1 Pressure Suppression Chamber-Drywell Vacuum Breakers

The pressure suppression chamber-to-drywell vacuum breakers limit the pressure differential between the drywell and suppression chamber, by relieving vacuum in the drywell, so that the structural integrity of the containment is maintained, especially during post-accident containment cooling.

VY has ten (10) pressure suppression chamber-drywell vacuum breakers. The ASME Boiler and Pressure Vessel Code, Section III, Subsection B, for this vessel allows eight (8) operable valves, therefore, with two (2) valves secured, containment integrity is not impaired. Per current VY Technical Specification (CTS) 3.7.A.6.b, up to two (2) of these may be determined to be inoperable provided that they are secured or known to be in the closed position.

CTS 3.7.A.6.a states that, when primary containment is required, all suppression chamber-drywell vacuum breakers shall be operable except during testing and as stated in CTS 3.7.A.6.b and c. CTS 3.7.A.6.a also provides the criteria for considering the vacuum breakers to be operable. CTS 3.7.A.6.a(1) requires that a vacuum breaker open fully with an applied force not to exceed 0.5 psi acting on the suppression chamber face of the valve disk. This requirement will continue to be satisfied by proposed TS 4.7.A.6.c which requires that the opening setpoint of each required vacuum breaker is ≤ 0.5 psid every 18 months. Proposed TS 4.7.A.6.c is equivalent to STS Surveillance Requirement (SR) 3.6.1.8.3.

CTS 3.7.A.6.a(2) requires that a vacuum breaker be closed by gravity to the equivalent of ≤ 0.05 inch at all points along the sealing surface of the valve disk; CTS 3.7.A.6.a(3) requires an alarm annunciation in the control room if the valve opening exceeds 0.05 inch; and CTS 3.7.A.6.c permits continued operation for 15 days in the event that one of the two independent position indication and alarm circuits is inoperable. CTS 3.7.A.6.a(2) and CTS 3.7.A.6.a(3) are satisfied by the vacuum breaker position indication system which provides light indication from two independent position detection and indication systems. Either system provides a Control Room alarm for a nonseated valve. The purpose of CTS 3.7.A.6.a(2) and 3.7.A.6.a(3) are to alert operators that bypass leakage through an unseated vacuum breaker is occurring and the purpose of CTS 3.7.A.6.c is to alert operators to a degraded condition of the position indication system. CTS 4.7.A.6.a requires periodic verification of the operability of the vacuum breaker position switches, indicators and alarms. CTS 4.7.A.6.b(1) requires a calibration and functionality test of the position indication and alarm system every refueling outage. The vacuum breaker position indication instrumentation in CTS 3.7.A.6.a(2), CTS 3.7.A.6.a(3), CTS 3.7.A.6.c, CTS 4.7.A.6.a (position indication system – only) and CTS 4.7.A.6.b(1) do not relate directly to system operability. NUREG-1433 does not specify indication-only equipment to be operable to support operability of a system or component. Vacuum breaker position is required to be known to be able to satisfy STS SR 3.6.1.8.1, SR 3.6.1.8.2 and SR 3.6.1.8.3. If position indication is not available and the vacuum breaker position cannot be determined, then the Surveillance Requirements cannot be satisfied and the appropriate actions must be taken for inoperable vacuum breakers in accordance with the actions of proposed TS 3.7.A.6. As a result, the requirements for the vacuum breaker position indication are adequately addressed by the requirements of proposed TS 3.7.A.6 and the associated SRs and are proposed to be deleted from the VY TS.

CTS 3.7.A.6.a(2), CTS 3.7.A.6.a(3), CTS 3.7.A.6.c, CTS 4.7.A.6.a (position indication system – only) and CTS 4.7.A.6.b(1) do not meet any of the criteria of 10CFR50.36(c)(2)(ii) as described below:

<u>Comparison to Screening Criteria</u>:

1. The suppression chamber-drywell vacuum breaker position indication and alarm system is not used for, nor capable of, detecting a significant abnormal degradation of the reactor coolant pressure boundary prior to a design basis accident (DBA).

2. The suppression chamber-drywell vacuum breaker position indication and alarm system is not process variables that are an initial condition of a DBA or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

3. The suppression chamber-drywell vacuum breaker position indication and alarm system are not part of the primary success path that functions or actuates to mitigate a DBA or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

4. The suppression chamber-drywell vacuum breaker position indication and alarm system was found to be a non-significant risk contributor to core damage frequency and offsite releases.

Conclusion:

Since the Technical Specification criteria have not been satisfied, the LCO and Surveillances for the suppression chamber-drywell vacuum breaker position indication and alarm system may be deleted.

Proposed TS 3.7.A.6.a would require eight suppression chamber-drywell vacuum breakers be operable for opening and ten suppression chamber-drywell vacuum breakers shall be closed, except when performing their intended function when the reactor is in the HOT SHUTDOWN, STARTUP and RUN modes. This proposed TS incorporates the Limiting Conditions for Operation (LCO) and Applicability sections of STS 3.6.1.8. The wording of this proposed TS is considered to be consistent with the wording of CTS 3.7.A.6.b.

Actions A, B and C of STS 3.6.1.8 are incorporated in proposed TS 3.7.A.6.a(1), (2) and (3) as follows;

Proposed TS 3.7.A.6.a(1) states that if one of the eight required suppression chamber-drywell vacuum breakers is inoperable for opening then restore one vacuum breaker to operable status within 72 hours; this is consistent with STS 3.6.1.8 Action A. At VY, seven vacuum breakers are capable of providing the vacuum relief function for 72 hours.

Proposed TS 3.7.A.6.a(2) states that if one of the ten suppression chamber-drywell vacuum breakers is not closed then close the open vacuum breaker within 2 hours; this is consistent with STS 3.6.1.8 Action B. This 2 hour period would allow VY to exercise an inoperable vacuum breaker and restore it to an operable status.

Proposed TS 3.7.A.6.a(3) states that if proposed TS 3.7.A.6.a(1) or proposed TS 3.7.A.6.a(2) are not met, the reactor shall be in hot shutdown within 12 hours and in cold shutdown within 36 hours; this is consistent with STS 3.6.1.8 Action C.

Proposed TS 4.7.A.6.a is considered to be consistent with the wording of STS SR 3.6.1.8.1 with the exception that the acronym "(S/RVs)" is omitted. The value of 0.5 psid is consistent with the design vacuum breaker actuation setpoint of 0.5 psid as listed in Table 5.2.1 of the VY Updated Final Safety Analysis Report (UFSAR).

CTS 4.7.A.6.a requires periodic operability testing of the vacuum breakers in accordance with the VY Inservice Testing (IST) program, currently on a quarterly basis, and within 12 hours following an operation that causes any of the vacuum breakers to open. It also requires that operability of the corresponding position switches and position indicators and alarms shall be verified monthly and following any maintenance. As discussed above, the surveillance requirements for the vacuum breaker position indication are adequately addressed by the requirements of proposed TS 3.7.A.6 and the associated SRs and are proposed to be deleted from the VY TS.

Proposed TS 4.7.A.6.b would continue to require operability testing of the vacuum breakers in accordance with the VY IST program and within 12 hours of any discharge of steam to the suppression chamber from the safety/relief valves and within 12 hours following an operation that

causes any of the vacuum breakers to open. The continued use of the term operability test rather than functional test is consistent with the guidance of NRC Inspection Manual Part 9900: Technical Guidance, dated 4/16/08, for Systems, Structures and Components required to be operable by TS. Currently, the operability testing is performed on a quarterly basis in accordance with the VY IST program. The continuation of this testing on a quarterly basis rather than the 31 day frequency specified by STS SR 3.6.1.8.2 is acceptable because it does not represent a relaxation of the current SR. Additionally, the vacuum breakers at VY are mounted externally to the suppression pool and are therefore not located in the harsh environment within the suppression chamber airspace. Proposed TS 4.7.A.6.b also uses the words "safety/relief valves" in lieu of the acronym "S/RVs" used in STS SR 3.6.1.8.2 and adds the specific reference to the IST TS (4.6.E.2) for clarification.

Proposed TS 4.7.A.6.c is considered to be consistent with the wording of STS SR 3.6.8.3. The value of 0.5 psid is consistent with the design actuation setpoint of 0.5 psid as listed in the VY UFSAR.

CTS 4.7.A.6.b(3) requires a drywell to suppression chamber leak rate test each refueling outage to demonstrate that with an initial differential pressure of not less than 1.0 psi, the differential pressure decay rate shall not exceed the equivalent of the leakage rate through a 1-inch orifice. CTS 4.7.A.6.b(2) has previously been deleted. Proposed TS 4.7.A.6.d retains the same wording and requirements of CTS 4.7.A.6.b(3) with the exception that the frequency is changed to every 18 months from each refueling outage. This is consistent with the 18 month frequency of the drywell to suppression chamber leak rate test in STS SR 3.6.1.1.2 and would allow the flexibility of performing the test online.

3.2 Drywell-Suppression Chamber Differential Pressure

Nitrogen is used to maintain the drywell-to-suppression chamber differential pressure at ≥1.7 pounds per square inch differential (psid). This differential pressure, which keeps the suppression chamber downcomer legs clear of water, is significant in reducing suppression chamber post design basis Loss of Coolant Accident (LOCA) hydrodynamic loads. The effect of this pressure differential and reduced downcomer water leg permits the downcomers to clear earlier in the LOCA with resultant lower drywell pressure.

CTS 3.7.A.10.a requires the drywell-to-suppression chamber differential pressure ≥ 1.7 psid while in the run mode during the time period from 24 hours after thermal power is greater than 15% rated thermal power (CTS 3.7.A.10.a.i) to 24 hours prior to reducing thermal power to less than 15% rated thermal power prior to the next shutdown (CTS 3.7.A.10.a.ii). Exceptions to this requirement are allowed by CTS 3.7.A.10.a.iii during required operability testing of the High Pressure Coolant Injection system pump, the Reactor Core Isolation Cooling system pump, the drywell-suppression chamber vacuum breakers, and the suppression chamber-reactor building vacuum breakers, and Standby Gas Treatment System testing. During operability testing, CTS 3.7.A.10.b allows the differential pressure to be reduced to less than 1.7 psid for a maximum of four hours. The action statement in CTS 3.7.A.10.c states that if CTS 3.7.A.10.a cannot be met, and if the differential pressure cannot be restored within the subsequent eight hours, reactor thermal power shall be less than 15% rated thermal power within the next 12 hours. CTS 3.7.A.10.a, 3.7.A.10.a.i, 3.7.A.10.a.ii and 3.7.A.10.c are considered to be consistent with Limiting Condition for Operation (LCO), Applicability and Action sections of STS 3.6.2.5 and were approved by the NRC in Reference (b).

The proposed change deletes CTS 3.7.A.10.a.iii and CTS 3.7.A.10.b. VY has found that performance of testing, other than that specified in CTS 3.7.A.10.b, that requires reducing differential pressure less than 1.7 psid is necessary, but prohibited by CTS 3.7.A.10.b. As an example, in situations where 2 of the 10 vacuum breakers are inoperable, VY has found the need to exercise an inoperable vacuum with the goal of restoring it to an operable status in order to

restore operating margin and avoid the need for an unnecessary plant shutdown in the event that a third vacuum breaker were to become inoperable.

CTS 4.7.A.10.a requires that the differential pressure between the drywell and the suppression chamber be recorded once per shift. The proposed change replaces CTS 4.7.A.10.a with STS SR 3.6.2.5.1 which requires that the drywell-to-suppression chamber differential pressure is within limit every 12 hours. This is considered to be equivalent to CTS 4.7.A.10.a as the VY shift duration is 12 hours.

CTS 4.7.A.10.b requires that the operability of the low differential pressure alarm be verified once per week. The low differential pressure alarm is used as an operator aid in the Control Room to help ensure that the differential pressure limit required by CTS 3.7.A.10.a is met. NUREG-1433 does not specify that a surveillance of the low differential pressure alarm is required to maintain the drywell-suppression chamber differential pressure within limits. NUREG-1433 bases the SR 3.6.2.5.1 12 hour surveillance frequency for verifying differential pressure is within limits on the fact that Control Room indications, such as alarms, are available to operators to alert them to abnormal pressure conditions. If the differential pressure was found to be in an alarming condition during this surveillance, then the appropriate actions must be taken for low differential pressure in accordance with the actions of proposed TS 3.7.A.10. As a result, the requirement for the low differential pressure alarm is adequately addressed by the requirements of proposed TS 3.7.A.10 and the associated SRs and is proposed to be deleted from the VY TS.

CTS 4.7.A.10.b does not meet any of the criteria of 10CFR50.36(c)(2)(ii) as described below:

Comparison to Screening Criteria:

1. The drywell-suppression chamber low differential pressure alarm is not used for, nor capable of, detecting a significant abnormal degradation of the reactor coolant pressure boundary prior to a DBA.

2. The drywell-suppression chamber low differential pressure alarm is not a process variable that is an initial condition of a DBA or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

3. The drywell-suppression chamber low differential pressure alarm is not part of the primary success path that functions or actuates to mitigate a DBA or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

4. The drywell-suppression chamber low differential pressure alarm was found to be non-significant risk contributors to core damage frequency and offsite releases.

Conclusion:

Since the Technical Specification criteria have not been satisfied, the Surveillance for the drywell-suppression chamber low differential pressure alarm may be deleted.

3.3 Administrative Changes

Replacing the words “cannot be met” with “is not met” in TS 3.7.A.10.c is consistent with the intent of 10CFR50.36(c)(2) which uses the term “is not” for defining actions to be taken when an LCO “is not” met. This change makes the TS consistent with the intent of the regulation. This is considered to be an administrative change in that it does not affect the technical intent of the specification.

The proposed change to revise the TOC to reflect that TS 3/4.7.C starts on page 155a instead of page 155 is an administrative change as the movement of TS 3/4.7.C to page 155a was previously approved by NRC License Amendment 197 (Reference (a)). This was an oversight in the previous amendment. VY identified this issue and entered it into the Corrective Action Process.

4. EVALUATION OF SIGNIFICANT HAZARDS CONSIDERATION

Pursuant to 10CFR50.92, Entergy Nuclear Operations, Inc. (ENO) has reviewed the proposed change and concludes that the change does not involve a significant hazards consideration since the proposed change satisfies the criteria in 10CFR50.92(c). These criteria require that operation of the facility in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated; (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

The proposed amendment would revise Vermont Yankee Technical Specifications 3/4.7.A.6 "Pressure Suppression Chamber-Drywell Vacuum Breakers" and 3/4.7.A.10 "Drywell/Suppression Chamber d/p" to be consistent with Standard Technical Specifications 3.6.1.8 "Suppression Chamber-to-Drywell Vacuum Breakers" and 3.6.2.5 "Drywell-to-Suppression Chamber Differential Pressure" of NUREG-1433, Revision 3, "Standard Technical Specifications General Electric Plants, BWR/4." The proposed amendment also includes two changes that are administrative in nature.

The discussion below addresses each of these criteria and demonstrates that the proposed amendment does not constitute a significant hazard.

1. <u>Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?</u>

   Response: No.

   The proposed amendment does not significantly increase the probability or consequences of an accident since it does not involve a modification to any plant equipment or affect how plant systems or components are operated. No design functions or design parameters are affected by the proposed amendment. The proposed amendment involves the operation and testing of Primary Containment systems but does not impact containment design or performance requirements. Therefore, the proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. <u>Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?</u>

   Response: No.

   The proposed change does not involve any physical alteration of plant equipment and does not change the method by which any safety-related system performs its function. No new or different types of equipment will be installed and the basic operation of installed equipment is unchanged. The methods governing plant operation and testing remain consistent with current safety analysis assumptions. The proposed amendment involves the operation and testing of Primary Containment systems but does not alter the way that the systems are operated or how the tests are performed. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?
Response: No.

The proposed change ensures that the safety functions of the pressure suppression chamber-drywell vacuum breakers and drywell-suppression chamber differential pressure are fulfilled by incorporating the guidance of NUREG-1433. The proposed amendment does not involve a physical modification of the plant and does not change the design or function of any component or system. Therefore, the proposed amendment will not involve a significant reduction in the margin of safety.

Based on the above, Entergy concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

5. ENVIRONMENTAL CONSIDERATIONS

This amendment request meets the eligibility criteria for categorical exclusion from environmental review set forth in 10CFR51.22(c)(9) as follows:

(i) The amendment involves no significant hazards determination.

As described in Section 4 of this evaluation, the proposed change involves no significant hazards consideration.

(ii) There is no significant change in the types or significant increase in the amounts of any effluent that may be released offsite.

The proposed amendment does not involve any physical alterations to the plant configuration that could lead to a change in the type or amount of effluent release offsite.

(iii) There is no significant increase in individual or cumulative occupational radiation exposure.

The proposed amendment does not involve a significant increase in individual or cumulative occupational radiation exposure.

Based on the above, VY concludes that the proposed change meets the eligibility criteria for categorical exclusion as set forth in 10CFR51.22(c)(9). Pursuant to 10CFR51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

6. REFERENCES

a) Letter, USNRC to Entergy, "Vermont Yankee Nuclear Power Station – Issuance of Amendment RE: Secondary Containment Systems (TAC No. MB0145)," NVY 01-018, dated March 23, 2001.

b) Letter, USNRC to Entergy, "Vermont Yankee Nuclear Power Station – Issuance of Amendment RE: Primary Containment Oxygen Concentration and Drywell-to-Suppression Chamber Differential Pressure Limits (TAC No. MD7055)," NVY 08-063, dated June 23, 2008.

Attachment 2

Vermont Yankee Nuclear Power Station

Proposed Change 289

Markup of the Current Technical Specifications and Bases Pages

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(Continued)

3.7 LIMITING CONDITIONS FOR OPERATION

line is verified to be closed and conditions required by 3.7.D.2 are met.

6. Pressure Suppression Chamber - Drywell Vacuum Breakers

INSERT 1

a. When primary containment is required, all suppression chamber - drywell vacuum breakers shall be operable except during testing and as stated in Specifications 3.7.A.6.b and c, below. Suppression chamber - drywell vacuum breakers shall be considered operable if:

(1) The valve is demonstrated to open fully with the applied force at all valve positions not exceeding that equivalent to 0.5 psi acting on the suppression chamber face of the valve disk.

(2) The valve can be closed by gravity, when released after being opened by remote or manual means, to within not greater than the equivalent of 0.05 inch at all points along the seal surface of the disk.

4.7 SURVEILLANCE REQUIREMENTS

6. Pressure Suppression Chamber - Drywell Vacuum Breakers

a. Periodic Operability Tests

Operability testing of the vacuum breakers shall be in accordance with Specification 4.6.E and within 12 hours after any discharge of steam to the suppression chamber from the safety/relief valves and within 12 hours following an operation that causes any of the vacuum breakers to open. Operability of the corresponding position switches and position indicators and alarms shall be verified monthly and following any maintenance.

b. Refueling Outage Tests

(1) All suppression chamber - drywell vacuum breaker position indication and alarm systems shall be calibrated and functionally tested.

(2) Deleted

INSERT 2

3.7 LIMITING CONDITIONS FOR OPERATION

INSERT 1

(3) The position alarm system will annunciate in the control room if the valve opening exceeds the equivalent of 0.05 inch at all points along the seal surface of the disk.

b. Up to two (2) of the ten (10) suppression chamber - drywell vacuum breakers may be determined to be inoperable provided that they are secured, or known to be, in the closed position.

c. Reactor operation may continue for fifteen (15) days provided that at least one position alarm circuit for each vacuum breaker is operable and each suppression chamber - drywell vacuum breaker is physically verified to be closed immediately and daily thereafter.

7. Oxygen Concentration

a. The primary containment atmosphere shall be reduced to less than 4 percent oxygen by volume with nitrogen gas while in the RUN MODE during the time period:

i. From 24 hours after thermal power is greater than 15% rated thermal power following startup, to

4.7 SURVEILLANCE REQUIREMENTS

INSERT 2

(3) A drywell to suppression chamber leak rate test shall demonstrate that with an initial differential pressure of not less than 1.0 psi, the differential pressure decay rate shall not exceed the equivalent of the leakage rate through a 1-inch orifice.

7. Oxygen Concentration

The primary containment oxygen concentration shall be measured and recorded on a weekly basis.

3.7 LIMITING CONDITIONS FOR OPERATION

ii. 24 Hours prior to reducing thermal power to less than 15% rated thermal power prior to the next shutdown.

8. If Specification 3.7.A.1 through 3.7.A.6 cannot be met, an orderly shutdown shall be initiated immediately and the reactor shall be in a cold shutdown condition within 24 hours.

9. If Specification 3.7.A.7 cannot be met, and the primary containment oxygen concentration cannot be restored to less than 4% oxygen by volume within the subsequent 24 hour period, reactor thermal power shall be less than 15% rated thermal power within the next 8 hours.

10. Drywell/Suppression Chamber d/p

a. Differential pressure between the drywell and suppression chamber shall be maintained ≥1.7 psid while in the RUN MODE during the time period:

i. From 24 hours after thermal power is greater than 15% rated thermal power following startup, to

ii. 24 hours prior to reducing thermal power to less than 15% rated thermal power prior to the next shutdown.

~~iii. Except as specified in 3.7.A.10.b.~~

4.7 SURVEILLANCE REQUIREMENTS

VERIFY DRYWELL-TO-SUPPRESSION CHAMBER DIFFERENTIAL PRESSURE IS WITHIN LIMIT EVERY 12 HOURS.

10. Drywell/Suppression Chamber d/p

a. ~~The differential pressure between the drywell and suppression chamber shall be recorded once per shift.~~

~~b. The operability of the low differential pressure alarm shall be verified once per week.~~

3.7 LIMITING CONDITIONS FOR OPERATION

b. ~~The differential pressure may be reduced to <1.7 psid for a maximum of four hours (period to begin when the ΔP is reduced to <1.7) during required operability testing of the HPCI system pump, the RCIC system pump, the drywell-suppression chamber vacuum breakers, and the suppression chamber-reactor building vacuum breakers, and SGTS testing.~~

DELETED

c. If Specification 3.7.A.10.a ~~cannot be~~ IS NOT met, and the differential pressure ~~cannot be~~ IS NOT restored within the subsequent eight hour period, reactor thermal power shall be less than 15% rated thermal power within the next 12 hours.

B. Standby Gas Treatment System

1. a. Except as specified in Specification 3.7.B.3.a below, whenever the reactor is in Run Mode or Startup Mode or Hot Shutdown condition, both trains of the Standby Gas Treatment System shall be operable at all times when secondary containment integrity is required.

b. Except as specified in Specification 3.7.B.3.b below, whenever the reactor is in Refuel Mode or Cold Shutdown condition, both trains of the Standby Gas

4.7 SURVEILLANCE REQUIREMENTS

B. Standby Gas Treatment System

1. At least once per operating cycle, not to exceed 18 months, the following conditions shall be demonstrated.

a. Pressure drop across the combined HEPA and charcoal filter banks is less than 6 inches of water at 1500 cfm ±10%.

b. Inlet heater input is at least 7.1 kW.

Insert 1

6. Pressure Suppression Chamber – Drywell Vacuum Breakers

a. Eight suppression chamber-drywell vacuum breakers shall be OPERABLE for opening and ten suppression chamber-drywell vacuum breakers shall be closed, except when performing their intended function when the reactor is in the HOT SHUTDOWN, STARTUP and RUN MODES or as specified below.

(1) If one of the eight required suppression chamber-drywell vacuum breakers is inoperable for opening then restore one vacuum breaker to OPERABLE status within 72 hours.

(2) If one of the ten suppression chamber-drywell vacuum breakers is not closed then close the open vacuum breaker within 2 hours.

(3) If Specifications 3.7.A.6.a.(1) or 3.7.A.6.a.(2) are not met, the reactor shall be in HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within 36 hours.

Insert 2

6. Pressure Suppression Chamber – Drywell Vacuum Breakers

a. ----------NOTE----------
Not required to be met for vacuum breakers that are open during Surveillances
---

Verify each vacuum breaker is closed every 14 days and within 2 hours after any discharge of steam to the suppression chamber from the safety/relief valves or any operation that causes the drywell-to-suppression chamber differential pressure to be reduced by ≥ 0.5 psid.

b. Perform an operability test of each required vacuum breaker in accordance with Specification 4.6.E.2 and within 12 hours after any discharge of steam to the suppression chamber from the safety/relief valves and within 12 hours following an operation that causes any of the vacuum breakers to open.

c. Verify the opening setpoint of each required vacuum breaker is ≤ 0.5 psid every 18 months.

d. A drywell to suppression chamber leak rate test shall demonstrate that with an initial differential pressure of not less than 1.0 psi, the differential pressure decay rate shall not exceed the equivalent of the leakage rate through a 1-inch orifice every 18 months.

BASES: 3.7 (Cont'd)

The purpose of the vacuum relief valves is to equalize the pressure between the drywell and suppression chamber and suppression chamber and reactor building so that the structural integrity of the containment is maintained.

4

~~Technical Specification 3.7.A.10.b is based on the assumption that the operability testing of the pressure suppression chamber-reactor building vacuum breaker, when required, will normally be performed during the same four hour testing interval as the pressure suppression chamber-drywell vacuum breakers in order to minimize operation with <1.7 psi, differential pressure.~~

The vacuum relief system from the pressure suppression chamber to Reactor Building consists of two 100% vacuum relief breakers (2 parallel sets of 2 valves in series). Operation of either system will maintain the pressure differential less than 2 psig; the external design pressure is 2 psig. With one vacuum breaker out of service there is no immediate threat to accident mitigation or primary containment and, therefore, reactor operation can be continued for 7 days while repairs are being made.

The capacity of the ten (10) drywell vacuum relief valves is sized to limit the pressure differential between the suppression chamber and drywell during post-accident drywell cooling operations to the design limit of 2 psig. They are sized on the basis of the Bodega Bay pressure suppression tests. The ASME Boiler and Pressure Vessel Code, Section III, Subsection B, for this vessel allows eight (8) operable valves, therefore, with two (2) valves secured, containment integrity is not impaired.

INSERT 3

~~Each drywell-suppression chamber vacuum breaker is fitted with a redundant pair of limit switches to provide fail-safe signals to panel mounted indicators in the Reactor Building and alarms in the Control Room when the disks are open more than 0.050" at all points along the seal surface of the disk. These switches are capable of transmitting the disk closed to open signal with 0.01" movement of the switch plunger. Continued reactor operation with failed components is justified because of the redundance of components and circuits and, most importantly, the accessibility of the valve lever arm and position reference external to the valve. The fail safe feature of the alarm circuits assures operator attention if a line fault occurs.~~

The requirement to inert the containment is based on the recommendation of the Advisory Committee on Reactor Safeguards. This recommendation, in turn, is based on the assumption that several percent of the zirconium in the core will undergo a reaction with steam during the loss-of-coolant accident. This reaction would release sufficient hydrogen to result in a flammable concentration in the primary containment building. The oxygen concentration is therefore kept below 4% to minimize the possibility of hydrogen combustion.

BASES: 3.7 (Cont'd)

General Electric has estimated that less than 0.1% of the zirconium would react with steam following a loss-of-coolant due to operation of emergency core cooling equipment. This quantity of zirconium would not liberate enough hydrogen to form a combustible mixture.

Drywell-to-suppression chamber differential pressure must be controlled when the primary containment is inert. The primary containment must be inert in RUN MODE, since this is the condition with the highest probability for an event that could produce hydrogen. It is also the condition with the highest probability of an event that could impose large loads on the primary containment.

Inerting primary containment is an operational problem because it prevents primary containment access without an appropriate breathing apparatus. Therefore, the primary containment is inerted as late as possible in the unit startup and is de-inerted as soon as possible in the unit shutdown. As long as reactor power is <15% RTP, the probability of an event that generates hydrogen or excessive loads on primary containment occuring within the first 24 hours following a startup or within the last 24 hours prior to a shutdown is low enough that these "windows," with the primary containment not inerted, are also justified. The 24 hour time period is a reasonable amount of time to allow plant personnel to perform inerting or de-inerting.

INSERT 4

The use of the 18" purge and vent flow path isolation valves AC-7A (16-19-7A), AC-7B (16-19-7B), AC-8 (16-19-8), AC-10 (16-19-10) has been restricted to 90 hours per year. Normal plant operations (other than inerting and de-inerting) will have AC-8 and AC-10 closed and nitrogen will be supplied to the drywell via the 1" nitrogen makeup supply. The differential pressure maintained between the drywell and torus will allow the nitrogen to "bubble over" into the suppression chamber. A normally open AC-6B (3") allows for venting. A normally closed AC-6A (3") is periodically opened for performance of

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 was 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. 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~~ EVERY 18 MONTHS each valve is tested to assure that it will open fully in response to a force less than that specified.

INSERT 5

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.

BASES: 4.7 (Cont'd)

EVERY 18 MONTHS ~~At the end of each refueling cycle~~, a leak rate test shall be performed to verify that significant leakage flow paths do not exist between the drywell and suppression chamber. The drywell pressure will be increased by at least 1 psi with respect to the suppression chamber pressure and held constant. The 2 psig set point will not be exceeded. The subsequent suppression chamber pressure transient (if any) will be monitored with a sensitive pressure gauge. If the drywell pressure cannot be increased by 1 psi over the suppression chamber pressure it would be because a significant leakage path exists; in this event the leakage source will be identified and eliminated before power operation is resumed. If the drywell pressure can be increased by 1 psi over the suppression chamber the rate of change of the suppression chamber pressure must not exceed a rate equivalent to the rate of leakage from the drywell through a 1-inch orifice. In the event the rate of change exceeds this value then the source of leakage will be identified and eliminated before power operation is resumed.

The drywell-suppression chamber vacuum breakers are exercised in accordance with Specification ~~4.6.E~~ 4.6.E.2, following termination of discharge of steam into the suppression chamber from the safety/relief valves and following any operation that causes the vacuum breakers to open. This monitoring of valve operability is intended to assure that valve operability ~~and position indication system performance~~ does not degrade between refueling inspections. When a vacuum breaker valve is exercised through an opening-closing cycle, the position indicating lights are designed to function as follows:

Full Closed (Closed to ≤0.050" open)	2 White - On
Open (>0.050" open to full open)	2 White - Off

Experience has shown that a weekly measurement of the oxygen concentration in the primary containment assures adequate surveillance of the primary containment atmosphere.

INSERT 6

B. and C. Standby Gas Treatment System and Secondary Containment System

Initiating reactor building isolation and operation of the standby gas treatment system to maintain at least a 0.15 inch of water vacuum within the secondary containment provides an adequate test of the operation of the reactor building isolation valves, leakage tightness of the reactor building, and performance of the standby gas treatment system. The testing of reactor building automatic ventilation system isolation valves in accordance with Technical Specification 4.6.E demonstrates the operability of these valves. In addition, functional testing of initiating sensors and associated trip channels demonstrates the capability for automatic actuation. Periodic testing gives sufficient confidence of reactor building integrity and standby gas treatment system performance capability.

Insert 3

Only 8 of the 10 vacuum breakers must be OPERABLE for opening. All suppression chamber-to-drywell vacuum breakers, however, are required to be closed (except during testing or when the vacuum breakers are performing their intended design function). The vacuum breaker OPERABILITY requirement provides assurance that the drywell-to-suppression chamber negative differential pressure remains below the design value. The requirement that the vacuum breakers be closed ensures that there is no excessive bypass leakage should a LOCA occur.

In the RUN, STARTUP and HOT SHUTDOWN MODES, the Suppression Pool Spray System is required to be OPERABLE to mitigate the effects of a DBA. Excessive negative pressure inside the drywell could occur due to inadvertent actuation of this system. The vacuum breakers, therefore, are required to be OPERABLE in the RUN, STARTUP and HOT SHUTDOWN MODES, when the Suppression Pool Spray System is required to be OPERABLE, to mitigate the effects of inadvertent actuation of the Suppression Pool Spray System.

Also, in the RUN, STARTUP and HOT SHUTDOWN MODES, a DBA could result in excessive negative differential pressure across the drywell wall, caused by the rapid depressurization of the drywell. The event that results in the limiting rapid depressurization of the drywell is the primary system rupture that fills the drywell free airspace with steam. Subsequent condensation of the steam would result in depressurization of the drywell.

In the COLD SHUTDOWN and REFUELING MODES, the probability and consequences of these events are reduced by the pressure and temperature limitations in these MODES; therefore, maintaining suppression chamber-to-drywell vacuum breakers OPERABLE is not required in the COLD SHUTDOWN and REFUELING MODES.

With one of the required vacuum breakers inoperable for opening (e.g., the vacuum breaker is not open and may be stuck closed or not within its opening setpoint limit, so that it would not function as designed during an event that depressurized the drywell), the remaining seven OPERABLE vacuum breakers are capable of providing the vacuum relief function. However, overall system reliability is reduced because a single failure in one of the remaining vacuum breakers could result in an excessive suppression chamber-to-drywell differential pressure during a DBA. Therefore, with one of the eight required vacuum breakers inoperable, 72 hours is allowed to restore at least one of the inoperable vacuum breakers to OPERABLE status so that plant conditions are consistent with those assumed for the design basis analysis. The 72 hour Completion Time is considered acceptable due to the low probability of an event in which the remaining vacuum breaker capability would not be adequate.

One of the ten vacuum breakers may be opened for up to 2 hours for any reason, including maintenance to restore a vacuum breaker to an OPERABLE status. An open vacuum breaker allows communication between the drywell and suppression chamber

airspace, and, as a result, there is the potential for suppression chamber overpressurization due to this bypass leakage if a LOCA were to occur. Therefore, the open vacuum breaker must be closed. A short time is allowed to close the vacuum breaker due to the low probability of an event that would pressurize primary containment. If vacuum breaker position indication is not reliable, an alternate method of verifying that the vacuum breakers are closed is to verify that a differential pressure ≥ 1.7 psid between the suppression chamber and drywell is maintained for 1 hour without makeup. The required 2 hour Completion Time is considered adequate to perform this test.

If the inoperable suppression chamber-to-drywell vacuum breaker cannot be closed or restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least HOT SHUTDOWN within 12 hours and to COLD SHUTDOWN within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

Insert 4

If drywell-to-suppression chamber differential pressure is not within the limit, the conditions assumed in the safety analyses are not met and the differential pressure must be restored to within the limit within 8 hours. The 8 hour Completion Time provides sufficient time to restore differential pressure to within limit and takes into account the low probability of an event that would create excessive suppression chamber loads occurring during this time period.

If the differential pressure cannot be restored to within limits within the associated Completion Time, the plant must be placed in a MODE in which the LCO does not apply. This is done by reducing power to ≤ 15% RTP within 12 hours. The 12 hour Completion Time is reasonable, based on operating experience, to reduce reactor power from full power conditions in an orderly manner and without challenging plant systems.

Insert 5

Each vacuum breaker is verified closed to ensure that a potential large bypass leakage path is not present. This Surveillance is performed by observing the vacuum breaker position indication or by verifying that a differential pressure ≥ 1.7 psid between the suppression chamber and drywell is maintained for 1 hour without makeup. The 14 day Frequency is based on engineering judgment and is considered adequate in view of other indications of vacuum breaker status available to operations personnel. This verification is also required within 2 hours after any discharge of steam to the suppression chamber from the safety/relief valves or any operation that causes the drywell-to-suppression chamber differential pressure to be reduced by ≥ 0.5 psid.

A Note is added to SR 4.7.A.6.a which allows suppression chamber-to-drywell vacuum breakers opened in conjunction with the performance of a Surveillance to not be considered as failing this SR. These periods of opening vacuum breakers are controlled by plant procedures and do not represent inoperable vacuum breakers.

Verification of the vacuum breaker opening setpoint is necessary to ensure that the safety analysis assumption regarding vacuum breaker full open differential pressure of 0.5 psid is valid.

Insert 6

The drywell-to-suppression chamber differential pressure is regularly monitored to ensure that the required limits are satisfied. The 12 hour Frequency is considered adequate in view of other indications available in the control room, including alarms, to alert the operator to an abnormal pressure condition.

Attachment 3

Vermont Yankee Nuclear Power Station

Proposed Change 289

Retyped Technical Specifications and Bases Pages

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(Continued)

3.7 LIMITING CONDITIONS FOR OPERATION

line is verified to be closed and conditions required by 3.7.D.2 are met.

6. Pressure Suppression Chamber - Drywell Vacuum Breakers

a. Eight suppression chamber-drywell vacuum breakers shall be OPERABLE for opening and ten suppression chamber-drywell vacuum breakers shall be closed, except when performing their intended function when the reactor is the HOT SHUTDOWN, STARTUP and RUN MODES or as specified below.

(1) If one of the eight required suppression chamber-drywell vacuum breakers is inoperable for opening then restore one vacuum breaker to OPERABLE status within 72 hours.

(2) If one of the ten suppression chamber-drywell vacuum breakers is not closed then close the open vacuum breaker within 2 hours.

(3) If Specifications 3.7.A.6.a.(1) or 3.7.A.6.a.(2) are not met, the reactor shall be in HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within 36 hours.

4.7 SURVEILLANCE REQUIREMENTS

6. Pressure Suppression Chamber - Drywell Vacuum Breakers

a. ---------NOTE---------
Not required to be met for vacuum breakers that are open during Surveillances
---
Verify each vacuum breaker is closed every 14 days and within 2 hours after any discharge of steam to the suppression chamber from the safety/relief valves or any operation that causes the drywell-to-suppression chamber differential pressure to be reduced by ≥ 0.5 psid.

b. Perform an operability test of each required vacuum breaker in accordance with Specification 4.6.E.2 and within 12 hours after any discharge of steam to the suppression chamber from the safety/relief valves and within 12 hours following an operation that causes any of the vacuum breakers to open.

c. Verify the opening setpoint of each required vacuum breaker is ≤ 0.5 psid every 18 months.

d. A drywell to suppression chamber leak rate test shall demonstrate that with an initial differential pressure of not less than 1.0 psi, the differential pressure decay rate shall not exceed the equivalent of the leakage rate through a 1-inch orifice every 18 months.

3.7 LIMITING CONDITIONS FOR OPERATION

7. Oxygen Concentration

a. The primary containment atmosphere shall be reduced to less than 4 percent oxygen by volume with nitrogen gas while in the RUN MODE during the time period:

i. From 24 hours after thermal power is greater than 15% rated thermal power following startup, to

4.7 SURVEILLANCE REQUIREMENTS

7. Oxygen Concentration

The primary containment oxygen concentration shall be measured and recorded on a weekly basis.

3.7 LIMITING CONDITIONS FOR OPERATION

ii. 24 Hours prior to reducing thermal power to less than 15% rated thermal power prior to the next shutdown.

8. If Specification 3.7.A.1 through 3.7.A.6 cannot be met, an orderly shutdown shall be initiated immediately and the reactor shall be in a cold shutdown condition within 24 hours.

9. If Specification 3.7.A.7 cannot be met, and the primary containment oxygen concentration cannot be restored to less than 4% oxygen by volume within the subsequent 24 hour period, reactor thermal power shall be less than 15% rated thermal power within the next 8 hours.

10. Drywell/Suppression Chamber d/p

a. Differential pressure between the drywell and suppression chamber shall be maintained ≥1.7 psid while in the RUN MODE during the time period:

i. From 24 hours after thermal power is greater than 15% rated thermal power following startup, to

ii. 24 hours prior to reducing thermal power to less than 15% rated thermal power prior to the next shutdown.

4.7 SURVEILLANCE REQUIREMENTS

10. Drywell/Suppression Chamber d/p

a. Verify drywell-to-suppression chamber differential pressure is within limit every 12 hours.

3.7 LIMITING CONDITIONS FOR OPERATION	4.7 SURVEILLANCE REQUIREMENTS
b. Deleted	
c. If Specification 3.7.A.10.a is not met, and the differential pressure is not restored within the subsequent eight hour period, reactor thermal power shall be less than 15% rated thermal power within the next 12 hours.	
B. Standby Gas Treatment System	B. Standby Gas Treatment System
1. a. Except as specified in Specification 3.7.B.3.a below, whenever the reactor is in Run Mode or Startup Mode or Hot Shutdown condition, both trains of the Standby Gas Treatment System shall be operable at all times when secondary containment integrity is required.	1. At least once per operating cycle, not to exceed 18 months, the following conditions shall be demonstrated.
b. Except as specified in Specification 3.7.B.3.b below, whenever the reactor is in Refuel Mode or Cold Shutdown condition, both trains of the Standby Gas	a. Pressure drop across the combined HEPA and charcoal filter banks is less than 6 inches of water at 1500 cfm ±10%.
	b. Inlet heater input is at least 7.1 kW.

BASES: 3.7 (Cont'd)

The purpose of the vacuum relief valves is to equalize the pressure between the drywell and suppression chamber and suppression chamber and reactor building so that the structural integrity of the containment is maintained.

The vacuum relief system from the pressure suppression chamber to Reactor Building consists of two 100% vacuum relief breakers (2 parallel sets of 2 valves in series). Operation of either system will maintain the pressure differential less than 2 psig; the external design pressure is 2 psig. With one vacuum breaker out of service there is no immediate threat to accident mitigation or primary containment and, therefore, reactor operation can be continued for 7 days while repairs are being made.

The capacity of the ten (10) drywell vacuum relief valves is sized to limit the pressure differential between the suppression chamber and drywell during post-accident drywell cooling operations to the design limit of 2 psig. They are sized on the basis of the Bodega Bay pressure suppression tests. The ASME Boiler and Pressure Vessel Code, Section III, Subsection B, for this vessel allows eight (8) operable valves, therefore, with two (2) valves secured, containment integrity is not impaired.

Only 8 of the 10 vacuum breakers must be OPERABLE for opening. All suppression chamber-to-drywell vacuum breakers, however, are required to be closed (except during testing or when the vacuum breakers are performing their intended design function). The vacuum breaker OPERABILITY requirement provides assurance that the drywell-to-suppression chamber negative differential pressure remains below the design value. The requirement that the vacuum breakers be closed ensures that there is no excessive bypass leakage should a LOCA occur.

In the RUN, STARTUP and HOT SHUTDOWN MODES, the Suppression Pool Spray System is required to be OPERABLE to mitigate the effects of a DBA. Excessive negative pressure inside the drywell could occur due to inadvertent actuation of this system. The vacuum breakers, therefore, are required to be OPERABLE in the RUN, STARTUP and HOT SHUTDOWN MODES, when the Suppression Pool Spray System is required to be OPERABLE, to mitigate the effects of inadvertent actuation of the Suppression Pool Spray System.

Also, in the RUN, STARTUP and HOT SHUTDOWN MODES, a DBA could result in excessive negative differential pressure across the drywell wall, caused by the rapid depressurization of the drywell. The event that results in the limiting rapid depressurization of the drywell is the primary system rupture that fills the drywell free airspace with steam. Subsequent condensation of the steam would result in depressurization of the drywell.

In the COLD SHUTDOWN and REFUELING MODES, the probability and consequences of these events are reduced by the pressure and temperature limitations in these MODES; therefore, maintaining suppression chamber-to-drywell vacuum breakers OPERABLE is not required in the COLD SHUTDOWN and REFUELING MODES.

With one of the required vacuum breakers inoperable for opening (e.g., the vacuum breaker is not open and may be stuck closed or not within its opening setpoint limit, so that it would not function as designed during an event that depressurized the drywell), the

remaining seven OPERABLE vacuum breakers are capable of providing the vacuum relief function. However, overall system reliability is reduced because a single failure in one of the remaining vacuum breakers could result in an excessive suppression chamber-to-drywell differential pressure during a DBA. Therefore, with one of the eight required vacuum breakers inoperable, 72 hours is allowed to restore at least one of the inoperable vacuum breakers to OPERABLE status so that plant conditions are consistent with those assumed for the design basis analysis. The 72 hour Completion Time is considered acceptable due to the low probability of an event in which the remaining vacuum breaker capability would not be adequate.

One of the ten vacuum breakers may be opened for up to 2 hours for any reason, including maintenance to restore a vacuum breaker to an OPERABLE status. An open vacuum breaker allows communication between the drywell and suppression chamber airspace, and, as a result, there is the potential for suppression chamber overpressurization due to this bypass leakage if a LOCA were to occur. Therefore, the open vacuum breaker must be closed. A short time is allowed to close the vacuum breaker due to the low probability of an event that would pressurize primary containment. If vacuum breaker position indication is not reliable, an alternate method of verifying that the vacuum breakers are closed is to verify that a differential pressure $\geq$ 1.7 psid between the suppression chamber and drywell is maintained for 1 hour without makeup. The required 2 hour Completion Time is considered adequate to perform this test.

If the inoperable suppression chamber-to-drywell vacuum breaker cannot be closed or restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least HOT SHUTDOWN within 12 hours and to COLD SHUTDOWN within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

The requirement to inert the containment is based on the recommendation of the Advisory Committee on Reactor Safeguards. This recommendation, in turn, is based on the assumption that several percent of the zirconium in the core will undergo a reaction with steam during the loss-of-coolant accident. This reaction would release sufficient hydrogen to result in a flammable concentration in the primary containment building. The oxygen concentration is therefore kept below 4% to minimize the possibility of hydrogen combustion.

General Electric has estimated that less than 0.1% of the zirconium would react with steam following a loss-of-coolant due to operation of emergency core cooling equipment. This quantity of zirconium would not liberate enough hydrogen to form a combustible mixture.

Drywell-to-suppression chamber differential pressure must be controlled when the primary containment is inert. The primary containment must be inert in RUN MODE, since this is the condition with the highest probability for an event that could produce hydrogen. It is also the condition with the highest probability of an event that could impose large loads on the primary containment.

Inerting primary containment is an operational problem because it prevents primary containment access without an appropriate breathing apparatus. Therefore, the primary containment is inerted as late as possible in the unit startup and is de-inerted as soon as possible in the unit shutdown. As long as reactor power is <15% RTP, the probability of an event that generates hydrogen or excessive loads on primary containment occuring within the first 24 hours following a

BASES: 3.7 (Cont'd)

startup or within the last 24 hours prior to a shutdown is low enough that these "windows," with the primary containment not inerted, are also justified. The 24 hour time period is a reasonable amount of time to allow plant personnel to perform inerting or de-inerting.

If drywell-to-suppression chamber differential pressure is not within the limit, the conditions assumed in the safety analyses are not met and the differential pressure must be restored to within the limit within 8 hours. The 8 hour Completion Time provides sufficient time to restore differential pressure to within limit and takes into account the low probability of an event that would create excessive suppression chamber loads occurring during this time period.

If the differential pressure cannot be restored to within limits within the associated Completion Time, the plant must be placed in a MODE in which the LCO does not apply. This is done by reducing power to ≤ 15% RTP within 12 hours. The 12 hour Completion Time is reasonable, based on operating experience, to reduce reactor power from full power conditions in an orderly manner and without challenging plant systems.

The use of the 18" purge and vent flow path isolation valves AC-7A (16-19-7A), AC-7B (16-19-7B), AC-8 (16-19-8), AC-10 (16-19-10) has been restricted to 90 hours per year. Normal plant operations (other than inerting and de-inerting) will have AC-8 and AC-10 closed and nitrogen will be supplied to the drywell via the 1" nitrogen makeup supply. The differential pressure maintained between the drywell and torus will allow the nitrogen to "bubble over" into the suppression chamber. A normally open AC-6B (3") allows for venting. A normally closed AC-6A (3") is periodically opened for performance of surveillances such as monthly torus to drywell vacuum breaker tests. Procedurally, when AC-6A is open, AC-6 and AC-7 are closed to prevent overpressurization of the SBGT system or the reactor building ductwork, should a LOCA occur. For this and similar analyses performed, a spurious opening of AC-6 or AC-7 (one of the closed containment isolation valves) is not assumed as a failure simultaneous with a postulated LOCA. Analyses demonstrate that for normal plant operation system alignments, including surveillances such as those described above, that SBGT integrity would be maintained if a LOCA was postulated. Therefore, during normal plant operations, the 90 hour clock does not apply. Accordingly, opening of the 18 inch atmospheric control isolation valves AC-7A, AC-7B, AC-8 and AC-10 will be limited to 90 hours per calendar year (except for performance of the subject valve stroke time surveillances - in which case the appropriate corresponding valves are closed to protect equipment should a LOCA occur). This restriction will apply whenever primary containment integrity is required. The 90 hour clock will apply anytime purge and vent evolutions can not assure the integrity of the SBGT trains or related equipment.

B. and C. Standby Gas Treatment System and Secondary Containment System

The secondary containment is designed to minimize any ground level release of radioactive materials which might result from a serious accident. The Reactor Building provides secondary containment during reactor operation, when the drywell is sealed and in service; the Reactor Building provides primary containment when the reactor is shutdown and the drywell is open, as during refueling. Because the secondary containment is an integral part of the complete containment system, secondary containment is required at all times that primary containment is required except, however, for initial fuel loading and low power physics testing.

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 was 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. 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. Every 18 months each valve is tested to assure that it will open fully in response to a force less than that specified.

Each vacuum breaker is verified closed to ensure that a potential large bypass leakage path is not present. This Surveillance is performed by observing the vacuum breaker position indication or by verifying that a differential pressure $\geq$ 1.7 psid between the suppression chamber and drywell is maintained for 1 hour without makeup. The 14 day Frequency is based on engineering judgment and is considered adequate in view of other indications of vacuum breaker status available to operations personnel. This verification is also required within 2 hours after any discharge of steam to the suppression chamber from the safety/relief valves or any operation that causes the drywell-to-suppression chamber differential pressure to be reduced by
$\geq$ 0.5 psid.

A Note is added to SR 4.7.A.6.a which allows suppression chamber-to-drywell vacuum breakers opened in conjunction with the performance of a Surveillance to not be considered as failing this SR. These periods of opening vacuum breakers are controlled by plant procedures and do not represent inoperable vacuum breakers.

Verification of the vacuum breaker opening setpoint is necessary to ensure that the safety analysis assumption regarding vacuum breaker full open differential pressure of 0.5 psid is valid.

BASES: 4.7 (Cont'd)

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.

Every 18 months, a leak rate test shall be performed to verify that significant leakage flow paths do not exist between the drywell and suppression chamber. The drywell pressure will be increased by at least 1 psi with respect to the suppression chamber pressure and held constant. The 2 psig set point will not be exceeded. The subsequent suppression chamber pressure transient (if any) will be monitored with a sensitive pressure gauge. If the drywell pressure cannot be increased by 1 psi over the suppression chamber pressure it would be because a significant leakage path exists; in this event the leakage source will be identified and eliminated before power operation is resumed. If the drywell pressure can be increased by 1 psi over the suppression chamber the rate of change of the suppression chamber pressure must not exceed a rate equivalent to the rate of leakage from the drywell through a 1-inch orifice. In the event the rate of change exceeds this value then the source of leakage will be identified and eliminated before power operation is resumed.

The drywell-suppression chamber vacuum breakers are exercised in accordance with Specification 4.6.E.2, following termination of discharge of steam into the suppression chamber from the safety/relief valves and following any operation that causes the vacuum breakers to open. This monitoring of valve operability is intended to assure that valve operability does not degrade between refueling inspections. When a vacuum breaker valve is exercised through an opening-closing cycle, the position indicating lights are designed to function as follows:

Full Closed (Closed to $\leq$0.050" open)	2 White - On
Open (>0.050" open to full open)	2 White - Off

Experience has shown that a weekly measurement of the oxygen concentration in the primary containment assures adequate surveillance of the primary containment atmosphere.

BASES: 4.7 (Cont'd)

The drywell-to-suppression chamber differential pressure is regularly monitored to ensure that the required limits are satisfied. The 12 hour Frequency is considered adequate in view of other indications available in the control room, including alarms, to alert the operator to an abnormal pressure condition.

B. and C. Standby Gas Treatment System and Secondary Containment System

Initiating reactor building isolation and operation of the standby gas treatment system to maintain at least a 0.15 inch of water vacuum within the secondary containment provides an adequate test of the operation of the reactor building isolation valves, leakage tightness of the reactor building, and performance of the standby gas treatment system. The testing of reactor building automatic ventilation system isolation valves in accordance with Technical Specification 4.6.E demonstrates the operability of these valves. In addition, functional testing of initiating sensors and associated trip channels demonstrates the capability for automatic actuation. Periodic testing gives sufficient confidence of reactor building integrity and standby gas treatment system performance capability.

The test frequencies are adequate to detect equipment deterioration prior to significant defects, but the tests are not frequent enough to load the filters, thus reducing their reserve capacity too quickly. That the testing frequency is adequate to detect deterioration was demonstrated by the tests which showed no loss of filter efficiency after 2 years of operation in the rugged shipboard environment on the NS Savannah (ORNL 3726). Pressure drop tests across filter sections are performed to detect gross plugging of the filter media. Considering the relatively short time that the fans may be run for test purposes, plugging is unlikely, and the test interval is reasonable. Such heater tests will be conducted once during each operating cycle. Considering the simplicity of the heating circuit, the test frequency is sufficient. Air distribution tests will be conducted once during each operating cycle.

The in-place testing of charcoal filters is performed using a halogenated hydrocarbon, which is injected into the system upstream of the charcoal filters. Measurements of the challenge gas concentration upstream and downstream of the charcoal filters is made. The ratio of the inlet and outlet concentrations gives an overall indication of the leak tightness of the system. Although this is basically a leak test, since the filters have charcoal of known efficiency and holding capacity for elemental iodine and/or methyl iodine, the test also gives an indication of the relative efficiency of the installed system.

High-efficiency particulate air filters are installed before and after the charcoal filter to minimize potential release of particulates to the environment and to prevent clogging of the iodine filters. An efficiency of 99% is adequate to retain particulates that may be released to the Reactor Building following an accident. This will be demonstrated by testing with DOP as testing medium.

The efficiencies of the particulate and charcoal filters are sufficient to prevent exceeding 10CFR50.67 limits for the accidents analyzed. The analysis of post-accident hydrogen purge assumed a charcoal filter efficiency of 95%. Hence requiring in-place test efficiencies of 99% for these filters and a laboratory methyl iodide test of 97.5% for the charcoal provides adequate margin.