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Michael J. Colomb
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BVY 09-068

December 3, 2009

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

SUBJECT: Technical Specifications Proposed Change No. 288
Scram Discharge Volume Vent and Drain Valves
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 to amend Operating License DPR-28 for Vermont Yankee Nuclear Power Station (VY).

The proposed changes would revise the VY Technical Specifications (TS) to incorporate Standard Technical Specification 3.1.8 "Scram Discharge Volume (SDV) Vent and Drain Valves" and associated Bases of NUREG-1433, Revision 3, "Standard Technical Specifications General Electric Plants, BWR/4," modified to account for plant specific design details.

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 December 1, 2010 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. David Mannai at 802-451-3304.

A001
NRR

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

Executed on December 3, 2009.

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: Mr. Samuel J. Collins
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Attachment 1

Vermont Yankee Nuclear Power Station

Proposed Change 288

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 changes would revise the VY Technical Specifications (TS) to incorporate Standard Technical Specification (STS) 3.1.8 "Scram Discharge Volume (SDV) Vent and Drain Valves" and associated Bases of NUREG-1433, Revision 3, Standard Technical Specifications General Electric Plants, BWR/4," modified to account for plant specific design details.

2. DETAILED DESCRIPTION

The proposed changes would revise the VY TS to incorporate STS 3.1.8 "Scram Discharge Volume (SDV) Vent and Drain Valves" and associated Bases of NUREG-1433, Rev. 3, modified to account for plant specific design details. The VY TS do not contain a Limiting Condition for Operation (LCO) related to the SDV vent and drain valves. VY Surveillance Requirement (SR) 4.3.B.7 requires that the SDV vent and drain valves be checked open at least once per month (this is equivalent to STS SR 3.1.8.1) and allows the valves to be closed intermittently for testing under administrative control. All other surveillance testing of the SDV vent and drain valves is controlled by the VY Inservice Test (IST) program.

Specifically, the proposed changes are:

1. Proposed TS 3/4.3.F will incorporate the required actions and surveillance requirements contained within STS 3.1.8 with the following changes to address plant specific configuration:

    a. VY has only one pneumatically-operated vent valve per vent line by design. There is a check valve in each vent line that backs up the pneumatically-operated valve. Proposed SR 4.3.F.1 is written to specify that only the pneumatically-operated vent and drain valves are checked open monthly and proposed SR 4.3.F.3 is written to specify that only the pneumatically-operated valves are subject to closure time testing on receipt of a scram signal and subsequent opening on scram reset.

    b. For consistency with the convention used in the VY TS, the terms STARTUP, RUN 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 pneumatically-operated SDV vent and drain valve closure time of ≤ [60] seconds in STS SR 3.1.8.3.a is replaced by a closure time of ≤ 30 seconds. This is the maximum time allowed by the VY IST program and is conservative with respect to the STS SR 3.1.8.3.a closure time.

    d. The terms *once per month* and *once per operating cycle* are used as surveillance requirement frequencies in lieu of *31 days* and *[18] months*, respectively.

    e. STS SR 3.1.8.2 requires the cycling of each SDV vent and drain valve to the fully open and fully closed position every 92 days. For the pneumatically-operated SDV vent and drain valves, this test is currently being performed on a quarterly basis. This test is performed on the check valves in each vent line during each refueling outage. Both tests are performed in accordance with the VY Inservice Testing (IST)

Program. SR 4.3.F.2 is written to continue performance of this SR in accordance with the VY IST Program, SR 4.6.E.2.

f. Added "SDV" to LCO wording for clarity.

2. VY SR 4.3.B.7 is being deleted. New SR 4.3.F.1 captures the requirements to verify the pneumatically-operated SDV vent and drain valves are open at least once per month.

3. The Table of Contents is revised to add proposed TS 3/4.3.F.

3. TECHNICAL EVALUATION

The scram discharge volume (SDV) vent and drain valves are part of the control rod drive (CRD) system. The CRD system at Vermont Yankee Nuclear Power Station (VY) is a reactivity control system which controls gross changes in core reactivity by incrementally positioning neutron absorbing control rods within the reactor core in response to manual control signals. The CRD System is required to quickly shut down the reactor (scram) by rapidly inserting control rods into the core in response to a manual or automatic signal.

The safety-related functions of the CRD system are:

a. The CRD System shall provide rapid control rod insertion in the core to shutdown the reactor. The basis for this function is to prevent violation of fuel damage limits for normal operation and all abnormal transients.

b. The CRD System shall provide signals to the Reactor Protection System (RPS) to initiate a scram when water in the SDV is above a specified minimum level. The basis for this requirement is to ensure that the SDV will have adequate volume for a full core scram when required.

The SDVs are used to limit the loss of, receive and contain the reactor vessel water from all the CRDs during a scram. VY has two separate, independent SDVs, each with its own vent and drain lines. Each SDV receives approximately half of the CRD discharges. One SDV is located on the north side of the 252' level of the Reactor Building (RB) and the other is located on the south side of the 252' level of the RB. Each drain line contains two pneumatically-operated valves connected in series that drain to the RB equipment drain sumps. Each vent line contains a single pneumatically-operated valve and a check valve in series and vents to the RB HVAC exhaust plenum. The check valves back up the pneumatically-operated valve and eliminate the spraying of contaminated water into the HVAC exhaust plenum upon scram reset as the same signal opens the vent and drain valves simultaneously.

During normal plant operation, the discharge volumes are empty with all their pneumatically-operated drain and vent valves open. The SDV is isolated upon initiation of a scram by closing the pneumatically-operated SDV vent and drain valves. The pneumatically-operated SDV vent and drain valves are operated by signals from the RPS to the pneumatically-operated SDV vent and drain solenoid valves or by the venting of air from the scram valve pilot air header. Position indicator switches on the pneumatically-operated vent and drain valves indicate valve position by lights in the Main Control Room.

The SDV vent and drain valves are designed to isolate the SDV when reactor water is discharged to the SDV through the scram discharge header and allow free venting and draining of the SDV after a scram. The SDV vent and drain valves are required to support the safety related rapid control rod insertion function.

The single automatic (pneumatically-operated) vent valve configuration at VY differs from the two automatic vent valve configuration assumed in Standard Technical Specification (STS) 3.1.8 "Scram Discharge Volume (SDV) Vent and Drain Valves" and associated Bases of NUREG-1433, Revision 3, "Standard Technical Specifications General Electric Plants, BWR/4." This difference in the vent line configuration is reflected in the proposed SRs by specifying that the monthly verification that each SDV vent and drain valve is open and the closure time measurement after receipt of a scram signal and subsequent reopening on scram reset each operating cycle are only applicable to the pneumatically-operated SDV vent and drain valves. The check valves in the vent lines are operability tested by leak testing and draining the SDV during each refueling outage. This surveillance is currently performed in accordance with the VY IST Program and would continue to be performed in accordance with proposed SR 4.3.F.2.

The proposed amendment does not change any existing equipment operating requirements and does not adversely affect existing plant safety margins or the reliability of the equipment assumed to operate in the safety analysis. The proposed amendment adds LCOs and SRs for the SDV vent and drain valves from the STS, modified to account for plant specific design details, to the VY TS. The surveillance tests proposed to be added as new SRs are currently performed as part of the VY IST program. As such, there are no changes being made to safety analysis assumptions, safety limits or safety system settings that would adversely affect plant safety as a result of the proposed amendment.

4. EVALUATION OF SIGNIFICANT HAZARDS CONSIDERATION

The proposed changes would revise the Vermont Yankee Nuclear Power Station (VY) Technical Specifications (TS) to incorporate Standard Technical Specification (STS) 3.1.8 "Scram Discharge Volume (SDV) Vent and Drain Valves" and associated Bases of NUREG-1433, Revision 3, "Standard Technical Specifications General Electric Plants, BWR/4," modified to account for plant specific design details, by adding Limiting Conditions for Operation (LCO) and Surveillance Requirements (SR) for the SDV vent and drain valves. The surveillance tests proposed to be added as new SRs are currently performed as part of the VY Inservice Testing (IST) program.

Pursuant to 10CFR50.92, Entergy Nuclear Operations, Inc. 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 discussion below addresses each of these criteria and demonstrates that the proposed amendment does not constitute a significant hazard.

The proposed change does not involve a significant hazards consideration because:

1. <u>The operation of Vermont Yankee Nuclear Power Station (VY) in accordance with the proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.</u>

   The proposed amendment does not impact the operability of any structure, system or component that affects the probability of an accident or that supports mitigation of

an accident previously evaluated. The proposed amendment does not affect reactor operations or accident analysis and has no radiological consequences. The operability requirements for accident mitigation systems remain consistent with the licensing and design basis. Therefore, the proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. The operation of VY in accordance with the proposed amendment will not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed change does not involve a physical alteration of the plant (no new or different type of equipment will be installed) or a change in the methods governing plant operation. Thus, this change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. The operation of VY in accordance with the proposed amendment will not involve a significant reduction in a margin of safety.

   The proposed change ensures that the safety functions of the SDV vent and drain valves are fulfilled. The isolation function is maintained by valves in the vent and drain lines and by the required action to isolate the affected line. The ability to vent and drain the SDVs is maintained through administrative controls. In addition, the reactor protection system ensures that an SDV will not be filled to the point that it has insufficient volume to accept a full scram. Maintaining the safety functions related to isolation of the SDV and insertion of control rods ensures that the proposed change does not involve a significant reduction in the margin of safety. The proposed amendment does not change the design or function of any component or system. The proposed amendment does not impact any safety limits, safety settings or safety margins.

Therefore, operation of VY in accordance with the proposed amendment will not involve a significant reduction in the margin to safety.

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 changes would revise the VY Technical Specifications (TS) to incorporate Standard Technical Specification (STS) 3.1.8 "Scram Discharge Volume (SDV) Vent and Drain Valves" and associated Bases of NUREG-1433, Revision 3, "Standard Technical Specifications General Electric Plants, BWR/4." The surveillance requirements that are proposed to be added to the TS are currently controlled by the VY IST program in accordance with VY SR 4.6.E; therefore, no new surveillance tests are proposed to be added and hence no significant increase in individual or cumulative occupational radiation exposure will occur.

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) NUREG-1433, Revision 3, "Standard Technical Specifications General Electric Plants, BWR/4," dated March 2004.

Attachment 2

Vermont Yankee Nuclear Power Station

Proposed Change 288

Markup of the Current Technical Specifications and Bases Pages

TABLE OF CONTENTS

3.3 LIMITING CONDITIONS FOR OPERATION	4.3 SURVEILLANCE REQUIREMENTS
	(c) Out-of-sequence control rods in each distinct RWM group shall be selected and the annunciator of the selection errors verified.
	(d) An out-of-sequence control rod shall be withdrawn no more than three notches and the rod block function verified.
4. Control rod patterns and the sequence of withdrawal or insertion shall be established such that the rod drop accident limit of 280 cal/g is not exceeded.	4. The control rod pattern and sequence of withdrawal or insertion shall be verified to comply with Specification 3.3.B.4.
5. Control rods shall not be withdrawn for startup or refueling unless at least two source range channels have an observed count rate greater than or equal to three counts per second.	5. Prior to control rod withdrawal for startup or during refueling, verification shall be made that at least two source range channels have an observed count rate of at least three counts per second.
6. If the above specifications are not satisfied, an orderly shutdown shall be initiated and the reactor shall be in the HOT SHUTDOWN condition within 12 hours.	6. Deleted
	DELETED 7. The scram discharge volume drain and vent valves shall be verified open at least once per month. These valves may be closed intermittently for testing under administrative control.

3.3 LIMITING CONDITIONS FOR OPERATION

E. Reactivity Anomalies

The reactivity equivalent of the difference between the actual critical rod configuration and the expected configuration during power operation shall not exceed 1% $\Delta k/k$. If this limit is exceeded, the reactor will be shut down until the cause has been determined and corrective actions have been taken if such actions are appropriate.

4.3 SURVEILLANCE REQUIREMENTS

E. Reactivity Anomalies

During the startup test program and startups following refueling outages, the critical rod configurations will be compared to the expected configurations at selected operating conditions. These comparisons will be used as base data for reactivity monitoring during subsequent power operation throughout the fuel cycle. At specific power operating conditions, the critical rod configuration will be compared to the configuration expected based upon appropriately corrected past data. This comparison will be made at least every equivalent full power month.

INSERT 1

BASES: 3.3 & 4.3 (Cont'd)

7. Periodic verification that the Scram Discharge Volume (SDV) drain and vent valves are maintained in the open position provides assurance that the SDV will be available to accept the water displaced from the control rod drives in the event of a scram.

C. Scram Insertion Times

DELETED

BACKGROUND

The scram function of the Control Rod Drive (CRD) System controls reactivity changes during abnormal operational transients to ensure that specified acceptable fuel design limits are not exceeded. The control rods are scrammed by positive means using hydraulic pressure exerted on the CRD piston.

When a scram signal is initiated, control air is vented from the scram valves, allowing them to open by spring action. Opening the exhaust valve reduces the pressure above the main drive piston to atmospheric pressure, and opening the inlet valve applies the accumulator or reactor pressure to the bottom of the piston. Since the notches in the index tube are tapered on the lower edge, the collet fingers are forced open by cam action, allowing the index tube to move upward without restriction because of the high differential pressure across the piston. As the drive moves upward and the accumulator pressure reduces below the reactor pressure, a ball check valve opens, letting the reactor pressure complete the scram action. If the reactor pressure is low, such as during startup, the accumulator will fully insert the control rod in the required time without assistance from reactor pressure.

APPLICABLE SAFETY ANALYSES

The Design Basis Accident (DBA) and transient analyses assume that all of the control rods scram at a specified insertion rate. The resulting negative scram reactivity forms the basis for the determination of plant thermal limits (e.g., MCPR). Other distributions of scram times (e.g., several control rods scramming slower than the average time with several control rods scramming faster than the average time) can also provide sufficient scram reactivity. Surveillance of each individual control rod's scram time ensures the scram reactivity assumed in the DBA and transient analyses can be met.

The scram function of the CRD System protects the MCPR Safety Limit (SL) (reference TS 1.1.A, "Bundle Safety Limit (Reactor Pressure >800 psia and Core Flow >10% of Rated)," and TS 3.11.C, "Minimum Critical Power Ratio (MCPR)") and the 1% cladding plastic strain fuel design limit (reference specification 3.11.A, "Average Planar Linear Heat Generation Rate (APLHGR)"), which ensure that no fuel damage will occur if these limits are not exceeded. Above 800 psig, the scram function is designed to insert negative reactivity at a rate fast enough to prevent the actual MCPR from becoming less than the MCPR SL, during the analyzed limiting power transient. Below 800 psig, the scram function is assumed to perform during the control rod drop accident (Reference 1) and, therefore, also provides protection against violating fuel damage limits during reactivity insertion accidents (Reference TS 3.3.B.3 and 3.3.B.4, regarding the Rod Worth Minimizer and control rod patterns). For the reactor vessel overpressure protection analysis, the scram function, along with the safety/relief valves, ensure that the peak vessel pressure is maintained within the applicable ASME Code limits.

Control rod scram times satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES: 3.3 & 4.3 (Cont'd)

E. Reactivity Anomalies

During each fuel cycle, excess operating reactivity varies as fuel depletes and as any burnable poison in supplementary control is burned. The magnitude of this excess reactivity may be inferred from the critical rod configuration. As fuel burnup progresses, anomalous behavior in the excess reactivity may be detected by comparison of the critical rod pattern selected base states to the predicted rod inventory at that state. Power operation base conditions provide the most sensitive and directly interpretable data relative to core reactivity. Furthermore, using power operating base conditions permits frequent reactivity comparisons. Reactivity anomaly is used as a measure of the predicted versus measured core reactivity during power operation. If the measured and predicted rod density for identical core conditions at BOC do not reasonably agree, then the assumptions used in the reload cycle design analysis or the calculation models used to predict rod density may not be accurate. If reasonable agreement between measured and predicted core reactivity exists at BOC, then the prediction may be normalized to the measured value. Requiring a reactivity comparison at the specified frequency assures that a comparison will be made before the core reactivity change exceeds 1% $\Delta k/k$. Deviations in core reactivity greater than 1% $\Delta k/k$ are not expected and require thorough evaluation. One percent reactivity limit is considered safe since an insertion of the reactivity into the core would not lead to transients exceeding design conditions of the Reactor System.

INSERT 2

Insert 1

3.3 LIMITING CONDITIONS FOR OPERATION	4.3 SURVEILLANCE REQUIREMENTS
F. Scram Discharge Volume Vent and Drain Valves	F. Scram Discharge Volume Vent and Drain Valves
1. Each scram discharge volume (SDV) vent and drain valve shall be OPERABLE when the reactor is in the STARTUP or RUN MODES ----------NOTES---------- • Separate Condition entry is allowed for each SDV vent and drain line. • An isolated SDV line may be unisolated under administrative control to allow draining and venting of the SDV. ---------- a. If there is one or more SDV vent or drain line with one valve inoperable, then isolate the associated SDV line within 7 days. b. If there is one or more SDV vent or drain line with both valves inoperable, then isolate the associated SDV line within 8 hours. c. If Specifications 3.3.F.1.a or 3.3.F.1.b are not met then the reactor shall be in HOT SHUTDOWN within 12 hours.	1. ----------NOTE---------- Not required to be met on vent and drain valves closed during performance of SR 4.3.F.2. ---------- Verify each pneumatically-operated SDV vent and drain valve is open at least once per month. 2. Cycle each SDV vent and drain valve to the fully closed and fully open position in accordance with Specification 4.6.E.2. 3. At least once per operating cycle, verify each pneumatically-operated SDV vent and drain valve: a. Closes in $\leq$ 30 seconds after receipt of an actual or simulated scram signal and b. Opens when the actual or simulated scram signal is reset.

Insert 2

F. Scram Discharge Volume Vent and Drain Valves

BACKGROUND

The pneumatically-operated Scram Discharge Volume (SDV) vent and drain valves are normally open and discharge any accumulated water in the SDV to ensure that sufficient volume is available at all times to allow a complete scram. During a scram, the pneumatically-operated SDV vent and drain valves close to contain reactor water. The scram discharge volumes are used to limit the loss of and contain the reactor vessel water from all the drives during a scram. These volumes are provided in the scram discharge header. There are two separate, independent SDVs, each with its own vent and drain lines. Each SDV receives approximately half of the CRD discharges. Each drain line contains two pneumatically-operated valves connected in series that drain to the Reactor Building (RB) equipment drain sumps. Each vent line contains a single pneumatically-operated valve and a check valve.

APPLICABLE SAFETY ANALYSES

The SDV vent and drain valves are designed to isolate the SDV when reactor water is discharged to the SDV through the scram discharge header and allow free venting and draining of the SDV after a scram. The SDV vent and drain valves are required to support the safety related rapid control rod insertion function.

Isolation of the SDV can also be accomplished by manual closure of the pneumatically-operated SDV valves. Additionally, the discharge of reactor coolant to the SDV can be terminated by scram reset or closure of the HCU manual isolation valves. The SDV vent and drain valves allow continuous drainage of the SDV during normal plant operation to ensure that the SDV has sufficient capacity to contain the reactor coolant discharge during a full core scram. To automatically ensure this capacity, a reactor scram is initiated if the SDV water level in the instrument volume exceeds a specified setpoint. The setpoint is chosen so that all control rods are inserted before the SDV has insufficient volume to accept a full scram.

LCO

The OPERABILITY of all SDV vent and drain valves ensures that the SDV vent and drain valves will close during a scram to contain reactor water discharged to the SDV piping. Since the drain lines are provided with two pneumatically-operated valves in series, the single failure of one valve in the open position will not impair the isolation function of the system. The vent line contains a single pneumatically-operated valve and a check valve as a backup. Additionally, the valves are required to open on scram reset to ensure that a path is available for the SDV piping to drain freely at other times.

APPLICABILITY

In the STARTUP and RUN MODES, scram may be required; therefore, the SDV vent and drain valves must be OPERABLE. In the HOT SHUTDOWN and COLD SHUTDOWN MODES, control rods are not able to be withdrawn since the reactor mode switch is in shutdown and a control rod block is applied. This provides adequate controls to ensure that only a single control rod can be withdrawn. Also, during the REFUELING MODE, only a single control rod can be withdrawn from a core cell containing fuel assemblies. Therefore, the SDV vent and drain valves are not required to be OPERABLE in these MODES since the reactor is subcritical and only one rod may be withdrawn and subject to scram.

REQUIRED ACTIONS

3.3.F.1 is modified by a note indicating that a separate condition entry is allowed for each SDV vent and drain line. This is acceptable, since the required actions for each condition provide appropriate compensatory actions for each inoperable SDV line. Complying with the required actions may allow for continued operation, and subsequent inoperable SDV lines are governed by subsequent condition entry and application of associated required actions.

When a line is isolated, the potential for an inadvertent scram due to high SDV level is increased. During these periods, the line may be unisolated under administrative control. This allows any accumulated water in the line to be drained, to preclude a reactor scram on SDV high level. This is acceptable since the administrative controls ensure the valve can be closed quickly, by a dedicated operator, if a scram occurs with the valve open.

3.3.F.1.a

When one SDV vent or drain valve is inoperable in one or more lines, the associated line must be isolated to contain the reactor coolant during a scram. The 7 day completion time is reasonable, given the level of redundancy in the lines and the low probability of a scram occurring while the valve(s) are inoperable and the line is not isolated. The SDV is still isolable since the redundant valve in the affected line is OPERABLE. During these periods, the single failure criterion may not be preserved, and a higher risk exists to allow reactor water out of the primary system during a scram. Once the associated SDV line is isolated continued operation is permissible.

3.3.F.1.b

If both vent or drain valves in a line are inoperable, the line must be isolated to contain the reactor coolant during a scram. The 8 hour completion time to isolate the line is based on the low probability of a scram occurring while the line is not isolated and unlikelihood of significant CRD seal leakage. Once the associated SDV line is isolated continued operation is permissible.

3.3.F.1.b

If both vent or drain valves in a line are inoperable, the line must be isolated to contain the reactor coolant during a scram. The 8 hour completion time to isolate the line is based on the low probability of a scram occurring while the line is not isolated and unlikelihood of significant CRD seal leakage. Once the associated SDV line is isolated continued operation is permissible.

3.3.F.1.c

If any required action and associated completion time are not met, 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. The allowed completion time of 12 hours is reasonable, based on operating experience, to reach HOT SHUTDOWN from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 4.3.F.1

During normal operation, the pneumatically-operated SDV vent and drain valves should be in the open position (except when performing SR 4.3.F.2) to allow for drainage of the SDV piping. Verifying that each valve is in the open position ensures that the pneumatically-operated SDV vent and drain valves will perform their intended functions during normal operation. This SR does not require any testing or valve manipulation; rather, it involves verification that the valves are in the correct position. The monthly frequency is based on engineering judgment and is consistent with the procedural controls governing valve operation, which ensure correct valve positions.

SR 4.3.F.2

During a scram, the SDV vent and drain valves should close to contain the reactor water discharged to the SDV piping. Cycling each valve through its complete range of motion (closed and open) ensures that the valve will function properly during a scram. The valves are tested in accordance with the requirements of the Inservice Testing Program.

SR 4.3.F.3

SR 4.3.F.3 is an integrated test of the pneumatically-operated SDV vent and drain valves to verify total system performance. After receipt of a simulated or actual scram signal, the closure of the pneumatically-operated SDV vent and drain valves is verified. The closure time of 30 seconds after receipt of a scram signal is based on the Design Maximum Actuation Time. Similarly, after receipt of a simulated or actual scram reset signal, the opening of the pneumatically-operated SDV vent and drain valves is verified. The Logic System Functional Test in LCO 3.1.A and the scram time testing of control rods in LCO

3.3.C overlap this surveillance to provide complete testing of the assumed safety function. The operating cycle frequency is based on the need to perform this surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the surveillance when performed at the operating cycle frequency; therefore, the frequency was concluded to be acceptable from a reliability standpoint.

Attachment 3

Vermont Yankee Nuclear Power Station

Proposed Change 288

Retyped Technical Specifications and Bases Pages

TABLE OF CONTENTS

3.3 LIMITING CONDITIONS FOR OPERATION	4.3 SURVEILLANCE REQUIREMENTS
	(c) Out-of-sequence control rods in each distinct RWM group shall be selected and the annunciator of the selection errors verified.
	(d) An out-of-sequence control rod shall be withdrawn no more than three notches and the rod block function verified.
4. Control rod patterns and the sequence of withdrawal or insertion shall be established such that the rod drop accident limit of 280 cal/g is not exceeded.	4. The control rod pattern and sequence of withdrawal or insertion shall be verified to comply with Specification 3.3.B.4.
5. Control rods shall not be withdrawn for startup or refueling unless at least two source range channels have an observed count rate greater than or equal to three counts per second.	5. Prior to control rod withdrawal for startup or during refueling, verification shall be made that at least two source range channels have an observed count rate of at least three counts per second.
6. If the above specifications are not satisfied, an orderly shutdown shall be initiated and the reactor shall be in the HOT SHUTDOWN condition within 12 hours.	6. Deleted
	7. Deleted

3.3 LIMITING CONDITIONS FOR OPERATION	4.3 SURVEILLANCE REQUIREMENTS
E. Reactivity Anomalies The reactivity equivalent of the difference between the actual critical rod configuration and the expected configuration during power operation shall not exceed 1% $\Delta k/k$. If this limit is exceeded, the reactor will be shut down until the cause has been determined and corrective actions have been taken if such actions are appropriate.	E. Reactivity Anomalies During the startup test program and startups following refueling outages, the critical rod configurations will be compared to the expected configurations at selected operating conditions. These comparisons will be used as base data for reactivity monitoring during subsequent power operation throughout the fuel cycle. At specific power operating conditions, the critical rod configuration will be compared to the configuration expected based upon appropriately corrected past data. This comparison will be made at least every equivalent full power month.
F. Scram Discharge Volume Vent and Drain Valves 1. Each scram discharge volume (SDV) vent and drain valve shall be OPERABLE when the reactor is in the STARTUP or RUN MODES. ----------NOTES---------- • Separate Condition entry is allowed for each SDV vent and drain line. • An isolated SDV line may be unisolated under administrative control to allow draining and venting of the SDV. ---------- a. If there is one or more SDV vent or drain line with one valve inoperable, then isolate the associated SDV line within 7 days.	F. Scram Discharge Volume Vent and Drain Valves 1. ----------NOTE---------- Not required to be met on vent and drain valves closed during performance of SR 4.3.F.2. ---------- Verify each pneumatically-operated SDV vent and drain valve is open at least once per month. 2. Cycle each SDV vent and drain valve to the fully closed and fully open position in accordance with Specification 4.6.E.2. 3. At least once per operating cycle, verify each pneumatically-operated SDV vent and drain valve: a. Closes in ≤ 30 seconds after receipt of an actual or simulated scram signal and

3.3 LIMITING CONDITIONS FOR OPERATION	4.3 SURVEILLANCE REQUIREMENTS
b. If there is one or more SDV vent or drain line with both valves inoperable, then isolate the associated SDV line within 8 hours.	b. Opens when the actual or simulated scram signal is reset.
c. If Specifications 3.3.F.1.a or 3.3.F.1.b are not met then the reactor shall be in HOT SHUTDOWN within 12 hours.	

BASES: 3.3 & 4.3 (Cont'd)

7. Deleted

C. Scram Insertion Times

BACKGROUND

The scram function of the Control Rod Drive (CRD) System controls reactivity changes during abnormal operational transients to ensure that specified acceptable fuel design limits are not exceeded. The control rods are scrammed by positive means using hydraulic pressure exerted on the CRD piston.

When a scram signal is initiated, control air is vented from the scram valves, allowing them to open by spring action. Opening the exhaust valve reduces the pressure above the main drive piston to atmospheric pressure, and opening the inlet valve applies the accumulator or reactor pressure to the bottom of the piston. Since the notches in the index tube are tapered on the lower edge, the collet fingers are forced open by cam action, allowing the index tube to move upward without restriction because of the high differential pressure across the piston. As the drive moves upward and the accumulator pressure reduces below the reactor pressure, a ball check valve opens, letting the reactor pressure complete the scram action. If the reactor pressure is low, such as during startup, the accumulator will fully insert the control rod in the required time without assistance from reactor pressure.

APPLICABLE SAFETY ANALYSES

The Design Basis Accident (DBA) and transient analyses assume that all of the control rods scram at a specified insertion rate. The resulting negative scram reactivity forms the basis for the determination of plant thermal limits (e.g., MCPR). Other distributions of scram times (e.g., several control rods scramming slower than the average time with several control rods scramming faster than the average time) can also provide sufficient scram reactivity. Surveillance of each individual control rod's scram time ensures the scram reactivity assumed in the DBA and transient analyses can be met.

The scram function of the CRD System protects the MCPR Safety Limit (SL) (reference TS 1.1.A, "Bundle Safety Limit (Reactor Pressure >800 psia and Core Flow >10% of Rated)," and TS 3.11.C, "Minimum Critical Power Ratio (MCPR)") and the 1% cladding plastic strain fuel design limit (reference specification 3.11.A, "Average Planar Linear Heat Generation Rate (APLHGR)"), which ensure that no fuel damage will occur if these limits are not exceeded. Above 800 psig, the scram function is designed to insert negative reactivity at a rate fast enough to prevent the actual MCPR from becoming less than the MCPR SL, during the analyzed limiting power transient. Below 800 psig, the scram function is assumed to perform during the control rod drop accident (Reference 1) and, therefore, also provides protection against violating fuel damage limits during reactivity insertion accidents (Reference TS 3.3.B.3 and 3.3.B.4, regarding the Rod Worth Minimizer and control rod patterns). For the reactor vessel overpressure protection analysis, the scram function, along with the safety/relief valves, ensure that the peak vessel pressure is maintained within the applicable ASME Code limits.

Control rod scram times satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES: 3.3 & 4.3 (Cont'd)

E. Reactivity Anomalies

During each fuel cycle, excess operating reactivity varies as fuel depletes and as any burnable poison in supplementary control is burned. The magnitude of this excess reactivity may be inferred from the critical rod configuration. As fuel burnup progresses, anomalous behavior in the excess reactivity may be detected by comparison of the critical rod pattern selected base states to the predicted rod inventory at that state. Power operation base conditions provide the most sensitive and directly interpretable data relative to core reactivity. Furthermore, using power operating base conditions permits frequent reactivity comparisons. Reactivity anomaly is used as a measure of the predicted versus measured core reactivity during power operation. If the measured and predicted rod density for identical core conditions at BOC do not reasonably agree, then the assumptions used in the reload cycle design analysis or the calculation models used to predict rod density may not be accurate. If reasonable agreement between measured and predicted core reactivity exists at BOC, then the prediction may be normalized to the measured value. Requiring a reactivity comparison at the specified frequency assures that a comparison will be made before the core reactivity change exceeds 1% $\Delta k/k$. Deviations in core reactivity greater than 1% $\Delta k/k$ are not expected and require thorough evaluation. One percent reactivity limit is considered safe since an insertion of the reactivity into the core would not lead to transients exceeding design conditions of the Reactor System.

F. Scram Discharge Volume Vent and Drain Valves

BACKGROUND

The pneumatically-operated Scram Discharge Volume (SDV) vent and drain valves are normally open and discharge any accumulated water in the SDV to ensure that sufficient volume is available at all times to allow a complete scram. During a scram, the pneumatically-operated SDV vent and drain valves close to contain reactor water. The scram discharge volumes are used to limit the loss of and contain the reactor vessel water from all the drives during a scram. These volumes are provided in the scram discharge header. There are two separate, independent SDVs, each with its own vent and drain lines. Each SDV receives approximately half of the CRD discharges. Each drain line contains two pneumatically-operated valves connected in series that drain to the Reactor Building (RB) equipment drain sumps. Each vent line contains a single pneumatically-operated valve and a check valve.

APPLICABLE SAFETY ANALYSES

The SDV vent and drain valves are designed to isolate the SDV when reactor water is discharged to the SDV through the scram discharge header and allow free venting and draining of the SDV after a scram. The SDV vent and drain valves are required to support the safety related rapid control rod insertion function.

Isolation of the SDV can also be accomplished by manual closure of the pneumatically-operated SDV valves. Additionally, the discharge of reactor coolant to the SDV can be terminated by scram reset or closure of the HCU manual isolation valves. The SDV vent and drain valves allow continuous drainage of the SDV during normal plant operation to ensure that the SDV has sufficient capacity to contain the reactor coolant discharge during a full core scram. To automatically ensure this capacity, a reactor scram is initiated if the SDV water level in the instrument volume exceeds a specified setpoint. The setpoint is chosen so that all control rods are inserted before the SDV has insufficient volume to accept a full scram.

LCO

The OPERABILITY of all SDV vent and drain valves ensures that the SDV vent and drain valves will close during a scram to contain reactor water discharged to the SDV piping. Since the drain lines are provided with two pneumatically-operated valves in series, the single failure of one valve in the open position will not impair the isolation function of the system. The vent line contains a single pneumatically-operated valve and a check valve as a backup. Additionally, the valves are required to open on scram reset to ensure that a path is available for the SDV piping to drain freely at other times.

APPLICABILITY

In the STARTUP and RUN MODES, scram may be required; therefore, the SDV vent and drain valves must be OPERABLE.

In the HOT SHUTDOWN and COLD SHUTDOWN MODES, control rods are not able to be withdrawn since the reactor mode switch is in shutdown and a control rod block is applied. Also, during the REFUELING MODE, only a single control rod can be withdrawn from a core cell containing fuel assemblies. Therefore, the SDV vent and drain valves are not required to be OPERABLE in these MODES since the reactor is subcritical and only one rod may be withdrawn and subject to scram.

REQUIRED ACTIONS

3.3.F.1 is modified by a note indicating that a separate condition entry is allowed for each SDV vent and drain line. This is acceptable, since the required actions for each condition provide appropriate compensatory actions for each inoperable SDV line. Complying with the required actions may allow for continued operation, and subsequent inoperable SDV lines are governed by subsequent condition entry and application of associated required actions.

When a line is isolated, the potential for an inadvertent scram due to high SDV level is increased. During these periods, the line may be unisolated under administrative control. This allows any accumulated water in the line to be drained, to preclude a reactor scram on SDV high level. This is acceptable since the administrative controls ensure the valve can be closed quickly, by a dedicated operator, if a scram occurs with the valve open. These controls consist of stationing a dedicated operator, with whom Control Room communication is immediately available, in the immediate vicinity of the valve controls.

3.3.F.1.a

When one SDV vent or drain valve is inoperable in one or more lines, the associated line must be isolated to contain the reactor coolant during a scram. The 7 day completion time is reasonable, given the level of redundancy in the lines and the low probability of a scram occurring while the valve(s) are inoperable and the line is not isolated. The SDV is still isolable since the redundant valve in the affected line is OPERABLE. During these periods, the single failure criterion may not be preserved, and a higher risk exists to allow reactor water out of the primary system during a scram. Once the associated SDV line is isolated continued operation is permissible.

3.3.F.1.b

If both vent or drain valves in a line are inoperable, the line must be isolated to contain the reactor coolant during a scram. The 8 hour completion time to isolate the line is based on the low probability of a scram occurring while the line is not isolated and unlikelihood of significant CRD seal leakage. Once the associated SDV line is isolated continued operation is permissible.

3.3.F.1.c

If any required action and associated completion time are not met, 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. The allowed completion time of 12 hours is reasonable, based on operating experience, to reach HOT SHUTDOWN from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 4.3.F.1

During normal operation, the pneumatically-operated SDV vent and drain valves should be in the open position (except when performing SR 4.3.F.2) to allow for drainage of the SDV piping. Verifying that each valve is in the open position ensures that the pneumatically-operated SDV vent and drain valves will perform their intended functions during normal operation. This SR does not require any testing or valve manipulation; rather, it involves verification that the valves are in the correct position. The monthly frequency is based on engineering judgment and is consistent with the procedural controls governing valve operation, which ensure correct valve positions.

SR 4.3.F.2

During a scram, the SDV vent and drain valves should close to contain the reactor water discharged to the SDV piping. Cycling each valve through its complete range of motion (closed and open) ensures that the valve will function properly during a scram. The valves are tested in accordance with the requirements of the Inservice Testing Program.

SR 4.3.F.3

SR 4.3.F.3 is an integrated test of the pneumatically-operated SDV vent and drain valves to verify total system performance. After receipt of a simulated or actual scram signal, the closure of the pneumatically-operated SDV vent and drain valves is verified. The closure time of 30 seconds after receipt of a scram signal is based on the Design Maximum Actuation Time. Similarly, after receipt of a simulated or actual scram reset signal, the opening of the pneumatically-operated SDV vent and drain valves is verified. The Logic System Functional Test in LCO 3.1.A and the scram time testing of control rods in LCO 3.3.C overlap this surveillance to provide complete testing of the assumed safety function. The operating cycle frequency is based on the need to perform this surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the surveillance when performed at the operating cycle frequency; therefore, the frequency was concluded to be acceptable from a reliability standpoint.