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BVY 10-067

December 2, 2010

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: Revision of Technical Specification Bases Pages
Vermont Yankee Nuclear Power Station
Docket No. 50-271
License No. DPR-28

REFERENCE: 1. Letter, USNRC to VYNPS, "Vermont Yankee Nuclear Power Station – Issuance of Amendment RE: Scram Discharge Volume Vent and Drain Valves (TAC No. ME2855)," NVY 10-063, dated October 6, 2010

Dear Sir or Madam:

This letter provides revised Vermont Yankee Technical Specification (TS) Bases pages. The Vermont Yankee TS Bases were revised to incorporate changes made to the TS for the Scram Discharge Volume Vent and Drain Valves, as approved by Reference 1.

These changes, processed in accordance with our Technical Specification Bases Control Program (TS 6.7.E), were determined not to require prior NRC approval. The revised Bases pages are provided for your information and for updating and inclusion with your copy of Vermont Yankee Technical Specifications. No NRC action is required in conjunction with this submittal.

There are no new regulatory commitments being made in this submittal.

Should you have any questions concerning this submittal, please contact me at 802-451-3166.

Sincerely,

Robert J. Wanczyk

[RJW/PLC]

A001
NRR

Attachment: 1. Revised Technical Specification Bases Pages (4 pages)

cc: Mr. William M. Dean
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Attachment 1

Vermont Yankee Nuclear Power Station

Revised Technical Specification Bases Pages

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.

BASES: 3.3 & 4.3 (Cont'd)

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. 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 SR 4.1.A.4 and the scram time testing of control rods in SR 4.3.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.