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December 12, 2005
BVY 05-094
TAC No. MC 5488

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

Subject: Vermont Yankee Nuclear Power Station
License No. DPR-28 (Docket No. 50-271)
Technical Specification Proposed Change No. 266
Revision to Control Rod Operability, Scram Time Testing and Control Rod Accumulators - Response to Request for Additional Information

References: (1) Entergy letter to USNRC (BVY 04-60), "Technical Specification Proposed Change No. 266 - Revision to Control Rod Operability Scram Time Testing and Control Rod Accumulators," dated December 15, 2004.

(2) Transmittal from R. Ennis (USNRC) to R. Daflucas (Entergy), "RAI for PCN 266 (TAC No. MC5488)," dated March 31, 2005.

By letter dated December 15, 2004 (Reference 1), Entergy Nuclear Operations, Inc. (Entergy) submitted Technical Specification (TS) Proposed Change No. 266 for the Vermont Yankee Nuclear Power Station (VY). The proposed change would revise the surveillance requirements (SR's) for verifying control rod coupling integrity as described in TS 4.3.B.1, revise the scram insertion time limiting conditions for operation (LCO) and SR's as described in TS 3.3.C and 4.3.C and enhance the LCO and SR for Control Rod Accumulators, TS 3.3.D and 4.3.D.

On March 31, 2005, the NRC provided to Entergy a request for additional information regarding TS Proposed Change No. 266 (Reference 2). Following a discussion with the NRC staff on May 11, 2005, Entergy agreed to provide a written response to the questions. Accordingly, Attachment 1 provides the response to the request for additional information. Attachment 2 provides an updated description of change for Changes #15 and #17. Attachment 3 provides replacement marked up TS pages and a supplemental marked up TS Bases page. Attachment 4 provides replacement retyped TS pages and a supplemental retyped TS Bases page.

There are no commitments contained within this letter.

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If you have any further questions or require additional information, please contact Mr. James M. DeVincentis at (802) 258-4236.

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

Executed on this 12 day of December, 2005.

Sincerely,

Jay K. Thayer
Site Vice President
Vermont Yankee Nuclear Power Station

Attachments (4)

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ATTACHMENT 1 TO BVY 05-094

Technical Specification Proposed Change No. 266
Revision to Control Rod Operability, Scram Time Testing and Control Rod Accumulators
Response to Request for Additional Information

Responses

ENTERGY NUCLEAR OPERATIONS, INC.
VERMONT YANKEE NUCLEAR POWER STATION
DOCKET NO. 50-271

ATTACHMENT 1

By letter dated December 15, 2004 (Reference 1), Entergy Nuclear Operations, Inc. (Entergy) submitted Technical Specification (TS) Proposed Change No. 266 for the Vermont Yankee Nuclear Power Station (VY). On March 31, 2005, the NRC provided to Entergy a Request for Additional Information (RAI) regarding TS Proposed Change No. 266 for VY (Reference 2). This attachment provides Entergy's responses to each individual RAI.

RAI 1:

You propose to remove TS 4.3.B.1 which states that rod coupling should be verified by exercising the rods and observing "discernable response of the nuclear instrumentation." On page 3 of Enclosure 1 of your application dated December 15, 2004, your justification for removing this TS is that it does not provide a "positive check that the control rod is uncoupled since if sufficient friction is not present an uncoupled rod would follow the drive being withdrawn." You also state that "if sufficient friction is present to uncouple the control rod from its drive, the control rod would not follow the drive being withdrawn." Explain how an uncoupled control rod that has sufficient friction so that it would not withdraw with the drive would be detected.

Response to RAI 1:

An uncoupled control rod that has sufficient friction so that it would not withdraw when the drive is withdrawn would be detected via the performance of a control rod coupling check. This control rod coupling check, as required by proposed TS Surveillance Requirement (SR) 4.3.B.1, requires verification that a control rod does not go to the withdrawn over-travel position each time a rod is fully withdrawn. The over-travel feature provides a positive check of coupling integrity since only an uncoupled control rod can go to the over-travel position.

The control rod coupling check is required to be performed any time a control rod is withdrawn to the full out position and prior to declaring a control rod operable after work on the control rod or Control Rod Drive system that could affect coupling. Since scram time testing from the full out position is required for each control rod following a refueling outage (reference proposed TS 4.3.C.1.d), coupling integrity would also be verified at that time.

RAI 2:

Provide your analytical scram reactivity curve. Provide details from your calculations you performed to determine that the scram times in your Proposed Table 4.3.C-1 meet the assumptions in your analytical scram reactivity curve. Include calculation details for instances where you would have the maximum number of "slow" rods (6 rods or 2 occupying adjacent locations.)

Response to RAI 2:

The analytical scram reactivity curve used by Entergy in performing the cycle specific Anticipated Operational Occurrence (AOO) analysis is based on methodology (Option B) previously approved by the NRC and documented in GESTAR-II (References 3 and 4). The values for the scram reactivity curve are provided in tabular format (Table 1) to clearly provide a comparison of the proposed TS values to the values used in the analysis for the current VY Cycle 25.

As shown in Table 1, the cycle specific scram times used in the analysis are equal to or slower than the proposed TS times. The use of "slower" scram times in the analysis is conservative since the limiting pressurization event would be worse and would result in a higher operating limit.

As specified in Reference 3, an evaluation is performed for any "slow rod" (i.e., control rod that does not meet the TS scram time). For rods that do not meet the TS scram times, an adjustment (τ) to the Operating Limit Minimum Critical Power Ratio (MCPR) (Safety Limit + AOO ΔCPR from analysis) is determined as specified in the VY cycle specific Core Operating Limits Report.

Table 1
Control Rod Drive Position vs. Scram Time[1]

Control Rod Notch	Option B Scram Times	VY Proposed TS Scram Times
46	0.375	0.358
36	1.096	1.096
26	1.860	1.860
6	3.419	3.419

Note:
1 – Time from de-energization of scram solenoid to specified CRD insertion

RAI 3:

TS 4.3.C.1 currently states in part "...all control rods shall be subject to scram-time measurements from the fully withdrawn position ... The scram times for single rod scram testing shall be measured without reliance on the control rod drive pumps." You did not provide the basis for removing this language. Please provide this.

Response to RAI 3:

Entergy did not propose to remove the requirement to perform scram-time measurements from the fully withdrawn position. Additionally, Entergy agrees with the NRC staff that it is appropriate that the scram times for single control rod scram time testing be measured without reliance on the control rod drive pumps. Accordingly, this requirement has been maintained. Please reference the note for proposed TS SR 4.3.C which reads:

NOTE:
During single control rod scram time Surveillances, the control rod drive (CRD) pumps shall be isolated from the associated scram accumulator.

RAI 4:

TS 3.3.C.3 currently states that "the reactor shall be shut down immediately upon determination that average scram time is deficient." You propose to change this requirement to state that "the reactor shall be placed in the HOT SHUTDOWN condition within 12 hours." You did not provide a basis addressing the safety implications for shutting down the reactor within 12 hours verses immediately. Please address this.

Response to RAI 4:

The change is proposed to clearly articulate the task to be performed and the allocated duration for completion of that task. The proposed change is consistent with nomenclature accepted by the industry and the allocated duration is consistent with the time necessary to perform immediate actions to perform a controlled shutdown. This is a non-intent proposed change with a purpose of providing clarification. Entergy would start the shutdown immediately and to complete the shutdown in 12 hours. This requirement is more conservative than just starting the shutdown, as all control rods will be inserted within the 12 hour time frame. The 12 hour period allows for a normal orderly shutdown of the reactor.

RAI 5:

You propose to change TS 3.3.D to allow up to two (2) inoperable control rod scram accumulators as long as the associated control rod scram time was declared to be "slow." Provide details demonstrating that the scram time for control rods with inoperable scram accumulators would not exceed the requirements for declaring the control rod inoperable (i.e., control rod scram time from fully withdrawn to notch position 04 is not greater than 7.0 seconds.)

Response to RAI 5:

With regard to demonstrating that the scram time for control rods with inoperable scram accumulators would not exceed the requirements for declaring a control rod inoperable, please reference Section 3.4.5.4 of the VY Updated Final Safety Analysis Report (UFSAR) which documents:

> "Each drive requires about 2.5 gallons of water during the scram stroke. There is adequate water capacity in each drive's accumulator to complete a scram in the required time at low reactor vessel pressure. At higher reactor vessel pressures, the accumulator is assisted on the upper end of the stroke by reactor vessel pressure acting on the drive via the ball check (shuttle) valve. As water is forced from the accumulator, the accumulator discharge pressure falls below reactor vessel pressure. This causes the check valve to shift its position to admit reactor pressure under the drive piston. Thus, reactor vessel pressure furnishes the force needed to complete the scram stroke at higher reactor vessel pressures. When the reactor vessel is up to full operating pressure, the accumulator is actually not needed to meet scram time requirements."

This design feature is also captured in the current Bases (reference Bases 3.3.D) which identifies:

"At reactor pressures in excess of 800 psig, even those control rods with inoperable accumulators will be able to meet required scram insertion times due to the action of reactor pressure."

As discussed in Change #17 of our original submittal, the allowance to declare a control rod "slow" is only allowed if reactor pressure is greater than or equal to 800 psi and the control rod was not previously identified as being "slow."

RAI 6:

Your current TS 3.3.D does not allow more than one inoperable control rod scram accumulator in a nine-rod square array. Your current TS bases for TS 3.3.D state that "requiring no more than one inoperable accumulator in any nine-rod (3x3) square array is based on a series of XY PDQ-4 quarter core calculations of a cold, clean core." Your proposed changes to TS 3.3.D allow up to 2 control rod accumulators to be inoperable under certain circumstances and does not have restrictions on the locations of the inoperable accumulators. Explain why it is no longer necessary to restrict the geometry of the inoperable accumulators.

Response to RAI 6:

The restrictions for numbers and geometry of inoperable and "slow" control rods are found within TS 3.3.A.2 and 3.3.C.1 as stated in the basis provided in Change #17 of Enclosure 1 of the original submittal, dated December 15, 2004 (Reference 1). In approving the Improved TS, the NRC referenced a letter from the BWR Owners Group to USNRC dated September 17, 1987 (Reference 5). The basis for restrictions on geometry of the inoperable accumulators is discussed in this document. The accumulators are required to scram the control rod when the reactor pressure is low. When the reactor is close to or at rated pressure, the reactor pressure scrams the control rod in the required time and the accumulator provides an additional energy boost. For VY, scram insertion times are applicable with reactor pressure greater than or equal to 800 psig. The primary requirement is that the Control Rod Drive (CRD) system performs its intended function and therefore, because of the large number of control rods, the operability of an individual control rod, or accumulator, is not necessarily required. However, the actions necessary for inoperable accumulators at less than 800 psig, require declaring associated control rods inoperable and those restrictions are found within the TS.

In addition, Entergy proposes a minor, non-intent change to the subject proposed Change #17 to TS 3.3.D, as discussed on page 15 of Enclosure 1 of our original submittal. In the original submittal, Entergy's proposed TS Section 3.3.D.4 provides the required actions if the CRD system verification is not satisfactory: "If the Specifications 3.3.D.2.a. or 3.3.D.3.a are not met, place the reactor mode switch in the shutdown position within 1 hour." Entergy requests the following non-intent change to the proposed change for 3.3.D.4: "If the Specifications 3.3.D.2.a or 3.3.D.3.a are not met, ensure all rods are fully inserted within 1 hour." This action ensures that the extensions of proposed TS 3.3.D.2 and TS 3.3.D.3 will not be used unless adequate CRD pressure is available to insert all rods into the reactor. This change is necessary since, due to the design of VY, placing the mode switch in shutdown position would likely cause closure of the Main Steam Isolation Valve(s). Accordingly, Change #17 is hereby revised to reflect this change, and is included in Attachment 2 to this letter. This proposed change is consistent with the intent of Standard TS and meets the intent of the original change.

Attachment 3 includes a replacement marked up TS page 87b. Attachment 4 includes a replacement retyped TS page 87b.

RAI 7:

LCO 3.3.A.2 "Reactivity Margin - Inoperable Control Rods," which reads "The control rod directional control valves for inoperable control rods shall be disarmed electrically..." You propose to remove the word "electrically" from this language. You state on page 13 of Enclosure 1 of your application dated December 15, 2004, that "the proposed change would allow for the disarming to be either hydraulically or electrically." In your TS Bases for TS 3.3.A.2 it states "If a rod is disarmed electrically, its position shall be consistent with the shutdown reactivity limitation stated in Specification 3.3.A.1." Does disarming the control valves for inoperable control rods hydraulically also give a position consistent with the shutdown reactivity limitation stated in Specification 3.3.A.1? Why are you not modifying your Bases to include a statement about disarming the control valves for inoperable control rods hydraulically?

Response to RAI 7:

Entergy should have removed the word "electrically" from the TS Bases for TS 3.3.A.2 to be consistent with the proposed change to LCO 3.3.A.2 since disarming an inoperable control rod hydraulically also provides a position consistent with the shutdown reactivity limitation stated in Specification 3.3.A.1. As indicated in the question above, this change is discussed on page 13 of Enclosure 1 of our original submittal as Change #15. Accordingly, Change #15 has been revised to reflect this change and is provided in Attachment 2 to this letter. This revised change replaces in its entirety the previously submitted Change #15.

Attachment 3 includes replacement markups of TS page 82 and TS Bases page 89. Attachment 4 includes replacement retyped TS page 82 and TS Bases page 89.

RAI 8:

With respect to LCO 3.3.B.1, why is the word "electrically" not being removed?

Response to RAI 8:

Similar to our response to RAI 7 above, the word "electrically" should have been removed from the TS 3.3.B.1. Change #15 has also been revised to reflect this change and is provided as Attachment 2 to this letter.

Attachment 3 includes replacement markups of TS page 82, reflecting the change to 3.3.B.1. Attachment 4 includes replacement retyped TS page 82, reflecting the change to 3.3.B.1.

RAI 9:

You propose to remove the text in SR 4.3.B.1(b) which requires recording the results of each coupling check/test. In your justification as to why this is acceptable, you discuss other regulations which require retention of records. Provide specific details describing where the results of your tests will be recorded and how this is controlled. Provide the regulatory basis that requires the results of your tests to be recorded, not just retained. Provide the basis for why this was originally included in your TS and how that is not being invalidated by removing this requirement.

Response to RAI 9:

The results of the subject surveillance test will be recorded and controlled in accordance with Entergy's NRC approved Quality Assurance Program Manual. As indicated in Change No. 4 of our original submittal, the requirement for retention of records related to activities affecting quality is contained in 10CFR50, Appendix B, Criterion XVII "Quality Assurance Records" which requires in part that "Sufficient records shall be maintained to furnish evidence of activities affecting quality. The records shall include at least the following: Operating logs and the results of reviews, inspections, tests...."

Research into the logic behind the inclusion of record and retention requirements being originally included in this specification (and not in the other surveillance requirements) has been inconclusive. It is noted that the record and retention requirements are not specified for other Technical Specification Surveillances. Since VY applies 10CFR50, Appendix B, Criterion XVII to the subject Technical Specification Surveillances, the results are documented and retained. The results of control rod coupling checks are documented and retained in accordance with VY Operating Procedure OP 4111, "Control Rod Drive System Surveillance," on form VYOPF 4111.03, "Friction Testing and Control Rod Cycling Data Sheet."

References:

1. Letter, Entergy to USNRC (BVY 04-60), "Technical Specification Proposed Change No. 266 - Revision to Control Rod Operability Scram Time Testing and Control Rod Accumulators," dated December 15, 2004.

2. Transmittal from R. Ennis (USNRC) to R. Daflucas (Entergy), "RAI for PCN 266 (TAC No. MC5488)," dated March 31, 2005.

3. Licensing Topical Report, NEDE-24011-P-A-14-US, "General Electric Standard Application for Reactor Fuel (Supplement for United States)," latest edition.

4. Letter, J.S. Charnley (GE) to H.N. Berkow (USNRC), "Revised Supplementary Information Regarding Amendment 11 to GE Licensing Topical Report NEDE-24011-P-A," dated January 16, 1986.

5. Letter, R.F. Janecek (BWR Owners' Group) to R.W. Starostecki (USNRC), BWROG-8754, "BWR Owners' Group Revised Reactivity Control System Technical Specifications," dated September 17, 1987.

ATTACHMENT 2 TO BVY 05-094

Technical Specification Proposed Change No. 266
Revision to Control Rod Operability, Scram Time Testing and Control Rod Accumulators
Response to Request for Additional Information

Revised Change Descriptions

ENTERGY NUCLEAR OPERATIONS, INC.
VERMONT YANKEE NUCLEAR POWER STATION
DOCKET NO. 50-271

Change #	Current Technical Specification	Proposed Change
15	TS 3.3.C.4 currently reads "If Specification 3.3.C.2 cannot be met [scram time ≤ 7.00 seconds], the deficient control rod shall be considered inoperable, fully inserted into the core and electrically disarmed." Similar wording (i.e.; electrically disarmed) is utilized in TS 3.3.A.2, Bases 3.3.A.2 and TS 3.3.B.1.	The subject text of TS 3.3.C.4 would be revised to specify that the deficient control rod be considered inoperable, fully inserted and disarmed. The details of the method to disarm would be relocated to the BASES. A similar change is proposed for TS 3.3.A.2, Bases 3.3.A.2 and TS 3.3.B.1 to delete the word electrically.

Basis/Safety Assessment:

The TS 3.3.C.4 details of the methods for disarming control rod drives (electrically) are proposed to be relocated to the Bases. These details are not necessary to ensure the associated CRDs of inoperable control rods are disarmed. Proposed TS 3.3.C.4, which requires disarming the associated CRDs of inoperable control rods, is adequate for ensuring associated CRDs and inoperable control rods are disarmed. As such, these relocated details are not required to be in the Technical Specifications to provide adequate protection of the public health and safety. Changes to the Bases are controlled by the provisions of the Bases Control Program described in Chapter 6 of the Technical Specifications.

A similar change is proposed for TS 3.3.A.2, Bases 3.3.A.2 and TS 3.3.B.1 to delete the word "electrically." This change is not safety significant in that the specifications would still require the subject control rods to be disarmed. The proposed change would allow for the disarming to be either hydraulically or electrically. Since either method provides adequate protection, the change is considered administrative.

This change is consistent with STS 3.1.3 "Control Rod Operability."

Change #	Current Technical Specification	Proposed Change
17	TS 3.3.D provides conditions associated with when a control rod accumulator may be inoperable.	It is proposed that TS 3.3.D would be revised and replaced in its entirety with Insert #5.

Basis/Safety Assessment:
TS 3.3.D provides conditions associated with when a control rod accumulator may be inoperable. The proposed TS 3.3.D would require each control rod scram accumulator to be OPERABLE in STARTUP and RUN MODEs. The OPERABILITY of the control rod scram accumulators is required to ensure that adequate scram insertion capability exists when needed over the entire range of reactor pressures. The OPERABILITY of the scram accumulators is based on maintaining adequate accumulator pressure. In STARTUP and RUN MODEs, the scram function is required for mitigation of DBAs and transients and therefore the scram accumulators must be OPERABLE to support the scram function.

Proposed TS 3.3.D.1, 3.3.D.2 and 3.3.D.3, allow up to 8 hours, depending upon the number of inoperable accumulators and the reactor pressure, before the control rod associated with the inoperable accumulator must be declared inoperable.

Proposed TS 3.3.D.1 would allow for one control rod scram accumulator to be inoperable for up to 8 hours, provided the reactor pressure is ≥ 800 psig (pressure based upon current TS Bases). An inoperable control rod scram accumulator affects the associated control rod scram time. However, at sufficiently high reactor pressure, the accumulators only provide a portion of the scram force. With this reactor pressure, the control rod will scram even without the associated accumulator, although probably not within the required scram times. The allowed Completion Time of 8 hours is reasonable, based on the large number of control rods available to provide the scram function and the ability of the affected control rod to scram with only reactor pressure at high reactor pressures. In addition, proposed TS 3.3.D.1.a provides an option to declare a control rod with an inoperable scram accumulator "slow." Action to declare the control rod "slow" allows the rod to remain withdrawn but not disarmed. Disarming the inoperable rod is intended to prevent inadvertent operation. The limits and allowances for numbers and distribution of inoperable and "slow" control rods (found in TS 3.3.A.2 and 3.3.C.1 respectively) are appropriately applied to control rods with inoperable scram accumulators whether declared inoperable or "slow." The option for declaring the control rod with an inoperable accumulator "slow" is restricted (by a Note to 3.3.D.1.a and 3.3.D.2.b.1) to control rods that were not previously known to be "slow." This restriction prevents allowing a "slow" control rod from remaining OPERABLE with the additional degradation to scram time caused by an inoperable scram accumulator.

Proposed TS 3.3.D.2 allows two or more control rod scram accumulators to be inoperable for up to 1 hour when reactor pressure is ≥ 800 psig. The requirement for declaration of "slow" or inoperable (and the implied concurrent restoration allowed time) is provided in proposed TS 3.3.D.2.b.1 and b.2. This 1 hour allowance provides a reasonable time to attempt investigation and restoration of the inoperable accumulator. The allowed Completion Time of 1 hour is reasonable, based on the ability of only the reactor pressure to scram the control rods and the low probability of a DBA or transient occurring while the affected accumulators are inoperable. Furthermore, proposed TS 3.3.D.2.a addresses the situation where additional accumulators may be rapidly becoming inoperable due to loss of charging water header pressure. Once verification of adequate charging water header pressure is made (20 minutes is provided), and considering that reactor pressure is adequate to assure the scram function of the control rods with inoperable accumulators, the 1 hour extension is not significant.

Basis/Safety Assessment (Continued)
Proposed TS 3.3.D.3 allows one or more control rod scram accumulators to be inoperable for up to 1 hour when reactor pressure is < 800 psig. This 1 hour allowance provides a reasonable time to attempt investigation and restoration of the inoperable accumulators. Proposed 3.3.D.3.a addresses the situation where additional accumulators may be rapidly becoming inoperable due to a loss of charging water header pressure. The verification is similar to that described in proposed TS 3.3.D.2.a above; however, the verification must be made immediately since adequate scram pressure is not guaranteed without the CRD system in operation. Once verification of adequate charging water header pressure is made, and considering that reactor pressure is adequate to assure the scram function of the control rods with inoperable accumulators, the 1 hour extension is not significant. In addition, since the reactor pressure may not be adequate to scram the rods in a proper time, the allowance provided in proposed TS 3.3.D.1 and 2 (to declare the rod "slow") is not provided under the lower pressure condition.

Proposed TS 3.3.D.4 provides the required actions if the CRD system verification is not satisfactory. If the system pressure is not adequate, ensure all rods are fully inserted within one hour is required (emphasis added). This change is necessary since, due to the design of VY, placing the mode switch in shutdown position would likely cause closure of the Main Steam Isolation Valve(s). This action ensures that the extensions of proposed TS 3.3.D.2 and TS 3.3.D.3 will not be used unless adequate CRD pressure is available to insert all rods into the reactor. This proposed change of one hour completion time, although different, is consistent with the intent of STS 3.1.5 which has an "immediate" action time. However, this one hour remains acceptable and consistent with the intent of the Standard TS and is significantly more restrictive than the current TS requirement to be in Cold Shutdown within 24 hours.

Proposed TS 3.3.D includes a Note ("Separate action item entry is allowed for each control rod scram accumulator") which provides more explicit instructions for proper application of the required actions to ensure TS compliance. This Note provides direction consistent with the intent of the existing actions for inoperable control rod scram accumulators. Upon discovery of each inoperable accumulator, it is intended that each specified action be applied regardless of it having been applied previously for other inoperable accumulators.

This change is consistent with STS 3.1.5 "Control Rod Scram Accumulators" except for proposed TS 3.3.D.4 which is proposing a one hour Completion Time vs. an immediate Completion Time as in STS. However, this one hour remains acceptable and is significantly more restrictive than the current TS requirement to be in Cold Shutdown within 24 hours.

ATTACHMENT 3 TO BVY 05-094

Technical Specification Proposed Change No. 266
Revision to Control Rod Operability, Scram Time Testing and Control Rod Accumulators
Response to Request for Additional Information

Revised Marked up TS Pages

ENTERGY NUCLEAR OPERATIONS, INC.
VERMONT YANKEE NUCLEAR POWER STATION
DOCKET NO. 50-271

3.3 LIMITING CONDITIONS FOR OPERATION

disarmed ~~electrically~~ except for control rods which are inoperable because of scram times greater than those specified in Specification 3.3.C. In no case shall the number of inoperable rods which are not fully inserted be greater than six during power operation.

B. Control Rods

1. Each control rod shall be either coupled to its drive or placed in the inserted position and its directional valves disarmed electrically. When removing up to one control rod drive per quadrant for inspection and the reactor is in the refueling mode, this requirement does not apply.

4.3 SURVEILLANCE REQUIREMENTS

of inoperable rods has been reduced to less than two and if it has been demonstrated that control rod drive mechanism collet housing failure is not the cause of an immovable control rod.

B. Control Rods

1. The coupling integrity shall be verified:

(a) When a rod is withdrawn the first time subsequent to each refueling outage or after maintenance, observe discernable response of the nuclear instrumentation; however, for initial rods when response is not discernable, subsequent exercising of these rods after the reactor is critical shall be performed to verify instrumentation response; and

(b) When a rod is fully withdrawn, observe that the rod does not go to the over-travel position. Prior to startup following a refueling outage, each rod shall be fully withdrawn continuously to observe that the rate of withdrawal is proper and that the rod does not go to the over-travel position. Following uncoupling, each control rod drive and blade shall be tested to verify

Declaring a control rod OPERABLE after work on a control rod or the CRD system that could affect coupling,

VERIFIED

[1] [2] [3] [3] [15] [15]

3.3 LIMITING CONDITIONS FOR OPERATION	4.3 SURVEILLANCE REQUIREMENTS
4. If Specifications 3.3.D.2.a or 3.3.D.3.a are not met, place the reactor mode switch in the shutdown position within 1 hour.	ensure all rods are fully inserted
NOTE: The above specification is not applicable if all inoperable control rod scram accumulators are associated with fully inserted control rods.	

BASES:

3.3 & 4.3 CONTROL ROD SYSTEM

A. Reactivity Limitations

1. Reactivity Margin - Core Loading

The specified shutdown margin (SDM) limit accounts for the uncertainty in the demonstration of SDM by testing. Separate SDM limits are provided for testing where the highest worth control rod is determined analytically or by measurement. This is due to the reduced uncertainty in the SDM test when the highest worth control rod is determined by measurement (e.g., SDM may be demonstrated by an in-sequence control rod withdrawal, in which the highest worth control rod is analytically determined, or by local criticals, where the highest worth rod is determined by testing).

Following a refueling, adequate SDM must be demonstrated to ensure that the reactor can be made subcritical at any point during the cycle. Since core reactivity will vary during the cycle as a function of fuel depletion and poison burnup, the beginning of cycle (BOC) test must also account for changes in core reactivity during the cycle. Therefore, to obtain the SDM, the initial measured value must exceed LCO 3.3.A.1 by an adder, "R", which is the difference between the calculated value of maximum core reactivity during the operating cycle and the calculated BOC core reactivity. If the value of "R" is negative (that is, BOC is the most reactive point in the cycle), no correction to the BOC measured value is required. The value of R shall include the potential shutdown margin loss assuming full B_4C settling in all inverted poison tubes present in the core. The frequency of 4 hours after reaching criticality is allowed to provide a reasonable amount of time to perform the required calculations and have appropriate verification.

When SDM is demonstrated by calculations not associated with a test (e.g., to confirm SDM during the fuel loading sequence), additional margin must be included to account for uncertainties in the calculation. During refueling, adequate SDM is required to ensure that the reactor does not reach criticality during control rod withdrawals. An evaluation of each in-vessel fuel movement during fuel loading (including shuffling fuel within the core) is required to ensure adequate SDM is maintained during refueling. This evaluation ensures that the intermediate loading patterns are bounded by the safety analyses for the final core loading pattern. For example, bounding analyses that demonstrate adequate SDM for the most reactive configurations during the refueling may be performed to demonstrate acceptability of the entire fuel movement sequence. These bounding analyses include additional margins to account for the associated uncertainties in the calculation.

2. Reactivity Margin - Inoperable Control Rods

Specification 3.3.A.2 requires that a rod be taken out of service if it cannot be moved with drive pressure. If a rod is disarmed [15] electrically, its position shall be consistent with the shutdown reactivity limitation stated in Specification 3.3.A.1. This assures that the core can be shutdown at all times with the remaining control rods, assuming the highest worth, operable control rod does rod insert. An allowable pattern for control rods valved out of service will be available to the reactor operator. The number of rods permitted to be inoperable could be

ATTACHMENT 4 TO BVY 05-094

Technical Specification Proposed Change No. 266
Revision to Control Rod Operability, Scram Time Testing and Control Rod Accumulators
Response to Request for Additional Information

Revised Retyped TS Pages

ENTERGY NUCLEAR OPERATIONS, INC.
VERMONT YANKEE NUCLEAR POWER STATION
DOCKET NO. 50-271

3.3 LIMITING CONDITIONS FOR OPERATION	4.3 SURVEILLANCE REQUIREMENTS
disarmed except for control rods which are inoperable because of scram times greater than those specified in Specification 3.3.C. In no case shall the number of inoperable rods which are not fully inserted be greater than six during power operation.	of inoperable rods has been reduced to less than two and if it has been demonstrated that control rod drive mechanism collet housing failure is not the cause of an immovable control rod.
B. Control Rods	B. Control Rods
1. Each control rod shall be either coupled to its drive or placed in the inserted position and its directional valves disarmed. When removing up to one control rod drive per quadrant for inspection and the reactor is in the refueling mode, this requirement does not apply.	1. The coupling integrity shall be verified: (a) When a rod is fully withdrawn, observe that the rod does not go to the over-travel position. (b) Prior to declaring a control rod OPERABLE after work on a control rod or the CRD system that could affect coupling, each rod shall be fully withdrawn and verified that the rod does not go to the over-travel position.

3.3 LIMITING CONDITIONS FOR OPERATION	4.3 SURVEILLANCE REQUIREMENTS
4. If Specifications 3.3.D.2.a or 3.3.D.3.a are not met, ensure all rods are fully inserted within 1 hour.	
NOTE: The above specification is not applicable if all inoperable control rod scram accumulators are associated with fully inserted control rods.	

BASES:

3.3 & 4.3 CONTROL ROD SYSTEM

A. Reactivity Limitations

1. Reactivity Margin - Core Loading

The specified shutdown margin (SDM) limit accounts for the uncertainty in the demonstration of SDM by testing. Separate SDM limits are provided for testing where the highest worth control rod is determined analytically or by measurement. This is due to the reduced uncertainty in the SDM test when the highest worth control rod is determined by measurement (e.g., SDM may be demonstrated by an in-sequence control rod withdrawal, in which the highest worth control rod is analytically determined, or by local criticals, where the highest worth rod is determined by testing).

Following a refueling, adequate SDM must be demonstrated to ensure that the reactor can be made subcritical at any point during the cycle. Since core reactivity will vary during the cycle as a function of fuel depletion and poison burnup, the beginning of cycle (BOC) test must also account for changes in core reactivity during the cycle. Therefore, to obtain the SDM, the initial measured value must exceed LCO 3.3.A.1 by an adder, "R", which is the difference between the calculated value of maximum core reactivity during the operating cycle and the calculated BOC core reactivity. If the value of "R" is negative (that is, BOC is the most reactive point in the cycle), no correction to the BOC measured value is required. The value of R shall include the potential shutdown margin loss assuming full B_4C settling in all inverted poison tubes present in the core. The frequency of 4 hours after reaching criticality is allowed to provide a reasonable amount of time to perform the required calculations and have appropriate verification.

When SDM is demonstrated by calculations not associated with a test (e.g., to confirm SDM during the fuel loading sequence), additional margin must be included to account for uncertainties in the calculation. During refueling, adequate SDM is required to ensure that the reactor does not reach criticality during control rod withdrawals. An evaluation of each in-vessel fuel movement during fuel loading (including shuffling fuel within the core) is required to ensure adequate SDM is maintained during refueling. This evaluation ensures that the intermediate loading patterns are bounded by the safety analyses for the final core loading pattern. For example, bounding analyses that demonstrate adequate SDM for the most reactive configurations during the refueling may be performed to demonstrate acceptability of the entire fuel movement sequence. These bounding analyses include additional margins to account for the associated uncertainties in the calculation.

2. Reactivity Margin - Inoperable Control Rods

Specification 3.3.A.2 requires that a rod be taken out of service if it cannot be moved with drive pressure. If a rod is disarmed, its position shall be consistent with the shutdown reactivity limitation stated in Specification 3.3.A.1. This assures that the core can be shutdown at all times with the remaining control rods, assuming the highest worth, operable control rod does rod insert. An allowable pattern for control rods valved out of service will be available to the reactor operator. The number of rods permitted to be inoperable could be