Entergy

Entergy Nuclear Operations, Inc.

Christopher J. Wamser
Site Vice President

BVY 12-006

February 1, 2012

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

SUBJECT: Technical Specifications Proposed Change No. 298
Rod Worth Minimizer Bypass Allowance
Vermont Yankee Nuclear Power Station
Docket No. 50-271
License No. DPR-28

Dear Sir or Madam:

In accordance with 10CFR50.90, Vermont Yankee (VY) is proposing an amendment to Operating License DPR-28. The proposed change would revise VY Technical Specification (TS) 3.3.B.3 allowances for bypassing the Rod Worth Minimizer consistent with the allowances recommended in the Standard Technical Specifications (NUREG-1433, Revision 3).

VY 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.

VY requests review and approval of the proposed license amendment by February 1, 2013 and a 60 day implementation period from the date of the amendment approval.

There are no new regulatory commitments made in this letter.

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

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

Executed on February 1, 2012.

Sincerely,

[CJW/JMD]

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

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Attachment 1

Vermont Yankee Nuclear Power Station

Proposed Change 298

Description and Evaluation of Proposed Changes

1. SUMMARY DESCRIPTION

This evaluation supports a request by Vermont Yankee (VY) to amend Operating License DPR-28.

The proposed amendment to the VY Technical Specifications (TS) change would revise TS 3.3.B.3 allowances for bypassing the Rod Worth Minimizer (RWM) consistent with the allowances provided in the Standard Technical Specifications (STS) (Reference 6.a).

The following changes are being proposed:

- If the RWM is inoperable during a reactor startup, the proposed TS will require immediate suspension of control rod movement except by scram.
- If the RWM is inoperable during a reactor startup, the proposed TS will provide the option to continue with control rod movement provided startup with the RWM inoperable has not been performed in the last 12 months, and that during control rod movement, movement of control rods is verified to be in compliance with banked position withdrawal sequence (BPWS) by a second licensed operator or another qualified member of the technical staff.
- If the RWM is inoperable during control rod movement with the reactor shutdown, the proposed TS will provide a requirement to verify movement of control rods is in compliance with BPWS by a second licensed operator or another qualified member of the technical staff.
- The current TS 3.3.B.3.b is deleted. TS 3.3.B.3.b allowed movement of up to two rods with the RWM inoperable if all rods, except those that cannot be moved with control rod drive pressure, are fully inserted. This provision is not contained in the STS and is seen as unnecessary with the additional provisions provided to allow startup and shutdown with the RWM inoperable.

2. DETAILED DESCRIPTION

The following changes are proposed to TS Section 3.3.B.3:

Current TS 3.3.B.3	Proposed TS 3.3.B.3
3. While the reactor is below 17% power, the Rod Worth Minimizer (RWM) shall be operating while moving control rods except that: (a) If after withdrawal of at least 12 control rods during a startup, the RWM fails, the startup may continue provided a second licensed operator verifies that the operator at the reactor console is following the control rod program; or	3. While the reactor is below 17% power, the Rod Worth Minimizer (RWM) shall be operable while moving control rods except that: (a) If the RWM is inoperable during a reactor startup. 1. Immediately suspend control rod movement except by scram. <u>OR</u>

(b) If all rods, except those that cannot be moved with control rod drive pressure, are fully inserted, no more than two rods may be moved.	2.1.a Immediately verify ≥ 12 rods withdrawn, OR 2.1.b Immediately verify by administrative measures that startup with the RWM inoperable has not been performed in the last 12 months. AND 2.2 During control rod movement, verify movement of control rods is in compliance with banked position withdrawal sequence (BPWS) by a second licensed operator or other qualified member of the technical staff. (b) If the RWM is inoperable during a reactor shutdown, during control rod movement, verify movement of control rods is in compliance with BPWS by a second licensed operator or other qualified member of the technical staff.

3. TECHNICAL EVALUATION

As described in VY Updated Final Safety Analysis Report (UFSAR) Section 7.15.3.3 the RWM function assists and supplements the operator with an effective backup control rod monitoring routine that enforces adherence to established startup, shutdown and low power level control rod procedures. The computer prevents the operator from establishing control rod patterns that are not consistent with established RWM sequences by initiating appropriate rod select block, rod withdrawal block, and rod insert block interlock signals to the Reactor Manual Control System's rod block circuitry. The RWM sequences stored in the computer memory are based on control rod withdrawal procedures designed to limit, and thereby minimize, individual control rod worth to acceptable levels as determined by the design basis control rod drop accident.

The RWM function does not interfere with normal reactor operation, and in the event of failure, does not itself cause rod patterns to be established which would violate the design objective of the RWM. The RWM function may be bypassed and its rod block function disabled only by specific procedural control initiated by the reactor operator and as allowed by the plant TS.

UFSAR Section 14.5.3.2 evaluates the consequences of a continuous rod withdrawal during reactor startup. The RWM would normally prevent withdrawal of such a rod but is was assumed in the analysis that the RWM fails to block the selection and continuous withdrawal of the out of sequence rod. The continuous rod withdrawal transient analysis in the startup range was performed by General Electric on a generic basis for a typical BWR to demonstrate that the contained energy of a fuel pellet located in the peak power region of the core does not exceed 170 cal/gm-UO_2 when an out of sequence control rod is withdrawn at the maximum allowable normal drive speed. The results of the analysis show that the resultant peak fuel enthalpies are less that 60 cal/gm-UO_2 which is significantly less than the 170 cal/gm-UO_2 acceptance criteria. This demonstrates that even if the RWM fails or an operator error results in a continuous rod withdrawal fuel integrity limits will not be exceeded. An evaluation of this event for the extended power uprate condition was performed because the changes in fuel and core design could lead to high rod worth and, therefore, higher peak fuel enthalpy for the event. The peak fuel enthalpy was found to increase by a factor of 1.2 to 72 cal/gm-UO_2 which is still well below the licensing basis criteria of 170 cal/gm-UO_2.

UFSAR Section 14.6.2 evaluates the control rod drop accident (CRDA). This accident is the rapid removal of a high worth control rod. In order to limit the worth of the rod which could be dropped, the RWM system is used below 17% power to limit the sequence of rod withdrawal. This ensures no movement of out of sequence control rods below 17% power. Above 17% power, even multiple operator errors will not create a potential rod drop situation with serious consequences. The control rod sequences are a series of rod withdrawal sequences designed to minimize the worth of control rods. The sequences are designed so that in the event of an uncoupling and subsequent free fall of the control rod, the incremental rod worth is acceptable. Acceptable worth is one that produces a fuel enthalpy of less than 280 cal/gm-UO_2 which was demonstrated by the analysis. The RWM is credited to be functional for the CRDA.

This proposed amendment allows, if the RWM is inoperable during a reactor startup, the option to immediately suspend control rod movement except by scram or to impose additional administrative controls to allow startup or shutdown to continue. These controls include requiring a second licensed operator or other qualified member of the technical staff to verify movement of control rods is in compliance with the BPWS.

This proposed change is consistent with the STS as modified by TSTF-464-T (Reference 6.b). TSTF-464-T addressed a conflict between the STS and the STS Bases and recommended use of the term "in the last 12 months" versus "in the last calendar year."

The proposed change, by limiting the use to once every 12 months, requires that there be a high degree of reliability of the RWM system so that the allowance is not abused, however, recognizes that plant startups and shutdowns can be safely performed with the RWM inoperable by imposing additional administrative requirements.

The imposition of additional proceduralized administrative controls provides reasonable assurance that the station will be operated within its design and licensing basis.

4. EVALUATION OF SIGNIFICANT HAZARDS CONSIDERATION

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

The proposed change would revise the VY Technical Specification (TS) 3.3.B.3 allowances for bypassing the rod worth minimizer (RWM) consistent with the allowances recommended in the Standard Technical Specifications and consistent with changes adopted at other boiling water reactors.

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

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

   Response: No.

   The proposed amendment does not significantly increase the probability or consequences of an accident. The RWM is credited to minimize the probability and consequences of a control rod drop accident however this amendment proposes to substitute additional administrative requirements that ensure the analysis remains conservative and bounding. The additional requirements are considered adequate so as not to have a significant impact on the probability or consequences of an accident. Individuals performing the additional verification of selected control rods are qualified and use additional process controls to ensure they perform the necessary verifications. Therefore, the proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

   Response: No.

   The proposed amendment does not involve any new modes of operation. The change established additional administrative controls for when the RWM system is inoperable. The administrative controls involve performing an independent verification that the correct control rod is selected. The proposed amendment does not change how the control rods are moved or change the design configuration of the control rods. No new accident precursors are introduced. No new or different types of equipment will be installed. The methods governing plant operation remain bounded by current safety analysis assumptions. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

   Response: No.

   The proposed amendment establishes additional administrative requirements for when the RWM is inoperable. The additional administrative controls provide reasonable assurance that station safety analysis results are unchanged and existing safety margins are preserved. The amendment ensures that control rod selection remains within established withdrawal sequences and minimizes the probability that a human error will result is an out of sequence rod being moved. Therefore, the proposed amendment will not involve a significant reduction in the margin of safety.

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

5. ENVIRONMENTAL CONSIDERATIONS

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

(i) The amendment involves no significant hazards determination.

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

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

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

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

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

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

6. REFERENCES

a. NUREG-1433 "Standard Technical Specifications General Electric Plants, BWR/4," Volume 1, Revision 3

b. TSTF-464-T, Revision 0, "Clarify the Control Rod Block Instrumentation required action"

Attachment 2

Vermont Yankee Nuclear Power Station

Proposed Change 298

Markup of the Current Technical Specifications and Bases Pages

3.3 LIMITING CONDITIONS FOR OPERATION

2. The Control Rod Drive Housing Support System shall be in place when the Reactor Coolant System is pressurized above atmospheric pressure with fuel in the reactor vessel unless all operable control rods are fully inserted.

3. ~~While the reactor is below 17% power, the Rod Worth Minimizer (RWM) shall be operating while moving control rods except that:~~

   (a) ~~If after withdrawal of at least 12 control rods during a startup, the RWM fails, the startup may continue provided a second licensed operator verifies that the operator at the reactor console is following the control rod program; or~~

   (b) ~~If all rods, except those that cannot be moved with control rod drive pressure, are fully inserted, no more than two rods may be moved.~~

TS INSERT

4.3 SURVEILLANCE REQUIREMENTS

2. The Control Rod Drive Housing Support System shall be inspected after reassembly.

3. Prior to control rod withdrawal for startup the Rod Worth Minimizer (RWM) shall be verified as operable by performing the following:

   (a) Verify that the control rod withdrawal sequence for the Rod Worth Minimizer computer is correct.

   (b) The Rod Worth Minimizer diagnostic test shall be performed.

TS Insert:

3. While the reactor is below 17% power, the Rod Worth Minimizer (RWM) shall be operable while moving control rods except that:

   (a) If the RWM is inoperable during a reactor startup.

      1. Immediately suspend control rod movement except by scram.

      <u>OR</u>

      2.1.a Immediately verify $\geq$ 12 rods withdrawn,

      <u>OR</u>

      2.1.b Immediately verify by administrative measures that startup with the RWM inoperable has not been performed in the last 12 months.

      <u>AND</u>

      2.2 During control rod movement, verify movement of control rods is in compliance with banked position withdrawal sequence (BPWS) by a second licensed operator or other qualified member of the technical staff.

   (b) If the RWM is inoperable during a reactor shutdown, during control rod movement, verify movement of control rods is in compliance with BPWS by a second licensed operator or other qualified member of the technical staff.

BASES: 3.3 & 4.3 (Cont'd)

2. The control rod housing support restricts the outward movement of a control rod to less than 3 inches in the extremely remote event of a housing failure. The amount of reactivity which could be added by this small amount of rod withdrawal, which is less than a normal single withdrawal increment, will not contribute to any damage of the primary coolant system. The design basis is given in Subsection 3.5.2 of the FSAR, and the design evaluation is given in Subsection 3.5.4. This support is not required if the reactor coolant system is at atmospheric pressure since there would then be no driving force to rapidly eject a drive housing.

3. In the course of performing normal startup and shutdown procedures, a pre-specified sequence for the withdrawal or insertion of control rods is followed. Control rod dropout accidents which might lead to significant core damage, cannot occur if this sequence of rod withdrawals or insertions is followed. The Rod Worth Minimizer (RWM) restricts withdrawals and insertions to those listed in the pre-specified sequence and provides an additional check that the reactor operator is following prescribed sequence. ~~Although beginning a reactor startup without having the RWM operable would entail unnecessary risk, continuing to withdraw rods if the RWM fails subsequently is acceptable if a second licensed operator verifies the withdrawal sequence.~~ Continuing the startup increases core power, reduces the rod worth and reduces the consequences of dropping any rod. Withdrawal of rods for testing is permitted with the RWM inoperable, if the reactor is subcritical and all other rods are fully inserted. Above 17% power, the RWM is not needed since even with a single error an operator cannot withdraw a rod with sufficient worth, which if dropped, would result in anything but minor consequences.

Basis Insert

4. Refer to the "General Electric Standard Application for Reactor Fuel (GESTAR II)," NEDE-24011-P-A, (the latest NRC-approved version will be listed in the COLR).

5. The Source Range Monitor (SRM) system provides a scram function in noncoincident configuration. It does provide the operator with a visual indication of neutron level. The consequences of reactivity accidents are a function of the initial neutron flux. The requirement of at least three counts per second assures that any transient, should it occur, begins at or above the initial value of 10^{-9} of rated power used in the analyses of transients from cold conditions. One operable SRM channel is adequate to monitor the approach to criticality, therefore, two operable SRM's are specified for added conservatism.

6. The action statement for TS 3.3.B.6 requires that the plant be placed in HOT SHUTDOWN within 12 hours if the required actions of TS 3.3.B.1 through 3.3.B.5 are not satisfied. This ensures that all insertable control rods are inserted and places the reactor in a condition that does not require the active function (i.e., scram) of the control rods. The allowed completion time of 12 hours is reasonable, based upon operating experience to reach HOT SHUTDOWN from full power in an orderly manner and without challenging plant systems.

Bases insert:

With the RWM inoperable during a reactor startup or shutdown, the operator is still capable of enforcing the prescribed control rod sequence. However, the defense in depth is reduced since a single operator error can result in violating the control rod sequence. Therefore, control rod movement must be immediately suspended except by scram. Alternatively, startup may continue if at least 12 control rods have already been withdrawn or a reactor startup with an inoperable RWM was not performed in the last 12 months. Once these conditions have been verified by either control room indication or control room logs, the RWM function can be performed manually following a second check of compliance with the prescribed rod sequence by a second licensed operator or other qualified member of the technical staff. The RWM may be bypassed under these conditions to allow continued operation or shutdown.

Attachment 3

Vermont Yankee Nuclear Power Station

Proposed Change 298

Retyped Technical Specifications and Bases Pages

3.3 LIMITING CONDITIONS FOR OPERATION

2. The Control Rod Drive Housing Support System shall be in place when the Reactor Coolant System is pressurized above atmospheric pressure with fuel in the reactor vessel unless all operable control rods are fully inserted.

3. While the reactor is below 17% power, the Rod Worth Minimizer (RWM) shall be operable while moving control rods except that:

   (a) If the RWM is inoperable during a reactor startup.

      1. Immediately suspend control rod movement except by scram.

      OR

      2.1.a Immediately verify ≥12 rods withdrawn,

      OR

      2.1.b Immediately verify by administrative measures that startup with the RWM inoperable has not been performed in the last 12 months.

      AND

      2.2 During control rod movement, verify movement of control rods is in compliance with banked position withdrawal sequence (BPWS) by a second licensed operator or other qualified member of the technical staff.

4.3 SURVEILLANCE REQUIREMENTS

2. The Control Rod Drive Housing Support System shall be inspected after reassembly.

3. Prior to control rod withdrawal for startup the Rod Worth Minimizer (RWM) shall be verified as operable by performing the following:

   (a) Verify that the control rod withdrawal sequence for the Rod Worth Minimizer computer is correct.

   (b) The Rod Worth Minimizer diagnostic test shall be performed.

3.3 LIMITING CONDITIONS FOR OPERATION	4.3 SURVEILLANCE REQUIREMENTS
(b) If the RWM is inoperable during a reactor shutdown, during control rod movement, verify movement of control rods is in compliance with BPWS by a second licensed operator or other qualified member of the technical staff.	

BASES: 3.3 & 4.3 (Cont'd)

2. The control rod housing support restricts the outward movement of a control rod to less than 3 inches in the extremely remote event of a housing failure. The amount of reactivity which could be added by this small amount of rod withdrawal, which is less than a normal single withdrawal increment, will not contribute to any damage of the primary coolant system. The design basis is given in Subsection 3.5.2 of the FSAR, and the design evaluation is given in Subsection 3.5.4. This support is not required if the reactor coolant system is at atmospheric pressure since there would then be no driving force to rapidly eject a drive housing.

3. In the course of performing normal startup and shutdown procedures, a pre-specified sequence for the withdrawal or insertion of control rods is followed. Control rod dropout accidents which might lead to significant core damage, cannot occur if this sequence of rod withdrawals or insertions is followed. The Rod Worth Minimizer (RWM) restricts withdrawals and insertions to those listed in the pre-specified sequence and provides an additional check that the reactor operator is following prescribed sequence. With the RWM inoperable during a reactor startup or shutdown, the operator is still capable of enforcing the prescribed control rod sequence. However, the defense in depth is reduced since a single operator error can result in violating the control rod sequence. Therefore, control rod movement must be immediately suspended except by scram. Alternatively, startup may continue if at least 12 control rods have already been withdrawn or a reactor startup with an inoperable RWM was not performed in the last 12 months. Once these conditions have been verified by either control room indication or control room logs, the RWM function can be performed manually following a second check of compliance with the prescribed rod sequence by a second licensed operator or other qualified member of the technical staff. The RWM may be bypassed under these conditions to allow continued operation or shutdown. Continuing the startup increases core power, reduces the rod worth and reduces the consequences of dropping any rod. Withdrawal of rods for testing is permitted with the RWM inoperable, if the reactor is subcritical and all other rods are fully inserted. Above 17% power, the RWM is not needed since even with a single error an operator cannot withdraw a rod with sufficient worth, which if dropped, would result in anything but minor consequences.

4. Refer to the "General Electric Standard Application for Reactor Fuel (GESTAR II)," NEDE-24011-P-A, (the latest NRC-approved version will be listed in the COLR).

5. The Source Range Monitor (SRM) system provides a scram function in noncoincident configuration. It does provide the operator with a visual indication of neutron level. The consequences of reactivity accidents are a function of the initial neutron flux. The requirement of at least three counts per second assures that any transient, should it occur, begins at or above the initial value of 10^{-8} of rated power used in the analyses of transients from cold conditions. One operable SRM channel is adequate to monitor the approach to criticality, therefore, two operable SRM's are specified for added conservatism.

BASES: 3.3 & 4.3 (Cont'd)

6. The action statement for TS 3.3.B.6 requires that the plant be placed in HOT SHUTDOWN within 12 hours if the required actions of TS 3.3.B.1 through 3.3.B.5 are not satisfied. This ensures that all insertable control rods are inserted and places the reactor in a condition that does not require the active function (i.e., scram) of the control rods. The allowed completion time of 12 hours is reasonable, based upon operating experience to reach HOT SHUTDOWN from full power in an orderly manner and without challenging plant systems.