September 25, 1996

Mr. Donald A. Reid
Vice President, Operations
Vermont Yankee Nuclear Power Corporation
Ferry Road
Brattleboro, VT 05301

SUBJECT: ISSUANCE OF AMENDMENT FOR VERMONT YANKEE NUCLEAR POWER STATION (TAC NO. M95905)

Dear Mr. Reid:

The Commission has issued the enclosed Amendment No. 148 to Facility Operating License No. DPR-28 for the Vermont Yankee Nuclear Power Station (VYNPS), in response to your application dated June 28, 1996, as supplemented by your letter of August 30, 1996.

The amendment revises the Technical Specifications (TSs) to increase the required shutdown margin. It also revises TSs associated with this shutdown margin increase to allow calculational determination of the highest worth control rod and to relax the action requirements in the event the required shutdown margin is not met. The amendment also makes appropriate editorial changes and minor editorial corrections to the affected TSs.

A copy of the related Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly Federal Register Notice.

Sincerely,

/S/

Craig Harbuck, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosures: 1. Amendment No. 148 to DPR-28
2. Safety Evaluation

cc w/encls: See next page

DOCUMENT NAME: G:\VERMONT\VY95905.AMD

To receive a copy of this document, indicate in the box: "C" = Copy without enclosures "E" = Copy with enclosures "N" = No copy

G VISSING

OFFICE	LA:PDI-1	PM:PDI-1	BC:SRXB	OGC	D:PDI-1
NAME	SLittle	CHarbuck/rsl	RJones		~~JMitchell~~
DATE	09/11/96	09/11/96	09/11/96	09/19/96	~~09/26~~/96

OFFICIAL RECORD COPY

NRC FILE CENTER COPY

D401

9610010083 960925
PDR ADOCK 05000271
P PDR

DATE: September 25, 1986

ISSUANCE OF AMENDMENT NO. 148 TO FACILITY OPERATING LICENSE NO. DPR-28

Docket File
PUBLIC
PDI-1 Reading
S. Varga
G. Vissing
S. Little
D. Dorman
C. Harbuck
OGC
G. Hill (2)
C. Grimes
ACRS
R. Jones

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 25, 1996

Mr. Donald A. Reid
Vice President, Operations
Vermont Yankee Nuclear Power Corporation
Ferry Road
Brattleboro, VT 05301

SUBJECT: ISSUANCE OF AMENDMENT FOR VERMONT YANKEE NUCLEAR POWER STATION (TAC NO. M95905)

Dear Mr. Reid:

The Commission has issued the enclosed Amendment No. 148 to Facility Operating License No. DPR-28 for the Vermont Yankee Nuclear Power Station (VYNPS), in response to your application dated June 28, 1996, as supplemented by your letter of August 30, 1996.

The amendment revises the Technical Specifications (TSs) to increase the required shutdown margin. It also revises TSs associated with this shutdown margin increase to allow calculational determination of the highest worth control rod and to relax the action requirements in the event the required shutdown margin is not met. The amendment also makes appropriate editorial changes and minor editorial corrections to the affected TSs.

A copy of the related Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly Federal Register Notice.

Sincerely,

C. Craig Harbuck, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-271

Enclosures: 1. Amendment No. 148 to DPR-28
2. Safety Evaluation

cc w/encls: See next page

D. Reid
Vermont Yankee Nuclear Power
Corporation

cc:

Regional Administrator, Region I
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

R. K. Gad, III
Ropes & Gray
One International Place
Boston, MA 02110-2624

Mr. Richard P. Sedano, Commissioner
Vermont Department of Public Service
120 State Street, 3rd Floor
Montpelier, VT 05602

Public Service Board
State of Vermont
120 State Street
Montpelier, VT 05602

Chairman, Board of Selectmen
Town of Vernon
P.O. Box 116
Vernon, VT 05354-0116

Mr. Jay Thayer, Vice President
Vermont Yankee Nuclear Power
Corporation
Ferry Road
Brattleboro, VT 05301

Mr. Robert J. Wanczyk, Plant Manager
Vermont Yankee Nuclear Power Station
P.O. Box 157, Governor Hunt Road
Vernon, VT 05354

G. Dana Bisbee, Esq.
Deputy Attorney General
33 Capitol Street
Concord, NH 03301-6937

Resident Inspector
Vermont Yankee Nuclear Power Station
U.S. Nuclear Regulatory Commission
P.O. Box 176
Vernon, VT 05354

Chief, Safety Unit
Office of the Attorney General
One Ashburton Place, 19th Floor
Boston, MA 02108

Mr. David Rodham, Director
ATTN: James Muckerheide
Massachusetts Civil Defense Agency
400 Worcester Rd.
P.O. Box 1496
Framingham, MA 01701-0317

Mr. Raymond N. McCandless
Vermont Division of Occupational
and Radiological Health
Administration Building
Montpelier, VT 05602

Mr. J. J. Duffy
Licensing Engineer
Vermont Yankee Nuclear Power
Corporation
580 Main Street
Bolton, MA 01740-1398

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

VERMONT YANKEE NUCLEAR POWER CORPORATION

DOCKET NO. 50-271

VERMONT YANKEE NUCLEAR POWER STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 148
License No. DPR-28

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment filed by the Vermont Yankee Nuclear Power Corporation (the licensee) dated June 28, 1996, as supplemented August 30, 1996, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Facility Operating License No. DPR-28 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 148 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance, and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Guy S. Vissing, Acting Director
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: September 25, 1996

ATTACHMENT TO LICENSE AMENDMENT NO. 148

FACILITY OPERATING LICENSE NO. DPR-28

DOCKET NO. 50-271

Replace the following pages of the Appendix A, Technical Specifications, with the attached pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change.

Remove	Insert
81	81
-	81a
88	88
89	89
-	89a
91	91
232	232
233	233
238	238

3.3 LIMITING CONDITIONS FOR OPERATION	4.3 SURVEILLANCE REQUIREMENTS
3.3 CONTROL ROD SYSTEM	4.3 CONTROL ROD SYSTEM
Applicability:	Applicability:
Applies to the operational status of the control rod system.	Applies to the surveillance requirements of the control rod system.
Objective:	Objective:
To assure the ability of the control rod system to control reactivity.	To verify the ability of the control rod system to control reactivity.
Specification:	Specification:
A. Reactivity Limitations	A. Reactivity Limitations
1. Reactivity Margin - Core Loading	1. Reactivity Margin - Core Loading
The core loading shall be limited to that which can be made subcritical in the most reactive condition during the operation cycle with the highest worth, operable control rod in its fully withdrawn position and all other operable rods inserted.	Verify that the required SDM is met prior to each in-vessel fuel movement during the fuel loading sequence.
To ensure this capability, the shutdown margin shall be provided as follows any time there is fuel in the core:	Within 4 hours after criticality following fuel movement within the reactor pressure vessel or control rod replacement, verify the required shutdown margin will be met at any time in the subsequent operation cycle with the highest worth operable control rod fully withdrawn and all other operable rods inserted (except as provided in Specifications 3.12.D and 3.12.E).
(a) $\geq$0.38% $\Delta k/k$ with the highest worth rod analytically determined;	
or	
(b) $\geq$0.28% $\Delta k/k$ with the highest worth rod determined by test.	
With the required shutdown margin not met during power operation, either restore the required shutdown margin within 6 hours, or be in hot shutdown within the next 12 hours.	

3.3 LIMITING CONDITIONS FOR OPERATION	4.3 SURVEILLANCE REQUIREMENTS
With the required shutdown margin not met and the mode switch in the "Refuel" position, immediately suspend Alteration of the Reactor Core except for control rod insertion and fuel assembly removal; immediately initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies; within 1 hour, initiate action to restore the integrity of the Secondary Containment System.	
2. Reactivity Margin - Inoperable Control Rods	2. Reactivity Margin - Inoperable Control Rods
Control rod driven which cannot be moved with control rod drive pressure shall be considered inoperable. If a partially or fully withdrawn control rod drive cannot be moved with drive or scram pressure, the reactor shall be brought to a shutdown condition within 48 hours unless investigation demonstrates that the cause of the failure is not due to a failed control rod drive mechanism collet housing. The control rod directional control valves for inoperable control rods shall be	Each partially or fully withdrawn operable control rod shall be exercised one notch at least once each week. This test shall be performed at least once per 24 hours in the event power operation is continuing with two or more inoperable control rods or in the event power operation is continuing with one fully or partially withdrawn rod which cannot be moved and for which control rod drive mechanism damage has not been ruled out. The surveillance need not be completed within 24 hours if the number

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% Δk/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.

F. If Specification 3.3B through D above are not met, an orderly shutdown shall be initiated and the reactor shall be in the cold shutdown condition within 24 hours.

~~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.

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 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

BASES: 3.3 & 4.3 (Cont'd)

many more than the six allowed by the Specification, particularly late in the operation cycle; however, the occurrence of more than six could be indicative of a generic control rod drive problem and the reactor will be shutdown. Also if damage within the control rod drive mechanism and in particular, cracks in drive internal housing, cannot be ruled out, then a generic problem affecting a number of drives cannot be ruled out. Circumferential cracks resulting from stress assisted intergranular corrosion have occurred in the collet housing of drives at several BWRs. This type of cracking could occur in a number of drives and if the cracks propagated until severance of the collet housing occurred, scram could be prevented in the affected rods. Limiting the period of operation with a potentially severed collet housing and requiring increased surveillance after detecting one stuck rod will assure that the reactor will not be operated with a large number of rods with failed collet housings.

B. Control Rods

1. Control rod dropout accidents as discussed in the FSAR can lead to significant core damage. If coupling integrity is maintained, the possibility of a rod dropout accident is eliminated. The overtravel position feature provides a positive check as only uncoupled drives may reach this position. Neutron instrumentation response to rod movement provides a verification that the rod is following its drive.

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

The Control Rod System is designed to bring the reactor subcritical at a rate fast enough to prevent fuel damage. The limiting power transient is that resulting from a turbine stop valve closure with a failure of the Turbine Bypass System. Analysis of this transient shows that the negative reactivity rates resulting from the scram with the average response of all the drives as given in the above specification, provide the required protection, and MCPR remains greater than the fuel cladding integrity safety limit.

The scram times for all control rods shall be determined during each operating cycle. The weekly control rod exercise test serves as a periodic check against deterioration of the Control Rod System and also verifies the ability of the control rod drive to scram. The frequency of exercising the control rods under the conditions of two or more control rods valved out of service provides even further assurance of the reliability of the remaining control rods.

D. Control Rod Accumulators

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. The worst case in a nine-rod withdrawal sequence resulted in a $K_{eff} \leq 1.0$. Other repeating rod sequences with more rods withdrawn resulted in $K_{eff} \geq 1.0$. 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. In addition, they may be normally inserted using the Control-Rod-Drive Hydraulic System. Procedural control will assure that control rods with inoperable accumulators will be spaced in a one-in-nine array rather than grouped together.

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. 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.

3.12 LIMITING CONDITIONS FOR OPERATION

D. Control Rod and Control Rod Drive Maintenance

One control rod may be withdrawn from the core for the purpose of performing control rod and/or control rod drive maintenance provided the following conditions are satisfied:

1. The reactor mode switch shall be locked in the "Refuel" position. All refueling interlocks shall be operable.

2. Specification 3.3.A.1 shall be met, or the control rod directional control valves for a minimum of eight control rods surrounding the drive out of service for maintenance shall be disarmed electrically and sufficient margin to criticality demonstrated.

3. SRMs shall be operable in the core quadrant containing the control rod on which maintenance is being performed and in an adjacent quadrant. The requirements for an SRM to be considered operable are given in Specification 3.12.B.

4.12 SURVEILLANCE REQUIREMENTS

D. Control Rod and Control Rod Drive Maintenance

1. Prior to performing this maintenance, core shutdown margin shall be determined in accordance with Specification 3.3.A.1 to ensure that the core can be made subcritical at any time during the maintenance with the strongest operable control rod fully withdrawn and all other operable rods fully inserted.

2. Alternately, if a minimum of eight control rods surrounding the control rod out of service for maintenance are to be fully inserted and have their directional control valves electrically disarmed, the required shutdown margin shall be met with the strongest control rod remaining in service during the maintenance period fully withdrawn.

3.12 LIMITING CONDITIONS FOR OPERATION	4.12 ~~SURVEILLANCE REQUIREMENTS~~
E. Extended Core Maintenance	E. Extended Core Maintenance
One or more control rods may be withdrawn or removed from the reactor core provided the following conditions are satisfied:	Prior to control rod withdrawal for extended core maintenance, that control rods control cell shall be verified to contain no fuel assemblies.
1. The reactor mode switch shall be locked in the "Refuel" position. The refueling interlock which prevents more than one control rod from being withdrawn may be bypassed on a withdrawn control rod after the fuel assemblies in the cell containing (controlled by) that control rod have been removed from the reactor core. All other refueling interlocks shall be operable.	1. This surveillance requirement is the same as that given in Specification 4.12.A.
2. SRMs shall be operable in the core quadrant where fuel or control rods are being moved, and in an adjacent quadrant. The requirements for an SRM to be considered operable are given in Specification 3.12.B.	2. This surveillance requirement is the same as that given in Specification 4.12.B.
3. If the spiral unload/reload method of core alteration is to be used, the following conditions shall be met:	
a. Prior to spiral unload and reload, the SRMs shall be proven operable as stated in Specification 3.12.B1 and 3.12.B2. However, during spiral unloading, the count rate may drop below 3 cps.	

BASES: 3.12 & 4.12 (Cont'd)

C. To assure that there is adequate water to shield and cool the irradiated fuel assemblies stored in the pool, a minimum pool water level is established. This minimum water level of 36 feet is established because it would be a significant change from the normal level, well above a level to assure adequate cooling (just above active fuel).

D. During certain periods, it is desirable to perform maintenance on a single control rod and/or control rod drive. This specification provides assurance that inadvertent criticality does not occur during such maintenance.

The maintenance is performed with the mode switch in the "Refuel" position to provide the refueling interlocks normally available during refueling operations as explained in Part A of these Bases. Refueling interlocks restrict the movement of control rods and the operation of the refueling equipment to reinforce operational procedures that prevent the reactor from becoming critical during refueling operations. During refueling operations, no more than one control rod is permitted to be withdrawn from a core cell containing one or more fuel assemblies. The refueling interlocks use the "full-in" position indicators to determine the position of all control rods. If the "full-in" position signal is not present for every control rod, then the "all-rods-in" permissive for the refueling equipment interlocks is not present and fuel loading and control rod withdrawal is prevented. The refuel position one-rod-out interlock will not allow the withdrawal of a second control rod. The requirement that an adequate shutdown margin be determined with the control rods remaining in service ensures that inadvertent criticality cannot occur during this maintenance. Disarming the directional control valves does not inhibit control rod scram capability.

E. The intent of this specification is to permit the unloading of a portion of the reactor core for such purposes as inservice inspection requirements, examination of the core support plate, control rod, control rod drive maintenance, etc. This specification provides assurance that inadvertent criticality does not occur during such operation.

This operation is performed with the mode switch in the "Refuel" position to provide the refueling interlocks normally available during refueling as explained in the Bases for Specification 3.12.A. In order to withdraw more than one control rod, it is necessary to bypass the refueling interlock on each withdrawn control rod which prevents more than one control rod from being withdrawn at a time. The requirement that the fuel assemblies in the cell controlled by the control rod be removed from the reactor core before the interlock can be bypassed ensures that withdrawal of another control rod does not result in inadvertent criticality. Each control rod essentially provides reactivity control for the fuel assemblies in the cell associated with that control rod. Thus, removal of an entire cell (fuel assemblies plus control rod) results in a lower reactivity potential of the core.

One method available for unloading or reloading the core is the spiral unload/reload. A spiral unloading pattern is one by which the fuel in the outermost cells (four fuel bundles surrounding a control rod) is removed first. Unloading continues by unloading the remaining outermost fuel by cell spiralling inward towards the center cell which is the last cell removed. Spiral reloading is reverse of unloading, with the exception that two (2) diagonally adjacent bundles, which have previously accumulated exposure in-core, are placed next to each of the 4 SRMs before the actual spiral reloading begins. The spiral reload then begins in the center cell and spirals outward until the core is fully loaded.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 148 TO FACILITY OPERATING LICENSE NO. DPR-28

VERMONT YANKEE NUCLEAR POWER CORPORATION

VERMONT YANKEE NUCLEAR POWER STATION

DOCKET NO. 50-271

1.0 INTRODUCTION

By letter dated June 28, 1996, as supplemented by letter dated August 30, 1996, the Vermont Yankee Nuclear Power Corporation (the licensee) submitted a request for changes to the Vermont Yankee Nuclear Power Station (VYNPS) Technical Specifications (TSs). The proposed changes would increase the required shutdown margin to allow the highest worth control rod to be determined by calculation as well as by testing. In addition, the licensee proposed to relax the action requirements in the event the required shutdown margin is not met. Appropriate editorial changes and minor editorial corrections to the affected specifications were also proposed. The August 30, 1996, letter provided clarifying information that did not change the scope of the June 28, 1996, application or affect the initial proposed no significant hazards consideration determination.

The safety objective of establishing shutdown margin limits is to ensure that inadvertent criticalities and potential control rod drop accidents (CRDAs) will not cause significant fuel damage, which could result in undue release of radioactivity. Consequently, to prevent significant fuel damage in the event of an inadvertent criticality or a CRDA, the TS require maintaining the shutdown margin within the established limit whenever fuel is present in the reactor vessel.

2.0 EVALUATION

The licensee has proposed to increase the current limit of 0.25 percent $\Delta k/k$ on shutdown margin in TSs 4.3.A.1, 4.12.D.1, and 4.12.D.2 to $\geq$ 0.28% $\Delta k/k$ with the highest worth rod determined by test, as currently done, and $\geq$ 0.38% $\Delta k/k$ with the highest worth rod determined analytically. The new limits would be given in the limiting condition for operation (LCO), TS 3.3.A.1, rather than in the associated surveillance requirement, TS 4.3.A.1, as currently done. TS 3.12.D would specify the same shutdown margin limits by referencing TS 3.3.A.1. The higher value of 0.38% $\Delta k/k$ provides conservative margin in consideration of the additional uncertainty that is introduced when the highest worth rod is not determined by actual measurement. However, as the licensee pointed out in its submittal, this provision will provide additional flexibility in refueling outage operations which require a shutdown margin demonstration. This flexibility in performing maintenance eliminates, for example, the need to completely remove all fuel from a maintenance cell to perform a control rod drive replacement. This,

in turn will reduce the number of times a fuel bundle is handled and thus the likelihood of a fuel handling event. The proposed increase is acceptable because it offers additional assurance that significant fuel damage will not occur in the event of an inadvertent criticality or a CRDA, and because of the potential benefit to safety from the added flexibility in performing maintenance.

The licensee proposed the following additional changes to accompany the increased shutdown margin limits.

(a) In the event the shutdown margin required by TS 3.3.A.1 is not met, TS 3.3.F specifies that "an orderly shutdown shall be initiated and the reactor shall be in the cold shutdown condition within 24 hours." These action requirements are replaced by the following less restrictive action requirements in revised TS 3.3.A.1: "With the required shutdown margin not met during power operation, either restore the required shutdown margin within 6 hours, or be in hot shutdown within the next 12 hours." The 6-hour allowance to restore the required shutdown margin is acceptable, considering that the reactor can still be shut down, assuming no failures of additional control rods to insert, and the low probability of an event occurring during this interval. The 12-hour allowance is reasonable, based on operating experience, to reach hot shutdown from full power conditions in an orderly manner and without challenging plant systems, and is therefore acceptable. There is no need to further cool down the plant to cold shutdown, as currently required, because in hot shutdown the plant is already in a safe condition. Therefore, deleting the cold shutdown requirement is acceptable.

(b) The applicability requirements of TS 3.12.D, "Control Rod and Control Rod Drive Maintenance," and TS 3.12.E, "Extended Core Maintenance," are revised as follows.

(1) TS 3.12.D states that "*A maximum of two non-adjacent control rods separated by more than two control cells in any direction* may be withdrawn from the core for the purpose of performing control rod and/or control rod drive maintenance" provided certain conditions are satisfied. The preceding words given in italics are replaced with the words "One control rod" thus limiting the application of this LCO to the performance of maintenance on one control rod and its associated control rod drive mechanism at a time.

The conditions that must be satisfied to perform control rod maintenance under this LCO are also revised. The first condition specified by TS 3.12.D contains the following statement, "The refueling interlock which prevents more than one control rod from being withdrawn may be bypassed for one of the control rods on which maintenance is being performed." This bypass allowance is deleted. This is acceptable because the revised LCO only allows one control to be withdrawn at a time for maintenance, making the bypass allowance unnecessary. The second and third conditions, as revised, only

contain minor editorial changes consistent with the change in the LCO applicability. In addition, the wording of the third condition, TS 3.12.D.3, is simplified to be consistent with the wording of similar condition in TS 3.12.E.2, regarding source range monitor operability. These editorial improvements are acceptable because they are purely administrative.

(2) TS 3.12.E states that "*More than two* control rods may be withdrawn from the reactor core" provided certain conditions are satisfied. The preceding words given in italics are replaced with the words "One or more" thus adding to the applicability of this LCO the withdrawal of one control rod for extended core maintenance. Also, the words "or removed" are inserted following the word withdrawn to change the LCO to state that "One or more control rods may be withdrawn or removed from the reactor core" provided certain conditions are satisfied. This last change only clarifies the intent of the current LCO and is consistent with plant practice. Thus, it does not remove or add any restrictions. Therefore, it is an acceptable administrative change.

As revised, both TS 3.12.D and 3.12.E appear to apply whenever maintenance on just one control rod is needed. However, the conditions that must be satisfied to perform such maintenance under these two LCOs make it clear that maintenance under TS 3.12.D is not to be conducted in conjunction with other core alterations associated with refueling; such a situation is covered by TS 4.12.E.

Overall, the preceding changes to TS 3.12.D and 3.12.E result in more restrictive TS controls over control rod and control rod drive maintenance. The conduct of maintenance on two control rods simultaneously may no longer be accomplished under the conditions and surveillances specified in TS 3/4.12.D, but under the more restrictive conditions and surveillances of TS 3/4.12.E. The procedural controls imposed by the requirements of these TSs, such as placing the reactor mode switch in the refuel position, verification of the required shutdown margin, source range monitor operability, and refueling interlock operability, will prevent the reactor from becoming critical during control rod maintenance and during refueling operations. Thus, the proposed changes to TS 3/4.12.D and 3/4.12.E will result in increased safety margins and are, therefore, acceptable.

The licensee also proposed changes to the Bases for TS 3.3.A.1, 3.3.E, 3.12.D, and 3.12.E to address the proposed changes discussed above and to replace the unit "Δk", that occurs in several places in the specifications and the Bases, with the correct unit for reactivity "$\Delta k/k$." The staff has reviewed the proposed Bases changes and has no objection to them.

The staff notes that the proposed changes are consistent with corresponding provisions in Specifications 3.1.1, "Shutdown Margin," 3.10.3, "Single Control Rod Withdrawal-Hot Shutdown," 3.10.4, "Single Control Rod Withdrawal-Cold

Shutdown," and 3.10.6, "Multiple Control Rod Withdrawal-Refueling," in NUREG-1433, "Standard Technical Specifications, General Electric Plants, BWR/4," Revision 1, dated April 1995.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Vermont State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes requirements with respect to installation or use of facility components located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (61 FR 20860). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: C. Harbuck

Date: September 25, 1996