TECHNICAL EVALUATION REPORT

BWR SCRAM DISCHARGE VOLUME LONG-TERM MODIFICATIONS

VERMONT YANKEE NUCLEAR POWER CORPORATION
VERMONT YANKEE NUCLEAR POWER STATION

NRC DOCKET NO. 50-271
NRC TAC NO. 42229
NRC CONTRACT NO. NRC-03-81-130

FRC PROJECT C5506
FRC ASSIGNMENT 2
FRC TASK 64

Prepared by

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Prepared for

Nuclear Regulatory Commission
Washington, D.C. 20555

Lead NRC Engineer: K. Eccleston

June 11, 1982

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CONTENTS

SUMMARY

This technical evaluation report reviews and evaluates the Vermont Yankee submittal concerning proposed Phase 1 changes in the Vermont Yankee Nuclear Power Station Technical Specifications for scram discharge volume (SDV) long-term modifications regarding surveillance requirements for SDV vent and drain valves and the limiting condition for operation (LCO)/surveillance requirements for reactor protection system and control rod withdrawal block SDV limit switches. Conclusions were based on the degree of compliance of the Licensee's submittal with criteria from the U.S. Nuclear Regulatory Commission (NRC) staff's Model Technical Specifications.

The Licensee's submittal dated October 14, 1980 was not responsive to the NRC's July 7, 1980 request [2] for proposed Technical Specifications changes. The NRC sent an additional letter dated March 6, 1981 to the Licensee requesting a commitment to propose revised Technical Specifications at least 3 months in advance of long-term modification completion dates. Since no answer was received from the Licensee, this TER is based on the first, nonresponsive submittal of October 14, 1980, and subsequent information obtained from the Lead NRC Engineer.

The agreed-upon revision of the Vermont Yankee Technical Specifications to require verifying that each SDV drain and vent valve is open at least once per 31 days and cycling each valve quarterly in accordance with the Vermont Yankee Inservice Inspection Program meets the NRC staff's Model Technical Specification requirements of paragraphs 4.1.3.1.1a and 4.1.3.1.1b, respectively.

Page 22, Table 4.1.1 of the Vermont Yankee Technical Specifications does not meet the surveillance requirements for reactor protection system SDV limit switches of the NRC staff's Model Technical Specifications, paragraph 4.3.1.1 and Table 4.3.1.1-1, which require Channel Functional Test for SDV water level-high not every 3 months, as specified at Vermont Yankee, but monthly. However, the Licensee is installing a second instrument volume containing four additional limit switches, for a total of eight limit switches for the reactor

protection system. This increases significantly the reliability of the system and provides technical bases for acceptance of the Channel Functional Test every 3 months as required in the present Vermont Yankee Technical Specifications.

There is a discrepancy between the Vermont Yankee Technical Specifications requirements, page 47, Table 3.2.5, and the actual SDV system in regard to control rod withdrawal block instrumentation. The specifications call for two trip systems; the actual Vermont Yankee SDV system has only one trip system with one instrument channel containing one limit switch for control rod withdrawal block. To eliminate the above discrepancy and make the existing system acceptable, the Licensee agreed to incorporate the following note or its equivalent concerning page 47, Table 3.2.5, for Function, Scram Discharge Volume Water Level-High:

> "Note (1) is not appplicable to this function. There shall be one operable or operating trip system for this function."

The remaining surveillance requirements are met by page 47 (Table 3.2.5), to be revised as indicated above, and pages 19 (Table 3.1.1), 25 (Table 4.1.2), 59 (Table 4.2.5), and 72 without any revision. Table 5-1 on pages 24 and 25 of this report summarizes the evaluation results.

1. INTRODUCTION

1.1 PURPOSE OF THE TECHNICAL EVALUATION

The purpose of this technical evaluation report (TER) is to review and evaluate the Vermont Yankee submittal concerning the proposed changes in the Technical Specifications of the Vermont Yankee Nuclear Power Station boiling water reactor (BWR) in regard to "BWR Scram Discharge Volume Long Term Modification," specifically:

- surveillance requirements for scram discharge volume (SDV) vent and drain valves
- limiting condition for operation (LCO)/surveillance requirements for the reactor protection system limit switches
- LCO/surveillance requirements for the control rod withdrawal block SDV limit switches.

The evaluation used criteria proposed by the NRC staff in Model Technical Specifications (see Appendix A of this report). This effort is directed toward the NRC objective of increasing the reliability of installed BWR scram discharge volume systems, the need for which was made apparent by events described below.

1.2 GENERIC ISSUE BACKGROUND

On June 13, 1979, while the reactor at Hatch Unit 1 was in the refuel mode, two SDV high level switches had been modified, tested, and found inoperable. The remaining switches were operable. Inspection of each inoperable level switch revealed a bent float rod binding against the side of the float chamber.

On October 19, 1979, Brunswick Unit 1 reported that water hammer due to slow closure of the SDV drain valve during a reactor scram damaged several pipe supports on the SDV drain line. Drain valve closure time was approximately 5 minutes because of a faulty solenoid controlling the air supply to the valve. After repair, to avoid probable damage from a scram, the unit was started with the SDV vent and drain valves closed except for periodic draining. During

this mode of operation, the reactor scrammed due to a high water level in the SDV system without prior actuation of either the high level alarm or rod block switch. Inspection revealed that the float ball on the rod block switch was bent, making the switches inoperable. The water hammer was reported to be the cause of these level switch failures.

As a result of these events involving common-cause failures of SDV limit switches and SDV drain valve operability, the NRC issued IE Bulletin 80-14, "Degradation of BWR Scram Discharge Volume Capability," on June 12, 1980 [1]. In addition, to strengthen the provisions of this bulletin and to ensure that the scram system would continue to work during reactor operation, the NRC sent a letter dated July 7, 1980 [2] to all operating BWR licensees requesting that they propose Technical Specifications changes to provide surveillance requirements for reactor protection system and control rod block SDV limit switches. The letter also contained the NRC staff's Model Technical Specifications to be used as a guide by licensees in preparing their submittals.

Meanwhile, during a routine shutdown of the Browns Ferry Unit 3 reactor on June 28, 1980, 76 of 185 control rods failed to insert fully. Full insertion required two additional manual scrams and an automatic scram for a total elapsed time of approximately 15 minutes between the first scram initiation and the complete insertion of all the rods. On July 3, 1980, in response to both this event and the previous events at Hatch Unit 1 and Brunswick Unit 1, the NRC issued (in addition to the earlier IE Bulletin 80-14) IE Bulletin 80-17 followed by five supplements. These initiated short-term and long-term programs described in "Generic Safety Evaluation Report BWR Scram Discharge System," NRC Staff, December 1, 1980 [9] and "Staff Report and Evaluation of Supplement 4 to IE Bulletin 80-17 (Continuous Monitoring Systems)" [10].

Analysis and evaluation of the Browns Ferry Unit 3 and other SDV system events convinced the NRC staff that SDV systems in all BWRs should be modified to assure long-term SDV reliability. Improvements were needed in three major areas: SDV-IV hydraulic coupling, level instrumentation, and system isolation. To achieve these objectives, an Office of Nuclear Reactor Regulation (NRR) task force and a subgroup of the BWR Owners Group developed Revised Scram Discharge

System Design and Safety Criteria for use in establishing acceptable SDV systems modifications [9]. Also, an NRC letter dated October 1, 1980 requested all operating BWR licensees to reevaluate installed SDV systems and modify them as necessary to comply with the revised criteria.

In Reference 9, the SDV-IV hydraulic coupling at the Big Rock Point, Brunswick 1 & 2, Duane Arnold, and Hatch 1 & 2 BWRs was judged acceptable. The remaining BWRs will require modification to meet the revised SDV-IV hydraulic coupling criteria, and all operating BWRs may require modification to meet the revised instrumentation and isolation criteria. The changes in Technical Specifications associated with this effort will be carried out in two phases:

Phase 1 - Improvements in surveillance for vent and drain valves and instrument volume level switches.

Phase 2 - Technical Specifications improvements required as a result of long-term modifications made to comply with revised design and performance criteria.

This TER is a review and evaluation of Technical Specifications changes proposed for phase I.

1.3 PLANT-SPECIFIC BACKGROUND

The July 7, 1980 NRC letter not only requested all BWR licensees to amend their facilities' Technical Specifications with respect to control rod drive SDV capability, but enclosed the NRC staff's proposed Model Technical Specifications (see Appendix A of this TER) as a guide for the licensees in preparing the requested submittals and as a source of criteria for an FRC technical evaluation of the submittals. This TER reviews and evaluates the Vermont Yankee Nuclear Power Station Technical Specifications submitted on October 14, 1980 (see Appendix B) by the Licensee, the Vermont Yankee Nuclear Power Corporation (VYNP), in regard to "BWR Scram Discharge Volume (SDV) Long-Term Modifications" and, specifically, the surveillance requirements for SDV vent and drain valves and the LCO/surveillance requirements for the reactor protection system and control rod withdrawal block SDV limit switches. The adequacy with which the VYNP information documented compliance with the NRC staff's Model Technical Specifications has also been assessed.

2. REVIEW CRITERIA

The criteria established by the NRC staff's Model Technical Specifications involving surveillance requirements of the main SDV components and instrumentation cover three areas of concern:

- o surveillance requirements for SDV vent and drain valves
- o LCO/surveillance requirements for reactor protection system SDV limit switches
- o LCO/surveillance requirements for control rod block SDV limit switches.

2.1 SURVEILLANCE REQUIREMENTS FOR SDV DRAIN AND VENT VALVES

The surveillance criteria of the NRC staff's Model Technical Specification for SDV drain valves are:

> "4.1.3.1.1 - The scram discharge volume drain and vent valves shall be demonstrated OPERABLE at least once per 31 days by:
>
> a. Verifying each valve to be open*, and
> b. Cycling each valve at least one complete cycle of full travel.
>
> *These valves may be closed intermittently for testing under administrative controls."

The Model Technical Specifications require testing the drain and vent valves at least once every 31 days, checking that each valve is fully open during normal operation, and cycling each valve at least one complete cycle of full travel under adminstrative controls.

Full opening of each valve during normal operation indicates that there is no degradation in the control air system and its components that control the air pressure to the pneumatic actuators of the drain and vent valves. Cycling each valve checks whether the valve opens fully and whether its movement is smooth, jerky, or oscillatory.

During normal operation, the drain and vent valves stay in the open position for very long periods. A silt of particulates such as metal chips and

flakes, various fibers, lint, sand, and weld slag from the water or air may accumulate at moving parts of the valves and temporarily "freeze" them. A strong breakout force may be needed to overcome this temporary "freeze," producing a violent jerk which may induce a severe water hammer if it occurs during a scram or a scram resetting. Periodic cycling of the drain and vent valves is the best method to clear the effects of particulate silting, thus promoting smooth opening and closing and more reliable valve operation. Also, in case of improper valve operation, cycling can indicate whether excessive pressure transients may be generated during and after a reactor scram which might damage the SDV piping system and cause a loss of system integrity or function.

2.2 LCO/SURVEILLANCE REQUIREMENTS FOR REACTOR PROTECTION SYSTEM SDV LIMIT SWITCHES

The paragraphs of the NRC staff's Model Technical Specifications pertinent to LCO/surveillance requirements for reactor protection system SDV limit switches are:

> "3.3.1 - As a minimum, the reactor protection system instrumentation channels shown in Table 3.3.1-1 shall be OPERABLE with the REACTOR PROTECTION SYSTEM RESPONSE TIME as shown in Table 3.3.1-2.

Table 3.3.1-1. Reactor Protection System Instrumentation

Functional Unit	Applicable Operational Conditions	Minimum Operable Channels Per Trip System (a)	Action
8. Scram Discharge Volume Water Level-High	1,2,5 (h)	2	4

Table 3.3.1-2. Reactor Protection System Response Times

Functional Unit	Response Time (Seconds)
8. Scram Discharge Volume Water Level-High	NA

"4.3.1.1 - Each reactor protection system instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST, and CHANNEL CALIBRATION operations for the OPERATIONAL CONDITIONS and at the frequencies shown in Table 4.3.1.1-1.

Table 4.3.1.1-1. Reactor Protection System Instrumentation Surveillance Requirements

Functional Unit	Channel Check	Channel Functional Test	Channel Calibration	Operational Conditions in Which Surveillance Required
8. Scram Discharge Volume Water Level-High	NA	M	R	1,2,5

Notation (a) A channel may be placed in an inoperable status up to 2 hours for required surveillance without placing the trip system in the tripped condition provided at least one OPERABLE channel in the same trip system is monitoring that parameter.

(h) With any control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2

Action 4: In OPERATIONAL CONDITION 1 or 2, be in at least HOT SHUTDOWN within 6 hours.

In OPERATIONAL CONDITION 5, suspend all operations involving CORE ALTERATIONS* and fully insert all insertable control rods within one hour.

*Except movement of IRM, SRM or special movable detectors, or replacement of LPRM strings provided SRM instrumentation is OPERABLE per Specification 3.9.2."

Paragraph 3.3.1 and Table 3.3.1-1 of the Model Technical Specifications require the functional unit of SDV water level-high to have at least 2 operable channels containing 2 limit switches per trip system, a total of 4 operable channels containing 4 limit switches per 2 trip systems for the reactor protection system, which automatically initiates a scram. The technical objective of these requirements is to provide 1-out-of-2-taken-twice

logic for the reactor protection system. The response time of the reactor protection system for the functional unit of SDV water level-high should be measured and kept available (it is not given in Table 3.3.1-2).

Paragraph 4.3.1.1 and Table 4.3.1.1-1 give reactor protection system instrumentation surveillance requirements for the functional unit of SDV water level-high. Each reactor protection system instrumentation channel containing a limit switch should be shown to be operable by the Channel Functional Test monthly and Channel Calibration at each refueling outage.

2.3 LCO/SURVEILLANCE REQUIREMENTS FOR CONTROL ROD WITHDRAWAL BLOCK SDV VOLUME LIMIT SWITCHES

The NRC staff's Model Technical Specifications specify the following LCO/surveillance requirements for control rod withdrawal block SDV limit switches:

> "3.3.6 The control rod withdrawal block instrumentation channel shown in Table 3.3.6-1 shall be OPERABLE with trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3.6-2.

Table 3.3.6-1. Control Rod Withdrawal Block Instrumentation

Trip Function	Minimum Operable Channels Per Trip Function	Applicable Operational Conditions	Action
5. Scram Discharge Volume			
a. Water level-high	2	1, 2, 5**	62
b. Scram trip bypassed	1	(1, 2, 5**)	62

ACTION 62: With the number of OPERABLE channels less than required by the minimum OPERABLE channels per Trip Function requirement, place the inoperable channel in the tripped condition within one hour.

**With more than one control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

Table 3.3.6-2 Control Rod Withdrawal Block Instrumentation Setpoints

Trip Function	Trip Setpoint	Allowable Value
5. Scram Discharge Volume		
a. Water level-high	NA	NA
b. Scram trip bypassed	NA	NA

4.3.6. Each of the above control rod withdrawal block trip systems and instrumentation channels shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL CONDITIONS and at the frequencies shown in Table 4.3.6-1.

Table 4.3.6-1. Control Rod Withdrawal Block Instrumentation Surveillance Requirements

Trip Function	Channel Check	Channel Functional Test	Channel Calibration	Operational Conditions in Which Surveillance Required
5. Scram Discharge Volume				
a. Water Level-High	NA	Q	R	1, 2, 5**
b. Scram Trip Bypassed	NA	M	NA	(1, 2, 5**)

**With more than one control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2."

Paragraph 3.3.6 and Table 3.3.6-1 of the Model Technical Specifications require the control rod withdrawal block instrumentation to have at least 2 operable channels containing 2 limit switches for SDV water level-high and 1 operable channel containing 1 limit switch for SDV scram trip bypassed. The technical objective of these requirements is to have at least one channel containing one limit switch available to monitor the SDV water level when the other channel with a limit switch is being tested or undergoing maintenance. The trip setpoint for control rod withdrawal block instrumentation monitoring

SDV water level-high should be specified as indicated in Table 3.3.6-2. The trip function prevents further withdrawal of any control rod when the control rod block SDV limit switches indicate water level-high.

Paragraph 4.3.6 and Table 4.3.6-1 require that each control rod withdrawal block instrumentation channel containing a limit switch be shown to be operable by the Channel Functional Test once per 3 months for SDV water level-high, by the Channel Functional Test once per month for SDV scram trip bypassed, and by Channel Calibration at each refueling outage for SDV water level-high.

The Surveillance Criteria of the BWR Owners Subgroup given in Appendix A, "Long-Term Evaluation of Scram Discharge System," of "Generic Safety Evaluation Report BWR Scram Discharge System," written by the NRC staff and issued on December 1, 1980, are:

1. Vent and drain valves shall be periodically tested.

2. Verifying and level detection instrumentation shall be periodically tested in place.

3. The operability of the entire system as an integrated whole shall be demonstrated periodically and during each operating cycle, by demonstrating scram instrument response and valve function at pressure and temperature at approximately 50% control rod density.

Analysis of the above criteria indicates that the NRC staff's Model Technical Specifications requirements, the acceptance criteria for the present TER, fully cover the BWR Owners Subgroup Surveillance Criteria 1 and 2 and partially cover Criterion 3.

3. METHOD OF EVALUATION

The VYNP submittal for the Vermont Yankee Nuclear Power Station was evaluated in two stages, initial and final.

During the initial evaluation, only the NRC staff's Model Technical Specifications requirements were used to determine if:

- the Licensee's submittal was responsive to the July 7, 1980 NRC request for proposed Technical Specifications changes involving the surveillance requirements of the SDV vent and drain valves, LCO/surveillance requirements for reactor protection system SDV limit switches, and LCO/surveillance requirements for control rod block SDV limit switches
- the submitted information was sufficient to permit a detailed technical evaluation.

During the final evaluation, in addition to the NRC staff's Model Technical Specifications requirements, background material in References 1 through 10, pertinent sections of the Vermont Yankee Nuclear Power Station Final Safety Analysis Report (FSAR), and the Vermont Yankee Technical Specifications were studied to determine the technical bases for the design of SDV main components and instrumentation. Subsequently, the Licensee's response was compared directly to the requirements of the NRC staff's Model Technical Specifications. The findings of the final evaluation are presented in Section 4 of this report.

The initial evaluation concluded that the Licensee's first submittal dated October 14, 1980 was not responsive to the NRC's July 7, 1980 request for proposed Technical Specifications changes. The NRC sent a letter dated March 6, 1981 to the Licensee requesting a commitment to propose revised Technical Specifications at least 3 months in advance of long-term modification completion dates. Since no answer was received from the Licensee, this TER is based on the first, non-responsive submittal of October 14, 1980, and subsequent information obtained from the Lead NRC Engineer.

4. TECHNICAL EVALUATION

4.1 SURVEILLANCE REQUIREMENTS FOR SDV DRAIN AND VENT VALVES

NRC STAFF'S MODEL TECHNICAL SPECIFICATIONS

Paragraph 4.1.3.1.1 requires demonstrating that the SDV drain and vent valves are operable by:

a. verifying each valve to be open at least once per 31 days (valves may be closed intermittently for testing under administrative controls)

b. cycling each valve at least one complete cycle of full travel at least once per 92 days.

LICENSEE RESPONSE

The Licensee responded as follows:

"Our positions on the NRC proposals are listed below.

1. Operability of SDV Vent and Drain Valves

Model STS - Would require the subject valves to be tested and timed:
a) after every shutdown of greater than 120 days
b) every 120 days during normal operation

Model STS would also require that the SDV vent and drain valves be verified open at least once per 31 days.

Vermont Yankee Position - The subject valves at Vermont Yankee are tested and timed in accordance with the Vermont Yankee Inservice Inspection Program. The program requires that this testing be done quarterly and is therefore more conservative than the change proposed by the NRC.

Vermont Yankee agrees with the position that the vent and drain valves be verified open at least once per month. This requirement will be administratively enforced until such time as this minor change can be included in another proposed change submittal."

According to information received from the NRC on June 3, 1982, the Licensee agreed to revise the Vermont Yankee Technical Specifications to

require verifying that each SDV drain and vent valve is open at least once per 31 days, and cycling each valve quarterly in accordance with the Vermont Yankee Inservice Inspection Program.

EVALUATION

The agreed-upon revision of the Vermont Yankee Technical Specifications to require verifying that each SDV drain and vent valve is open at least once per 31 days and cycling each valve quarterly in accordance with the Vermont Yankee Inservice Inspection Program meets the NRC staff's Model Technical Specifications requirements of paragraphs 4.1.3.1.1a and 4.1.3.1.1b, respectively.

4.2 LCO/SURVEILLANCE REQUIREMENTS FOR REACTOR PROTECTION SYSTEM SDV LIMIT SWITCHES

NRC STAFF'S MODEL TECHNICAL SPECIFICATIONS

Paragraph 3.3.1 and Table 3.3.1-1 require the functional unit of SDV water level-high to have at least 2 operable channels containing 2 limit switches per trip system, a total of 4 operable channels containing 4 limit switches per 2 trip systems for the reactor protection system which automatically initiates scram.

Paragraph 3.3.1 and Table 3.3.1-2 concern the response time of the reactor protection system for the functional unit of SDV water level-high which should be specified for each BWR (it is not specified in the table). Paragraph 4.3.1.1 and Table 4.3.1.1-1 require that each reactor protection system instrumentation channel containing a limit switch be shown to be operable for the functional unit of SDV water level-high by the Channel Functional Test monthly and Channel Calibration at each refueling outage. The applicable operational conditions for these requirements are Startup, Run, and Refuel.

LICENSEE RESPONSE

The Vermont Yankee position is given below:

"2. Surveillance Requirements for SDIV High Water Level Scram

Model STS - Would require:
a) channel functional test every 31 days
b) channel calibration every 18 months

Vermont Yankee Position - Current Technical Specification requires
a) channel functional test every 3 months
b) channel calibration every refueling (12 months)

Vermont Yankee believes that the testing interval for this trip should not be reduced for the following reasons:

1) Calibration is done concurrent with the functional test on a quarterly basis. Past functional testing of this trip has been highly successful with no instances of failed SDIV level switches due in any part to float assembly misoperation.

2) Tripling the frequency of functional testing in this area would unnecessarily increase personnel exposure."

The following corrections should be made in the Licensee's statements: "Model STS - Would require: a. channel functional test every 31 days" (it should be monthly); "b. channel calibration every 18 months" (it should be each refueling outage).

Page 19 of the Vermont Yankee Technical Specifications contains Table 3.1.1, Reactor Protection System (Scram) Instrument Requirements, which provides the following information for Trip Function, Scram Discharge Volume High Level:

"1. Trip Settings: $\leq$ 24 gallons

2. Modes in Which Functions Must be Operating: Refuel (1), Startup, Run.

3. Minimum Number Operating Instrument Channels Per Trip System (2): 2

4. Required Conditions When Minimum Conditions For Operation Are Not Satisfied (3): A"

Notes:

"1. When the reactor is subcritical and the reactor water temperature is less than 212°F, only the following trip functions need to be operable:

a. mode switch in shutdown
b. manual scram
c. high flux IRM* or high flux SRM in coincidence
d. scram discharge volume high water level.

2. Whenever an instrument system is found to be inoperable, the instrument system output relay shall be tripped immediately. Except for MSIV & Turbine Stop Valve Position, this action shall result in tripping the trip system."

In addition, the Vermont Yankee FSAR provides this information on page 3.4-13: "At the third (highest) level, the four level switches (two for each reactor protection system trip system) initiate a scram to shut down the reactor while sufficient free volume is still present to receive the scram discharge." The above information is applicable to the NRC staff's Model Technical Specifications requirements of paragraph 3.3.1 and Table 3.3.1-1.

The requirements of paragraph 3.3.1 and Table 3.3.1-2 are covered in the Vermont Yankee Technical Specifications in Section 3.3 (page 72) and in Section 4.3 (Control Rod System, paragraph C: Scram Insertion Times), which include the reactor protection system SDV water level-high response time from scram time tests.

The applicable information to cover the NRC staff's Model Technical Specifications requirements of paragraph 4.3.1.1 and Table 4.3.1.1-1 is found on pages 22 and 25 of the Vermont Yankee Specifications. Page 22 contains Table 4.1.1 (Scram Instrumentation and Logic Systems, Functional Tests, Minimum Functional Test Frequencies for Safety Instrumentation, Logic Systems and Control Circuits), with the following information for Instrument Channel High Water Level in Scram Discharge Volume:

"1. Group (3): A
2. Functional Test (7): Trip Channel and Alarm
3. Minimum Frequency (4): Every 3 months"

*The Vermont Yankee Technical Specifications state IDM; it should be IRM.

Notes:

"3. A description of the three groups is included in the basis of this Specification." (See page 31 of the Vermont Yankee Technical Specifications.)

"4. Functional tests are not required when the systems are not required to be operable or are tripped. If tests are missed, they shall be performed prior to returning the systems to an operable status.

7. A functional test of the logic of each channel is performed as indicated. This coupled with placing the mode switch in shutdown each refueling outage constitutes a logic system functional test of the scram system."

Table 4.1.2, Scram Instrument Calibration Minimum Calibration Frequencies for Reactor Protection Instrument Channels, on page 25 contains the following information for Instrument Channel High Water Level in Scram Discharge Volume:

"1. Group (1): A

2. Calibration Standard (4): Water Level

3. Minimum Frequency (2): Refueling Outage"

Notes:

"1. A description of the three groups is included in the bases of this specification." (See page 31 of the Vermont Yankee Technical Specifications.)

"2. Calibration tests are not required when the systems are not required to be operable or are tripped. If tests are missed, they shall be performed prior to returning the systems to an operable status.

4. Response time is not part of the routine instrument check and calibration, but will be checked every operating cycle."

According to information received from the NRC on June 3, 1982, the Licensee is installing a second instrument volume containing four additional limit switches, for a total of eight limit switches for the reactor protection system.

EVALUATION

Page 19, Table 3.1.1 of the Vermont Yankee Technical Specifications complies with the NRC staff's Model Technical Specifications requirements of para-

graph 3.3.1 and Table 3.3.1-1. The Vermont Yankee reactor protection system SDV water level-high instrumentation consists of 2 operable channels containing 2 limit switches per trip system, for a total of 4 operable channels containing 4 limit switches per 2 trip systems, making 1-out-of-2-taken-twice logic. Page 19, Table 3.1.1 also specifies $\leq$ 24 gallons as a trip setting for scram initiation and applicable operating conditions of Refuel, Startup, and Run, which are acceptable.

Although the Vermont Yankee Technical Specifications do not directly specify the reactor protection system SDV water level-high response time, as required in the NRC staff's Model Technical Specifications, paragraph 3.3.1 and Table 3.3.1-2, they have the requirements for scram time tests, which include the required response time (see Section 3.3C, page 72; and Section 4.3C, Scram Insertion Times). This approach is acceptable, since the reactor protection system SDV water level-high response time can be deduced from the scram time tests.

Page 22, Table 4.1.1 of the Vermont Yankee Technical Specifications does not comply with the NRC staff's Model Technical Specifications requirements of paragraph 4.3.1.1 and Table 4.3.1.1-1 that the reactor protection system SDV water level-high be tested monthly by the Channel Functional Test, and not every 3 months as specified in the Vermont Yankee Technical Specifications. However, the Licensee is installing a second instrument volume containing four additional limit seitches, for a total of eight limit switches for the reactor protection system. This increases significantly the reliability of the system and provides technical bases for acceptance of the Channel Functional Test every 3 months as required in the present Vermont Yankee Technical Specifications.

4.3 LCO/SURVEILLANCE REQUIREMENTS FOR CONTROL ROD WITHDRAWAL BLOCK SDV LIMIT SWITCHES

NRC STAFF'S MODEL TECHNICAL SPECIFICATIONS

Paragraph 3.3.6 and Table 3.3.6-1 require the control rod withdrawal block instrumentation to have at least 2 operable channels containing 2 limit switches for SDV water level-high, and 1 operable channel containing 1 limit

switch for SDV trip bypassed. Paragraph 3.3.6 also requires specifying the trip setpoint for control rod withdrawal block instrumentation monitoring SDV water level-high as indicated in Table 3.3.6-2

Paragraph 4.3.6 and Table 4.3.6-1 require each control rod withdrawal block instrumentation channel containing a limit switch to be shown to be operable by the Channel Functional Test once per 3 months for SDV water level-high, once per month for SDV scram trip bypassed, and Channel Calibration at each refueling outage for SDV water level-high.

LICENSEE RESPONSE

In regard to LCO/surveillance requirements for control rod withdrawal block SDV limit switches, the Licensee's response was as follows:

"3. Technical Specification Requirement for Control Rod Block on SDIV High Water Level Scram Bypass

Model STS - Contains requirement for this rod block function to be operable when the mode switch is in Run, Startup/Hot Standby, or Shutdown or Refuel. Associated testing and calibration requirements are also provided.

Vermont Yankee Position - Vermont Yankee does not feel that this requirement is justified for the following reasons:

1) Plant design at Vermont Yankee does not allow the SDIV high water level scram to be bypassed unless the mode switch is in the shutdown or refuel position. In these modes, a low power rod block is concurrently provided by the IRM system as well as by the high level scram bypass switch.

2) At Vermont Yankee the SDIV rod block can only be reset by draining the SDIV to a point below the 12 gallon control rod block setpoint. This assures that during the period of time that the SDIV high water level trip is bypassed to allow draining of the SDIV a rod block is present until the water level drops below the rod block setpoint."

Page 47, Table 3.2.5 (Control Rod Block Instrumentation) of the Vermont Yankee Technical Specifications provides the following information for Trip Function, Scram Discharge Volume:

"1. Minimum Number of Operable Instrument Channels per Trip System (Note 1): 1

2. Modes in Which Function Must be Operable: Refuel, Startup, Run

3. Trip Setting: $\leq$ 12 gallons"

Note 1:

"There shall be two operable or tripped trip systems for each function in the required operating mode. If the minimum number of operable instruments are not available for one of the two trip systems, this condition may exist for up to seven days provided that during the time the operable system is functionally tested immediately and daily thereafter; if the condition lasts longer than seven days, the system shall be tripped. If the minimum number of instrument channels are not available for both trip systems, the systems shall be tripped."

The information provided on page 59, Table 4.2.5 (Minimum Test and Calibration Frequencies, Control Rod Block Instrumentation) is as follows regarding Trip Function, High Water Level in Scram Discharge Volume:

"1. Functional Test: every 3 months

2. Calibration: Refueling Outage."

The Licensee agreed to incorporate the following note or its equivalent concerning page 47, Table 3.2.5, for Function, Scram Discharge Volume Water Level-High:

"NOTE (1) is not applicable to this function. There shall be one operable or operating trip system for this function."

EVALUATION

The existing Vermont Yankee Technical Specifications, page 47, Table 3.2.5 (Control Rod Block Instrumentation) require "two operable or tripped trip systems for each function," and one trip system should have at least one operable instrument channel, making a total of two operable instrument channels per two trip systems. Page 3.4-13 of the Vermont Yankee Nuclear Power Station FSAR indicates that the present control rod withdrawal block instrumentation has only one trip system with one instrument channel containing one limit switch.

Thus, the actual Vermont Yankee SDV system in regard to control rod withdrawal block instrumentation does not comply with the existing Vermont Yankee Technical Specifications requirements of Table 3.2.5, page 47. However, there are technical bases which make the Licensee's existing system acceptable as long as the existing Vermont Yankee Technical Specifications are corrected.

In addition to the control rod withdrawal block channel containing one limit switch with a 12-gallon trip setpoint for water level-high, Vermont Yankee has another SDV level switch set at a lower point which initiates an alarm for operator action (see Vermont Yankee FSAR, page 3.4-13). Reference 9, page 50, states Design Criterion 9, "Instrumentation shall be provided to aid the operator in the detection of water accumulation in the instrumented volume(s) prior to scram initiation," gives the Technical Basis for "Long-Term Evaluation of Scram Discharge System," and defines Acceptable Compliance, "The present alarm and rod block instrumentation meets the criterion given adequate hydraulic coupling with the SDV headers." Thus, if the Vermont Yankee scram discharge system is modified (long term) so that the hydraulic coupling between scram discharge header and instrumented volume is adequate and acceptable, then the present alarm and rod block instrumentation meets NRC requirements, since the Licensee agreed to incorporate the following note or its equivalent concerning page 47, Table 3.2.5, for Function, Scram Discharge Volume Water Level-High:

> "Note (1) is not applicable to this function. There shall be one operable or operating trip system for this function."

The specified trip setting for control rod withdrawal block SDV water level-high of $\leq$ 12 gallons meets the NRC staff's Model Technical Specifications requirements of paragraph 3.3.6 and Table 3.3.6-2 and is acceptable.

Page 59, Table 4.2.5 of the Vermont Yankee Technical Specifications complies with the NRC staff's Model Technical Specifications requirements of paragraph 3.3.6 and Table 3.3.6-2; it requires the Channel Functional Test once per 3 months for the control rod withdrawal block instrumentation channel containing a limit switch and Channel Calibration each refueling outage for SDV water level-high.

5. CONCLUSIONS

Table 5-1 summarizes the results of the final review and evaluation of the Vermont Yankee submittal concerning Phase 1 proposed Technical Specifications changes for SDV long-term modification in regard to surveillance requirements for SDV vent and drain valves and LCO/surveillance requirements for reactor protection system and control rod block SDV limit switches. The following conclusions were reached:

- The Licensee did not propose any changes in the Vermont Yankee Technical Specifications. The Licensee's submittal was not responsive to the NRC's July 7, 1980 request for proposed Technical Specifications changes.

Since then, according to information received from the NRC on June 3, 1982, the Licensee agreed to the required revision of the Vermont Yankee Specifications to meet the NRC staff's Model Technical Specifications requirements.

- The Licensee agreed to revise the Vermont Yankee Technical Specifications to require verifying that each SDV drain and vent valve is open at least once per 31 days, and cycling each valve quarterly in accordance with the Vermont Yankee Inservice Inspection Program. This revision complies with the NRC staff's Model Technical Specifications requirements of paragraphs 4.1.3.1.1a and 4.1.3.1.1b, respectively.

- Page 22, Table 4.1.1 of the Vermont Yankee Technical Specifications does not meet the surveillance requirements for reactor protection system SDV limit switches of the NRC staff's Model Technical Specifications, paragraph 4.3.1.1 and Table 4.3.1.1-1, which require the Channel Functional Test monthly for SDV water level-high, not every 3 months. However, the Licensee is installing a second instrument volume containing four additional limit switches, for a total of eight limit switches for the reactor protection system. This increases significantly the reliability of the system and provides techincal bases for acceptance of the Channel Functional Test every 3 months as required in the present Vermont Yankee Technical Specifications.

- There is a discrepancy between the Vermont Yankee Technical Specifications requirements (page 47, Table 3.2.5) and the actual Vermont Yankee SDV system in regard to control rod withdrawal block instrumentation. The specifications call for two trip systems; the actual Vermont Yankee SDV system has only one trip system with one instrument channel containing one limit switch for control rod

withdrawal block. To eliminate the above discrepancy, the Licensee agreed to incorporate the following note or its equivalent concerning page 47, Table 3.2.5, for Function, Scram Discharge Volume Water Level-High:

"Note (1) is not applicable to this function. There shall be one operable or operating trip system for this function."

- The remaining surveillance requirements are met by pages 19 (Table 3.1.1), 25 (Table 4.1.2), 59 (Table 4.2.5), and 72 without any revision and page 47 (Table 3.2.5) with revision as indicated above.

Table 5-1 Evaluation of Phase 1 Proposed Technical Specifications Changes for Scram Discharge Volume Long-Term Modifications Vermont Yankee Nuclear Power Station

Surveillance Requirements	Technical Specifications: NRC Staff Model (Paragraph)	Technical Specifications: Proposed by Licensee	Evaluation
SDV DRAIN AND VENT VALVES			
Verity each valve open	Once per 31 days (4.1.3.1.1a)	Once per month (See page 14 of this TER)	Acceptable
Cycle each valve one complete cycle	Once per 31 days (4.1.3.1.1b)	Quarterly (See page 14 of this TER)	Acceptable
REACTOR PROTECTION SYSTEM SDV LIMIT SWITCHES			
Minimum operable channels per trip system	2 (3.3.1, Table 3.3.1-1)	2 (p. 19, Table 3.1.1)	Acceptable
SDV water level-high response time	NA (3.3.1, Table 3.3.1-2)	NA (p. 72, Scram Insertion Times)	Acceptable
SDV water level-high			
Channel functional test	Monthly (3.1.1, Table 4.3.1.1-1 and page 18 of this TER)	Every 3 months (p.22, Table 4.1.1 and page 18 of this TER)	Acceptable
Channel calibration	Each refueling (4.3.1.1, Table 4.3.1.1-1)	Each refueling (p. 25, Table 4.1.2)	Acceptable

Table 5-1 (Cont.)

Surveillance Requirements	Technical Specifications: NRC Staff Model (Paragraph)	Technical Specifications: Proposed by Licensee	Evaluation
CONTROL ROD BLOCK SDV LIMIT SWITCHES			
Minimum operable channels per trip function			
SDV water level-high	2 (3.3.6, Table 3.3.6-1)	1 per 1 trip system (p. 47, Table 3.2.5 with revision, see p. 20)	Acceptable*
SDV scram trip bypassed	1 (3.3.6, Table 3.3.6-1)	NA (p. 47, Table 3.2.5)	
SDV water level-high			
Trip setpoint	NA (3.3.6, Table 3.3.6-2)	≤12 gallons (p. 47, Table 3.2.5)	Acceptable
Channel functional test	Quarterly (4.3.6, Table 4.3.6-1)	Every 3 months (p. 59, Table 4.2.5)	Acceptable
Channel calibration	Each refueling (4.3.6, Table 4.3.6-1)	Each refueling (p. 59, Table 4.2.5)	Acceptable
SDV scram trip bypassed			
Channel functional test	Monthly (4.3.6, Table 4.3.6-1)	NA	Acceptable*

* See Reference 9, p. 50, and pp. 20 and 21 of this TER.

6. REFERENCES

1. "Degradation of BWR Scram Discharge Volume Capability"
   NRC, Office of Inspection and Enforcement, June 12, 1980
   IE Bulletin 80-14

2. D. G. Eisenhut (NRR)
   Letter "To All Operating Boiling Water Reactors (BWRs)" with enclosure, "Model Technical Specifications"
   July 7, 1980

3. "Failure of 76 of 185 Control Rods to Fully Insert During a Scram at a BWR"
   NRC, Office of Inspection and Enforcement, July 3, 1980
   IE Bulletin 80-17

4. Supplement 1, "Failure of 76 of 185 Control Rods to Fully Insert During a Scram at a BWR"
   NRC, Office of Inspection and Enforcement, July 18, 1980
   IE Bulletin 80-17

5. Supplement 2, "Failures Revealed by Testing Subsequent to Failure of Control Rods to Insert During a Scram at a BWR"
   NRC, Office of Inspection and Enforcement, July 22, 1980
   IE Bulletin 80-17

6. Supplement 3, "Failure of Control Rods to Insert During a Scram at a BWR"
   NRC, Office of Inspection and Enforcement, August 22, 1980
   IE Bulletin 80-17

7. Supplement 4, "Failure of Control Rods to Insert During a Scram at a BWR"
   NRC, Office of Inspection and Enforcement, December 18, 1980
   IE Bulletin 80-17

8. Supplement 5, "Failure of Control Rods to Insert During a Scram at a BWR"
   NRC, Office of Inspection and Enforcement, February 13, 1981
   IE Bulletin 80-17

9. P. S. Check (NRR)
   Memorandum with enclosure, "Generic Safety Evaluation Report BWR Scram Discharge System"
   December 1, 1980

10. P. S. Check (NRR)
    Memorandum with enclosure, "Staff Report and Evaluation of Supplement 4 to IE Bulletin 80-17"
    June 10, 1981

APPENDIX A

NRC STAFF'S MODEL TECHNICAL SPECIFICATIONS*

* Note: Applicable changes are marked by vertical lines in the margins.

REACTIVITY CONTROL SYSTEMS

LIMITING CONDITION FOR OPERATION (Continued)

ACTION (Continued)

2. If the inoperable control rod(s) is inserted, within one hour disarm the associated directional control valves either:

   a) Electrically, or

   b) Hydraulically by closing the drive water and exhaust water isolation valves.

3. Otherwise, be in at least HOT SHUTDOWN within the next 12 hours.

c. With more than 8 control rods inoperable, be in at least HOT SHUTDOWN within 12 hours.

SURVEILLANCE REQUIREMENTS

4.1.3.1.1 The scram discharge volume drain and vent valves shall be demonstrated OPERABLE at least once per 31 days by:

a. Verifying each valve to be open,* and

b. Cycling each valve through at least one complete cycle of full travel.

4.1.3.1.2 When above the preset power level of the RWM and RSCS, all withdrawn control rods not required to have their directional control valves disarmed electrically or hydraulically shall be demonstrated OPERABLE by moving each control rod at least one notch:

a. At least once per 7 days, and

b. At least once per 24 hours when any control rod is immovable as a result of excessive friction or mechanical interference.

4.1.3.1.3 All control rods shall be demonstrated OPERABLE by performance of Surveillance Requirements 4.1.3.2, 4.1.3.4, 4.1.3.5, 4.1.3.6 and 4.1.3.7.

*These valves may be closed intermittently for testing under administrative controls.

REACTIVITY CONTROL SYSTEMS

CONTROL ROD MAXIMUM SCRAM INSERTION TIMES

LIMITING CONDITION FOR OPERATION

2.1.3.2 The maximum scram insertion time of each control rod from the fully withdrawn position to notch position (6), based on de-energization of the scram pilot valve solenoids as time zero, shall not exceed (7.0) seconds.

APPLICABILITY: OPERATIONAL CONDITIONS 1 and 2.

ACTION:

With the maximum scram insertion time of one or more control rods exceeding (7.0) seconds:

a. Declare the control rod(s) with the slow insertion time inoperable, and

b. Perform the Surveillance Requirements of Specification 4.1.3.2.c at least once per 60 days when operation is continued with three or more control rods with maximum scram insertion times in excess of (7.0) seconds, or

c. Be in at least HOT SHUTDOWN within 12 hours.

SURVEILLANCE REQUIREMENTS

4.1.3.2 The maximum scram insertion time of the control rods shall be demonstrated through measurement with reactor coolant pressure greater than or equal to 950 psig and, during single control rod scram time tests, the control rod drive pumps isolated from the accumulators:

a. For all control rods prior to THERMAL POWER exceeding 40% of RATED THERMAL POWER following CORE ALTERATIONS or after a reactor shutdown that is greater than 120 days,

b. For specifically affected individual control rods following maintenance on or modification to the control rod or control rod drive system which could affect the scram insertion time of those specific control rods, and

c. For 10% of the control rods, on a rotating basis, at least once per 120 days of operation.

3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR PROTECTION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the reactor protection system instrumentation channels shown in Table 3.3.1-1 shall be OPERABLE with the REACTOR PROTECTION SYSTEM RESPONSE TIME as shown in Table 3.3.1-2.

APPLICABILITY: As shown in Table 3.3.1-1.

ACTION:

a. With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement for one trip system, place at least one inoperable channel in the tripped condition within one hour.

b. With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement for both trip systems, place at least one inoperable channel in at least one trip system* in the tripped condition within one hour and take the ACTION required by Table 3.3.1-1.

c. The provisions of Specification 3.0.3 are not applicable in OPERATIONAL CONDITION 5.

SURVEILLANCE REQUIREMENTS

4.3.1.1 Each reactor protection system instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL CONDITIONS and at the frequencies shown in Table 4.3.1.1-1.

4.3.1.2 LOGIC SYSTEM FUNCTIONAL TESTS and simulated automatic operation of all channels shall be performed at least once per 18 months.

4.3.1.3 The REACTOR PROTECTION SYSTEM RESPONSE TIME of each reactor trip function shown in Table 3.3.1-2 shall be demonstrated to be within its limit at least once per 18 months. Each test shall include at least one logic train such that both logic trains are tested at least once per 36 months and one channel per function such that all channels are tested at least once every N times 18 months where N is the total number of redundant channels in a specific reactor trip function.

* If both channels are inoperable in one trip system, select at least one inoperable channel in that trip system to place in the tripped condition, except when this would cause the Trip Function to occur.

TABLE 3.3.1-1 (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	APPLICABLE OPERATIONAL CONDITIONS	MINIMUM OPERABLE CHANNELS PER TRIP SYSTEM (a)	ACTION
8. Scram Discharge Volume Water Level - High	1, 2, 5(h)	2	4
9. Turbine Stop Valve - Closure	1(i)	4(j)	7
10. Turbine Control Valve Fast Closure, Trip Oil Pressure - Low	1(i)	2(j)	7
11. Reactor Mode Switch in Shutdown Position	1, 2, 3, 4, 5	1	8
12. Manual Scram	1, 2, 3, 4, 5	1	9

TABLE 3.3.1-1 (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION

ACTION

ACTION 1 - In OPERATIONAL CONDITION 2, be in at least HOT SHUTDOWN within 6 hours.

In OPERATIONAL CONDITION 5, suspend all operations involving CORE ALTERATIONS* and fully insert all insertable control rods within one hour.

ACTION 2 - Lock the reactor mode switch in the Shutdown position within one hour.

ACTION 3 - Be in at least STARTUP within 2 hours.

ACTION 4 - In OPERATIONAL CONDITION 1 or 2, be in at least HOT SHUTDOWN within 6 hours.

In OPERATIONAL CONDITION 5, suspend all operations involving CORE ALTERATIONS* and fully insert all insertable control rods within one hour.

ACTION 5 - Be in at least HOT SHUTDOWN within 6 hours.

ACTION 6 - Be in STARTUP with the main steam line isolation valves closed within 2 hours or in at least HOT SHUTDOWN within 6 hours.

ACTION 7 - Initiate a reduction in THERMAL POWER within 15 minutes and reduce turbine first stage pressure to ≤ (250) psig, equivalent to THERMAL POWER less than (30)% of RATED THERMAL POWER, within 2 hours.

ACTION 8 - In OPERATIONAL CONDITION 1 or 2, be in at least HOT SHUTDOWN within 6 hours.

In OPERATIONAL CONDITION 3 or 4, verify all insertable control rods to be fully inserted within one hour.

In OPERATIONAL CONDITION 5, suspend all operations involving CORE ALTERATIONS* and fully insert all insertable control rods within one hour.

ACTION 9 In OPERATIONAL CONDITION 1 or 2, be in at least HOT SHUTDOWN within 6 hours.

In OPERATIONAL CONDITION 3 or 4, lock the reactor mode switch in the Shutdown position within one hour.

In OPERATIONAL CONDITION 5, suspend all operations involving CORE ALTERATIONS* and fully insert all insertable control rods within one hour.

*Except movement of IRM, SRM or special movable detectors, or replacement of LPRM strings provided SRM instrumentation is OPERABLE per Specification 3.9.2.

TABLE 3.3.1-1 (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION

TABLE NOTATIONS

(a) A channel may be placed in an inoperable status for up to 2 hours for required surveillance without placing the trip system in the tripped condition provided at least one OPERABLE channel in the same trip system is monitoring that parameter.

b) The "shorting links" shall be removed from the RPS circuitry prior to and during the time any control rod is withdrawn* and shutdown margin demonstrations performed per Specification 3.10.3.

(c) An APRM channel is inoperable if there are less than 2 LPRM inputs per level or less than (11) LPRM inputs to an APRM channel.

(d) These functions are not required to be OPERABLE when the reactor pressure vessel head is unbolted or removed per Specification 3.10.1.

(e) This function shall be automatically bypassed when the reactor mode switch is not in the Run position.

(f) This function is not required to be OPERABLE when PRIMARY CONTAINMENT INTEGRITY is not required.

(g) Also actuates the standby gas treatment system.

(h) With any control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

(i) These functions are automatically bypassed when turbine first stage pressure is $\leq$ (250) psig, equivalent to THERMAL POWER less than (30)% of RATED THERMAL POWER.

(j) Also actuates the EDC-RPT system.

*Not required for control rods removed per Specification 3.9.10.1 or 3.9.10.2.

TABLE 3.3.1-2

REACTOR PROTECTION SYSTEM RESPONSE TIMES

FUNCTIONAL UNIT	RESPONSE TIME (Seconds)
1. Intermediate Range Monitors:	
a. Neutron Flux - Upscale	NA
b. Inoperative	NA
2. Average Power Range Monitor*:	
a. Neutron Flux - Upscale, (15)%	NA
b. Flow Biased Simulated Thermal Power - Upscale	≤ (0.09)**
c. Fixed Neutron Flux - Upscale, (118)%	≤ (0.09)
d. Inoperative	NA
e. LPRM	NA
3. Reactor Vessel Steam Dome Pressure - High	≤ (0.55)
4. Reactor Vessel Water Level - Low, Level 3	≤ (1.05)
5. Main Steam Line Isolation Valve - Closure	≤ (0.06)
6. Main Steam Line Radiation - High	NA
7. Primary Containment Pressure - High	NA
8. Scram Discharge Volume Water Level - High	NA
9. Turbine Stop Valve - Closure	≤ (0.06)
10. Turbine Control Valve Fast Closure, Trip Oil Pressure - Low	≤ (0.08)#
11. Reactor Mode Switch in Shutdown Position	NA
12. Manual Scram	NA

*Neutron detectors are exempt from response time testing. Response time shall be measured from the detector output or from the input of the first electronic component in the channel. (This provision is not applicable to Construction Permits docketed after January 1, 1978. See Regulatory Guide 1.18, November 1977.)

**Not including simulated thermal power time constant.

#Measured from start of turbine control valve fast closure.

TABLE 4.3.1.1-1 (Continued)

REACTOR PROTECTION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION	OPERATIONAL CONDITIONS IN WHICH SURVEILLANCE REQUIRED
8. Scram Discharge Volume Water Level - High	NA	M	R	1, 2, 5
9. Turbine Stop Valve - Closure	NA	M	R	1
10. Turbine Control Valve Fast Closure Trip Oil Pressure - Low	NA	M	Q	1
11. Reactor Mode Switch in Shutdown Position	NA	R	NA	1, 2, 3, 4, 5
12. Manual Scram	NA	M	NA	1, 2, 3, 4, 5

(a) Neutron detectors may be excluded from CHANNEL CALIBRATION.
(b) Within 24 hours prior to startup, if not performed within the previous 7 days.
(c) The IRM and SRM channels shall be determined to overlap for at least ( ) decades during each startup and the IRM and APRM channels shall be determined to overlap for at least ( ) decades during each controlled shutdown, if not performed within the previous 7 days.
(d) This calibration shall consist of the adjustment of the APRM channel to conform to the power values calculated by a heat balance during OPERATIONAL CONDITION 1 when THERMAL POWER ≥ 25% of RATED THERMAL POWER. Adjust the APRM channel if the absolute difference greater than 2%. Any APRM channel gain adjustment made in compliance with Specification 3.2.2 shall not be included in determining the absolute difference.
(e) This calibration shall consist of the adjustment of the APRM readout to conform to a calibrated flow signal.
(f) The LPRMs shall be calibrated at least once per 1000 effective full power hours (EFPH) using the TIP system.

INSTRUMENTATION

3/4.3.6 CONTROL ROD WITHDRAWAL BLOCK INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.6. The control rod withdrawal block instrumentation channels shown in Table 3.3.6-1 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3.6-2.

APPLICABILITY: As shown in Table 3.3.6-1.

ACTION:

a. With a control rod withdrawal block instrumentation channel trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3.6-2, declare the channel inoperable until the channel is restored to OPERABLE status with its trip setpoint adjusted consistent with the Trip Setpoint value.

b. With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, take the ACTION required by Table 3.3.6-1.

c. The provisions of Specification 3.0.3 are not applicable in OPERATIONAL CONDITION 5.

SURVEILLANCE REQUIREMENTS

4.3.6 Each of the above required control rod withdrawal block trip systems and instrumentation channels shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL FUNCTIONAL TEST and CHANNEL CALIBRATION operations for the OPERATIONAL CONDITIONS and at the frequencies shown in Table 4.3.6-1.

TABLE 3.3.6-1

CONTROL ROD WITHDRAWAL BLOCK INSTRUMENTATION

TRIP FUNCTION	MINIMUM OPERABLE CHANNELS PER TRIP FUNCTION	APPLICABLE OPERATIONAL CONDITIONS	ACTION
1. ROD BLOCK MONITOR[a]			
a. Upscale	2	1*	60
b. Inoperative	2	1*	60
c. Downscale	2	1*	60
2. APRM			
a. Flow Biased Simulated Thermal Power - Upscale	4	1	61
b. Inoperative	4	1, 2, 5	61
c. Downscale	4	1	61
d. Neutron Flux - Upscale, Startup	4	2, 5	61
3. SOURCE RANGE MONITORS			
a. Detector not full in[b]	3	2	61
	2	5	61
b. Upscale[c]	3	2	61
	2	5	61
c. Inoperative[c]	3	2	61
	2	5	61
d. Downscale[d]	3	2	61
	2	5	61
4. INTERMEDIATE RANGE MONITORS			
a. Detector not full in [e]	6	2, 5	61
b. Upscale	6	2, 5	61
c. Inoperative	6	2, 5	61
d. Downscale[e]	6	2, 5	61
5. SCRAM DISCHARGE VOLUME			
a. Water Level-High	2	1, 2, 5**	62
b. Scram Trip Bypassed	1	1, 2, 5**	62
6. REACTOR COOLANT SYSTEM RECIRCULATION FLOW			
a. Upscale	2	1	62
b. Inoperative	2	1	62
c. (Comparator) (Downscale)	2	1	62

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TABLE 3.3.6-1 (Continued)

CONTROL ROD WITHDRAWAL BLOCK INSTRUMENTATION

ACTION

ACTION 60 - Take the ACTION required by Specification 3.1.4.3.

ACTION 61 - With the number of OPERABLE Channels:

a. One less than required by the Minimum OPERABLE Channels per Trip Function requirement, restore the inoperable channel to OPERABLE status within 7 days or place the inoperable channel in the tripped condition within the next hour.

b. Two or more less than required by the Minimum OPERABLE Channels per Trip Function requirement, place at least one inoperable channel in the tripped condition within one hour.

ACTION 62 - With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip Function requirement, place the inoperable channel in the tripped condition within one hour.

NOTES

* With THERMAL POWER ≥ (20)% of RATED THERMAL POWER.

** With more than one control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

a. The RBM shall be automatically bypassed when a peripheral control rod is selected.

b. This function shall be automatically bypassed if detector count rate is > 100 cps or the IRM channels are on range (2) or higher.

c. This function shall be automatically bypassed when the associated IRM channels are on range 8 or higher.

d. This function shall be automatically bypassed when the IRM channels are on range 3 or higher.

e. This function shall be automatically bypassed when the IRM channels are on range 1.

TABLE 3.3.6-2

CONTROL ROD WITHDRAWAL BLOCK INSTRUMENTATION SETPOINTS

TRIP FUNCTION	TRIP SETPOINT	ALLOWABLE VALUE
1. ROD BLOCK MONITOR		
a. Upscale	$\leq$ 0.66 W + (40)%	$\leq$ 0.66 W + (43)%
b. Inoperative	NA	NA
c. Downscale	$\geq$ (5)% of RATED THERMAL POWER	$\geq$ (3)% of RATED THERMAL POWER
2. APRM		
a. Flow Biased Simulated Thermal Power - Upscale	$\leq$ 0.66 W + (42)%*	$\leq$ 0.66 W + (45)%*
b. Inoperative	NA	NA
c. Downscale	$\geq$ (5)% of RATED THERMAL POWER	$\geq$ (3)% of RATED THERMAL POWER
d. Neutron Flux - Upscale Startup	$\leq$ (12)% of RATED THERMAL POWER	$\leq$ (14)% of RATED THERMAL POWER
3. SOURCE RANGE MONITORS		
a. Detector not full in	NA	NA
b. Upscale	$\leq (2 \times 10^5)$ cps	$\leq (5 \times 10^5)$ cps
c. Inoperative	NA	NA
d. Downscale	$\geq$ (3) cps	$\geq$ (2) cps
4. INTERMEDIATE RANGE MONITORS		
a. Detector not full in	NA	NA
b. Upscale	$\leq$ (108/125) of full scale	$\leq$ (110/125) of full scale
c. Inoperative	NA	NA
d. Downscale	$\geq$ (5/125) of full scale	$\geq$ (3/125) of full scale
5. SCRAM DISCHARGE VOLUME		
a. Water Level High	$\leq$ (18) gallons	$\leq$ (18) gallons
b. Scram Trip Bypassed	NA	NA
6. REACTOR COOLANT SYSTEM RECIRCULATION FLOW		
a. Upscale	$\leq$ (___/___) of full scale	$\leq$ (___/___) of full scale
b. Inoperative	NA	NA
c. (Comparator) (Downscale)	$\leq$ (10)% flow deviation	$\leq$ (__)% flow deviation

*The Average Power Range Monitor rod block function is varied as a function of recirculation loop flow (W). The trip setting of this function must be maintained in accordance with Specification 3.2.2.

TABLE 4.3.6-1

CONTROL ROD WITHDRAWAL BLOCK INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TRIP FUNCTION	CHANNEL CHECK	CHANNEL FUNCTIONAL TEST	CHANNEL CALIBRATION[a]	OPERATIONAL CONDITIONS IN WHICH SURVEILLANCE REQUIRED
1. ROD BLOCK MONITOR				
a. Upscale	NA	S/U[b],M	Q	1*
b. Inoperative	NA	S/U[b],M	NA	1*
c. Downscale	NA	S/U[b],M	Q	1*
2. APRM				
a. Flow Biased Simulated Thermal Power - Upscale	NA	S/U[b],M	Q	1
b. Inoperative	NA	S/U[b],M	NA	1, 2, 5
c. Downscale	NA	S/U[b],M	Q	1
d. Neutron Flux - Upscale, Startup	NA	S/U[b],M	Q	2, 5
3. SOURCE RANGE MONITORS				
a. Detector not full in	NA	S/U[b],W[c]	NA	2, 5
b. Upscale	NA	S/U[b],W[c]	Q	2, 5
c. Inoperative	NA	S/U[b],W[c]	NA	2, 5
d. Downscale	NA	S/U[b],W[c]	Q	2, 5
4. INTERMEDIATE RANGE MONITORS				
a. Detector not full in	NA	S/U[b],W[c]	NA	2, 5
b. Upscale	NA	S/U[b],W[c]	Q	2, 5
c. Inoperative	NA	S/U[b],W[c]	NA	2, 5
d. Downscale	NA	S/U[b],W[c]	Q	2, 5
5. SCRAM DISCHARGE VOLUME				
a. Water Level-High	NA	Q	R	1, 2, 5**
b. Scram Trip Bypassed	NA	M	NA	1, 2, 5**
6. REACTOR COOLANT SYSTEM RECIRCULATION FLOW				
a. Upscale	NA	S/U[b],M	Q	1
b. Inoperative	NA	S/U[b],M	NA	1
c. (Comparator) (Downscale)	NA	S/U[b],M	Q	1

TABLE 4.3.6-1 (Continued)

CONTROL ROD WITHDRAWAL BLOCK INSTRUMENTATION SURVEILLANCE REQUIREMENTS

NOTES:

a. Neutron detectors may be excluded from CHANNEL CALIBRATION.

b. Within 24 hours prior to startup, if not performed within the previous 7 days.

c. When making an unscheduled change from OPERATIONAL CONDITION 1 to OPERATIONAL CONDITION 2, perform the required surveillance within 12 hours after entering OPERATIONAL CONDITION 2.

* With THERMAL POWER $\geq$ (20)% of RATED THERMAL POWER.

** With any control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2.

APPENDIX B

VERMONT YANKEE NUCLEAR POWER CORPORATION LETTER OF OCTOBER 14, 1980

AND

SUBMITTAL WITH PROPOSED TECHNICAL SPECIFICATIONS CHANGES

FOR

VERMONT YANKEE NUCLEAR POWER STATION

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8010210336 DOC.DATE: 80/10/14 NOTARIZED: NO DOCKET #
FACIL:50-271 Vermont Yankee Nuclear Power Station, Vermont Yankee 05000271
AUTH.NAME AUTHOR AFFILIATION
SMITH,R.L. Vermont Yankee Nuclear Power Corp.
RECIP.NAME RECIPIENT AFFILIATION
Office of Nuclear Reactor Regulation, Director

SUBJECT: Responds to NRC 800707 ltr requesting scram discharge vol Tech Spec changes.Util agrees that vent & drain valves be verified open min of once per month.Requirement for control rod block on high water level scram bypass not justified.

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VERMONT YANKEE NUCLEAR POWER CORPORATION

SEVENTY SEVEN GROVE STREET
RUTLAND, VERMONT 05701

B.3.2.1
WVY 80-146

REPLY TO:
ENGINEERING OFFICE
TURNPIKE ROAD
WESTBORO, MASSACHUSETTS 01581
TELEPHONE 617-366-9011

October 14, 1980

United States Nuclear Regulatory Commission
Washington, DC 20555

Attention: Office of Nuclear Reactor Regulation

References: (a) License No. DPR-28 (Docket No. 50-271)
(b) Letter D. G. Eisenhut to All Operating Boiling Water Reactors, dated July 7, 1980

Subject: Response to NRC Request for Scram Discharge Volume Technical Specification Changes

Dear Sir:

Reference (b) requested that Vermont Yankee amend the station Technical Specifications with respect to control rod drive scram discharge volume (SDV) capability. Guidance was given in the form of model standardized technical specifications (STS) which provided increased surveillance requirements for SDV vent and drain valves and LCO/surveillance requirements for RPS and Control Rod Block SDIV limit switches. Vermont Yankee has reviewed the proposed amendment with respect to our facility and our current technical specifications. Our positions on the NRC proposals are listed below.

1) Operability of SDV Vent and Drain Valves

Model STS - Would require the subject valves to be tested and timed:
a) after every shutdown of greater than 120 days
b) every 120 days during normal operation

Model STS would also require that the SDV vent and drain valves be verified open at least once per 31 days.

Vermont Yankee Position - The subject valves at Vermont Yankee are tested and timed in accordance with the Vermont Yankee Inservice Inspection Program. The program requires that this testing be done quarterly and is therefore more conservative than the change proposed by the NRC.

Vermont Yankee agrees with the position that the vent and drain valves be verified open at least once per month. This requirement will be administratively enforced until such time as this minor change can be included in another proposed change submittal.

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2) Surveillance Requirements for SDIV High Water Level Scram

Model STS - Would require:
a) channel functional test every 31 days
b) channel calibration every 18 months

Vermont Yankee Position - Current Technical Specification requires
a) channel functional test every 3 months
b) channel calibration every refueling (12 months)

Vermont Yankee believes that the testing interval for this trip should not be reduced for the following reasons:
1) Calibration is done concurrent with the functional test on a quarterly basis. Past functional testing of this trip has been highly successful with no instances of failed SDIV level switches due in any part to float assembly misoperation.
2) Tripling the frequency of functional testing in this area would unnecessarily increase personnel exposure.

3) Technical Specification Requirement for Control Rod Block on SDIV High Water Level Scram Bypass

Model STS - Contains requirement for this rod block function to be operable when the mode switch is in Run, Startup/Hot Standby, or Shutdown or Refuel. Associated testing and calibration requirements are also provided.

Vermont Yankee Position - Vermont Yankee does not feel that this requirement is justified for the following reasons:
1) Plant design at Vermont Yankee does not allow the SDIV high water level scram to be bypassed unless the mode switch is in the shutdown or refuel position. In these modes, a low power rod block is concurrently provided by the IRM system as well as by the high level scram bypass switch.
2) At Vermont Yankee the SDIV rod block can only be reset by draining the SDIV to a point below the 12 gallon control rod block setpoint. This assures that during the period of time that the SDIV high water level trip is bypassed to allow draining of the SDIV a rod block is present until the water level drops below the rod block setpoint.

We trust the information presented above is satisfactory; however, should you have any questions, please feel free to contact us.

Very truly yours,

VERMONT YANKEE NUCLEAR POWER CORPORATION

for R. L. Smith
Licensing Engineer