Attachment 1

Vermont Yankee Nuclear Power Station

Fourth-Interval Inservice Testing (IST) Program Plan and
Request for Approval of IST Relief Requests

List of Commitments

SUMMARY OF VERMONT YANKEE COMMITMENTS

BVY NO.: 03-10

The following table identifies commitments made in this document by Vermont Yankee. Any other actions discussed in the submittal represent intended or planned actions by Vermont Yankee. They are described to the NRC for the NRC's information and are not regulatory commitments. Please notify the Licensing Manager of any questions regarding this document or any associated commitments.

COMMITMENT	COMMITTED DATE OR "OUTAGE"
NONE	N/A

VYAPF 0058.04
AP 0058 Original

Attachment 2

Vermont Yankee Nuclear Power Station

Fourth-Interval Inservice Testing (IST) Program Plan and Request for Approval of IST Relief Requests

Program Plan

VERMONT YANKEE NUCLEAR POWER STATION

ADMINISTRATIVE PROCEDURE

PP 7013

REVISION 12

INSERVICE TESTING PROGRAM IMPLEMENTATION

USE CLASSIFICATION: **INFORMATION**

LPC No.	Effective Date	Affected Pages

Implementation Statement: N/A

Issue Date:__________

TABLE OF CONTENTS

1.0 PURPOSE, SCOPE, AND DISCUSSION

1.1. Purpose

This procedure establishes the responsibilities and administrative controls for implementation of the Vermont Yankee Inservice Testing (IST) Program. The IST Program is required by Title 10, Part 50.55a, of the Code of Federal Regulations (10CFR50.55a) to comply with the ASME Code of record as incorporated by 10CFR50.55a. Technical Specification 4.6.E.2 requires that, "Operability testing of safety-related pumps and valves shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda as required by 10 CFR 50,Section 50.55a(f), except where specific written relief has been granted by the NRC." In addition to meeting the regulatory requirements of 10CFR50.55a and Technical Specifications, the objectives of the IST Program are the following:

- To ensure the operational readiness of in-scope safety related pumps and valves
- To identify component degradation and
- To initiate appropriate corrective actions to maintain operational readiness .

This procedure is applicable to all activities related to inservice testing (IST) at the Vermont Yankee Nuclear Power Station performed in accordance with the applicable edition and addenda of ASME Code For Operation and Maintenance of Nuclear Power Plants ("ASME OM Code") incorporated by reference into the Vermont Yankee Inservice Testing Program Procedure (PP 7013).

1.2. Scope

The Fourth-Interval Vermont Yankee IST Program establishes testing requirements to assess the operational readiness of certain Safety Class 1, 2, and 3 pumps and valves which are required to:

- Shut down the reactor to the safe shutdown ("hot shutdown") condition,
- Maintain the reactor in the safe shutdown ("hot shutdown") condition, or
- Mitigate the consequences of an accident.

The IST Program Plan specifies components subject to testing and the frequency of testing needed to satisfy the Code, including authorized exceptions and Technical Justifications as applicable.

The Vermont Yankee Inservice Testing Program is divided into three major components: **IST Program Procedure, IST Program Plan, and IST Component Database**. The attributes of the IST Program are explained below:

IST Program Procedure (PP 7013) –

This procedure is applicable to all activities related to Inservice Testing at the Vermont Yankee Nuclear Power Station performed in accordance with the applicable edition and addenda of the Code. This procedure is considered upper tier.

IST Program Plan –

This document is Appendix A, Appendix B, and Tables 1-19 of Program Procedure PP 7013 and is submitted to the Nuclear Regulatory Commission (NRC). The Program Plan contains the applicable Code commitment text, component specific test requirement tables, cold shutdown justifications, refueling outage justifications, relief requests, and VY technical positions as applicable.

IST Component Database –
This database identifies the pumps and valves that have safety functions that support the safe shutdown of the plant or mitigate the consequences of an accident. For each system included in the program, each Process and Instrument Diagram (P&ID) was analyzed to determine which pumps and valves have safety functions. Pumps and valves and their associated safety function were analyzed to determine active or passive safety functions. Appropriate text provides an explanation of how the component falls within IST scope. Some components with obvious passive safety functions are not analyzed. An example of a passive valve that is not analyzed would be a manual vent or test connection valve that is normally closed during plant operation and open only under administrative controls.

The VY IST Component Database will reside on a shared network server following its registration as SQA software.

1.3. Discussion

The Fourth-Interval Vermont Yankee IST Program is based on the ASME OM-1998 Edition through the OMb-2000 Addenda. The recommendations described in Generic Letter 89-04, its supplements, and NUREG-1482 are also incorporated as applicable. The Fourth-Interval IST Program provides compliance with Vermont Yankee Technical Specification 4.6.E.2.

The Fourth-Interval Vermont Yankee IST Program is effective from September 1, 2003 through August 31, 2013.

The IST Program Plan specifies components subject to testing and the frequency of testing needed to satisfy the Code requirements, including Cold Shutdown Justifications, Refueling Outage Justifications, and 10CFR50.55a Requests as applicable. Certain Code requirements have been determined to be impractical or to constitute an undue burden without a compensating increase in quality or safety. These determinations and NRC authorization to perform alternative testing are documented in 10CFR50.55a Requests. The 10CFR50.55a Requests are discussed and included in the IST Program Plan, Appendix A and Appendix B.

The Inservice Testing Program requires periodic updating based on new design changes, applicable codes and standards, regulatory requirements, and administrative requirements. The Plant Inservice Testing Coordinator (PISTC) controls the technical content and revision of documents comprising the Inservice Testing (IST) Program.

The IST Program Procedure (PP 7013), including the IST Program Plan (Appendix A, Appendix B, and Tables 1-19) is a controlled document. The IST Program Procedure and the IST implementing procedures are controlled by AP 0095, "Plant Procedures." AP 0095 defines the review and approval process that shall be followed (AP 0096 and AP 0097).

In accordance with AP 6002, Preparing 50.59 Evaluations, the results of an Applicability Determination (AD) has determined that an AD is not required for future changes provided that the intent and type of activities associated with this procedure remain unchanged. The basis for this conclusion is that this document is a managerial and an administrative monitoring process, subject to 10CFR50.55a and 10CFR50 Appendix B, that does not alter the design, performance requirements, operation, or control of Systems, Structures, or Components (SSCs). Future changes to this procedure will require cross-disciplinary review by Quality Assurance because PP 7013 is a Quality Assurance Plan implementing procedure identified in PP 7802.

2.0 DEFINITIONS

2.1. Program

A "Program" is a set of activities that benefit from the existence of a formal, high level "Program Document." Such documents are meant to provide for a common understanding of program depth, breadth and technical bases as well as the responsibilities of the program owner and those helping to implement the program. "Program Documents" are typically created to ensure regulatory requirements are satisfied. They can also be used to layout the technical bases and personnel responsibilities related to complex, multi-departmental processes.

2.2. Program Owner

The individual responsible for maintaining the program, program documents, and assuring proper execution of the program requirements. Each program shall have an individual assigned as the program owner. The appropriate job title is determined by the responsible Department Manager. The Program Owner of the Pump and Valve Inservice Testing Program is the Plant IST Coordinator (PISTC). The expectations of the Program Owner are those listed in AP 0098, Appendix A.

2.3. Inservice Test

A test to assess the operational readiness of a system, structure, or component after first electrical generation by nuclear heat.

3.0 PRIMARY RESPONSIBILITIES

3.1. The Manager, System Engineering

is the Responsible Procedure Owner (RPO) for this Program Procedure. The Superintendent System Engineering is responsible for:

- The assignment of the Plant Inservice Testing Coordinator (PISTC or "IST Coordinator"), the program owner.
- Approval of changes to the Inservice Testing Program (PP 7013).
- The content of this procedure
- Maintaining overall accountability for development, maintenance and implementation of the ASME XI Inservice Testing Program Plan at Vermont Yankee.

3.2. The Manager, Technical Support

is responsible for

- Control of the AP 4000 Surveillance Testing Program as it affects the IST Program

3.3. The Manager, Fluid Systems Design Engineering

is responsible for

- Controlling design basis documentation,
- Establishing design basis limits for pumps and valves
- Informing System Engineering of changes to design basis documentation that affects the IST program.

3.4. The Manager, Operations

is responsible for

- Maintaining task specific qualification of personnel conducting the testing.
- Scheduling and performing specific component tests required by the Inservice Testing Program Plan,
- Review of work orders for ASME XI post-maintenance test requirement identification
- Determining the acceptability of specific test results in accordance with approved surveillance procedures (LER9308OP2).
- Rejecting test data and providing a justification if there is sufficient reason to believe that the test data does not represent the true condition of the component, such as transcription error, instrument

malfunction, or operator error. (ER950159_05)(FVY 88-22) Whenever test data is rejected or if a valve fails to stroke, initiate an ER and attach any incomplete surveillance forms. (ER96133_01)

- Determining acceptability of Operations surveillance procedure test results when instrumentation used to perform IST is found out-of-calibration. VYPPF 7013.03 part 1 and Part 2 are completed by the instrument user department. (MOOID9406B_04) DP 0160, "Control of Operations Department Measuring and Test Equipment," refers to DP 0301 for identification of "out of cal" conditions while operability of previous test results is satisfied by completion of VYPPF 7013.03.
- Promptly notifying the System Engineer when IST components fall in the "Alert" or "Required Action" range. Initiating and approving VYAPF 4000.01 upon notification from the Shift Engineer for components that enter the "Alert" range. (INS9331OP1)

3.5. The Manager, Maintenance
is responsible for

- Ensuring that instruments used for inservice testing are in a calibration program, calibrated to the required accuracy at the required intervals, and meet the requirements specified by Electrical/I&C Design Engineering.
- Notifying the PISTC of instrument calibration issues per DP 0301, Calibration and Control of I/C Measuring and Test Equipment (M/TE) and I/C Shop Equipment. (MOOID9406B_04)
- Scheduling and performing specific component inspections and tests required by the Inservice Testing Program Plan, in accordance with the Check Valve Program (PP 7202), the Safety & Relief Valve Program (PP 7204), and the AOV Program (PP 7301)
- Determining the acceptability of specific inspections and test results in accordance with approved procedures.

3.6. Manager, Work Management/Outage
is responsible to ensure:

- Work Order planning complies with the requirements of the IST Program.
- Outage planning complies with the requirements of the IST Program to ensure that surveillance testing is performed when required.

3.7. Appendix J Program Coordinator
is responsible for:

- Implementation of leak rate tests for containment isolation valves and other valves requiring leak rate testing in accordance with Appendix J, as identified by the IST Program.
- Performing leak rate testing to satisfy the position indication requirements or the obturator movement requirements for the assets identified by the IST Program.
- Evaluation of leak rate test results and initiation of maintenance work orders as necessary.

3.8. Plant IST Coordinator
is responsible for:

- Meeting the expectations of the IST Program Owner, as described in AP 0098, Appendix A
- Providing technical direction on all aspects of the IST program, including the acceptability of test methods, incorporation of relief request commitments, and acceptance criteria into surveillance procedures.
- Periodic review of Relief Requests, Cold Shutdown and Refueling Outage Justifications.
- Preparation, review, and approval of component reference values and acceptance criteria and initiation of a Type A Commitment per AP 0028 for implementing department action.
- Maintaining a file or database of current and historical reference values.
- Reviewing IST component radiographs with the Code Programs Supervisor and informing the Shift Manager, System Engineer, and Maintenance Engineer of unsatisfactory IST component radiograph results.

- Ensuring that reference value records and check valve radiography records are processed in accordance with PP 7801,"Quality Assurance Records Program."
- Reviewing restoration of increased frequency testing (Alert Range) to normal testing in accordance with VYPPF 7013.04.
- Review of IST related out-of-calibration dispositions. (MOOID9406B_04)
- Initiating a Surveillance Testing Program Change Form (VYAPF 4000.01) to the VY Surveillance Program for IST component addition or deletion, and initiating this form when a component is removed from the Alert Range.
- Review and approval of the Cold Shutdown Surveillance Report.
- Maintaining the IST Instrument List (contained in Appendix A, Section II) and informing the Maintenance Support Lead I&C Engineer regarding changes to this list.
- Ensuring that check valve, excess flow check valve, and relief valve groupings as identified by implementing department procedures meet Code requirements.
- Classification of assets for the IST field of EMPAC.

4.0 PROCEDURE

4.1. Instrumentation

Instrumentation selection criteria, range, and accuracy shall be in accordance with the IST Program Plan (Appendix A and Appendix B). Following receipt of form VYDPF 0301.03, "Review Of I/C Measuring And Test Equipment Found Out Of Calibration," the PISTC shall evaluate the effect of the questionable instrumentation on past test results and shall document the evaluation.

4.2. Test Methods

Inservice testing of pumps and valves shall be in accordance with Technical Specification 4.6.E.2, 10CFR50.55a, and the IST Program Plan. Pumps that are being returned to quarterly testing following the successful completion of a corrective action plan shall have the return to normal testing documented on VYPPF 7013.04.

4.3. Reference Values and Acceptance Criteria

Reference values and acceptance criteria shall be established in accordance with the IST Program Plan and shall be documented on VYPPF 7013.01 (Pumps) or VYPPF 7013.02 (Valves).

4.4. Corrective Action

10CFR50, Appendix B contains the following:

> XVI. Corrective Action
>
> Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management.

Inservice test failures shall be documented, and corrective actions shall be in accordance with AP 0009 and the IST Program Plan. Whether a particular IST failure is a "significant condition adverse to quality" is determined by the corrective action process.

4.5. Data Analysis and Records

Data analysis and records shall be in accordance with the IST Program Plan. IST reference values, acceptance criteria, and test records are QA records and shall be handled in accordance with PP 7801, "Quality Assurance Records Program."

4.6. Technical Positions

Technical positions and clarifications of Code or regulatory requirements shall be documented in the IST Program Plan. The Plant IST Coordinator has ultimate authority to determine the testing required by the Code.

4.7. Program Plan Development

The Inservice Testing Program Plan should provide sufficient information to allow Vermont Yankee and outside personnel to understand clearly the technical and administrative requirements of the program. This is achieved by incorporating and interpreting key information and by referring to the applicable Codes, standards, USNRC regulations, and the Vermont Yankee Design Basis and Licensing Basis, including licensing documents (UFSAR, Technical Specifications, etc.), commitments, drawings, and procedures.

4.8. Program Plan Format and Content

The format and content of the Inservice Testing Program Plan shall be consistent with the requirements of Vermont Yankee licensing commitments. The format and content may follow the guidance of Appendix A in ASME OM-1998 or subsequent Editions and Addenda. NUREG 1482, "Guidelines for Inservice testing at Nuclear Power Plants," provides additional guidance concerning the information needed to properly document relief requests, cold shutdown and refueling outage justifications for the IST Program.

10CFR50.55a Requests are prepared where exceptions need be taken to the testing required by the Code. 10CFR50.55a Requests are prepared in accordance with 10 CFR 50.55a(a)(3) or 10CFR50.55a(f). 10CFR50.55a Requests shall be included as part of the Inservice Testing Program Plan. Requests are submitted for the NRC to review and approve relief from requirements of the Code, or for authorization to use approved alternatives. The justification must include adequate information for the NRC staff to determine if the alternative can be authorized or relief can be granted. The alternative proposed may not normally be implemented prior to NRC approval. In rare instances, the proposed alternative testing may be implemented while the NRC is reviewing the relief request if the request is for relief from those requirements that have been determined to be clearly impractical.

4.9. IST Program Plan Revision

4.9.1. IST Program Plan Periodic Revisions

The IST program documents submitted to the NRC are used by NRC to prepare for IST Inspections and to review relief requests. The program plan need not be submitted more often than necessary to reflect major changes, but it is expected that Vermont Yankee will make changes to the document periodically, and at least once every other cycle a complete, up-to-date copy should be submitted to the NRC.

Regarding components added to or removed from the program, the regulations do not require the licensee to inform the NRC on every change to the IST Program. As long as the program is consistent with the regulations, the ASME Code, and applicable commitments, changes to the IST program do not require NRC approval. It is the responsibility of Vermont Yankee to verify that our IST program is complete, complies with the regulations and the Code, and that all required components are included and tested to the extent practical. If a particular component is deleted from the IST program, documentation of the reason will be maintained in the IST Component Database.

Full revisions submitted to the NRC will include all changes since the previous full revision. The current status of each 10CFR50.55a Request, as provided in the NRC SERs, and new 10CFR50.55a Requests, if any, will be included. The Inservice Testing Program Plan will be maintained current between NRC submittals. Changes will be numbered to denote the current full revision number. Partial revisions shall be in accordance with the LPC process for administrative and program procedures. Inservice Testing Program Plan revisions submitted to the NRC shall be full revisions.

All implementation and test procedures shall be revised and maintained current to the latest version of the Inservice Testing Program Plan prior to a scheduled surveillance, using the Commitment Tracking Process in AP 0028.

4.9.2. 120-month IST Program Plan Update

Inservice Testing Programs are required to be updated every 120 months (10 years) by 10CFR50.55a(f)(4)(ii). Vermont Yankee must comply with the requirements of the latest edition and addenda of the Code incorporated by reference in 10CFR50.55a(b) 12 months before the start of 120-month interval, subject to the limitations and modifications listed in paragraph (b). The Vermont Yankee Fourth Interval IST Program is applicable from September 1, 2003 through August 31, 2013, and the Code of record is the ASME OM-1998 Edition through the OMb-2000 Addenda.

10CFR50.55a(f)(5)(iv) specifies that the licensee list the Code requirements found to be impractical for the new interval such that the basis for this determination be demonstrated to the satisfaction of the Commission not later than 12 months after the start of the new interval. Although not required, it is recommended that 10CFR50.55a requests for the new interval be submitted approximately 6 months prior to the new interval to account for a period for NRC review. Common practice is to submit a revised program within 6 to 9 months before the beginning of the new interval.

The testing interval may be decreased or extended (but not cumulatively) by as much as one year as discussed in NUREG 1482, Section 3.3.1. For a plant that is out of service continuously for 6 months or more, the testing interval during which the outage occurred may be extended for a period equivalent to the outage. The NRC should be notified of any extension before the date that would have been the end of the current interval. Although the Code does not require NRC approval for one-year extensions of the interval, Vermont Yankee would avoid any discrepancies in the interval dates by informing the NRC of the extension and documenting it in the IST Program.

4.10. <u>IST Component Database</u>

The supporting documentation for the IST Program Plan is maintained in the IST Component Database. It is not the intent of the IST Database to supplant or supersede existing Vermont Yankee documents, procedures, or other design basis information. This database, though not a Licensing Basis Document, is a useful reference. The IST Component Database, which is recommended but not required by the NRC, will aid in ensuring continuity of the IST program when the responsibilities of personnel or groups change. It provides the basis that the components are either included or excluded from the program.

The IST Component Database comprises individual component basis records. Each record contains specific attributes and references to substantiate component inclusion or exclusion to the IST Program Plan, test condition requirements, acceptance criteria basis and reference value basis, where applicable. The IST Component Database is archived with each partial or full revision to facilitate retrieval of historical information. The IST Component Database resides on a shared network server.

4.11. IST Program Plan Forms

This Program Procedure contains certain forms used by the PISTC to document results that are required for Code compliance or for effective program administration. These forms may be prepared using hard-copy duplicates of the included forms or by using computer generated forms that contain the information provided on the hard-copy form. The computer-generated forms should be formatted to the appearance of the hard-copy form to the maximum extent practicable.

5.0 REFERENCES AND COMMITMENTS

5.1. Technical Specifications and Site Documents

- 5.1.1. T.S. 3.6.E
- 5.1.2. T.S. 4.6.E.2
- 5.1.3. Vermont Yankee Operational Quality Assurance Manual (VOQAM)
    - I.C. ORGANIZATION – Organizational Relationships
    - III.C DESIGN CONTROL - Implementation
    - X.C INSPECTIONS - Implementation
    - XI.C TEST CONTROL - Implementation
    - XV.C NON-CONFORMING MATERIALS, PARTS AND COMPONENTS - Implementation
    - XVI.C CORRECTIVE ACTIONS CONTROL - Implementation
    - XVII.C QUALITY ASSURANCE RECORDS - Implementation
    - APPENDIX D.III ADMINISTRATIVE CONTROLS - Plant Operating Records

5.2. Administrative Limits

None

5.3. Codes, Standards and Regulations

- a. 10 CFR 50.55a, Codes and Standards
- b. "Code For Operation And Maintenance Of Nuclear Power Plants," ASME OM Code-1998 Edition through ASME OMb Code-2000 Addenda
- c. NRC Generic Letter No. 89-04, "Guidance on Developing Acceptable Inservice Testing Programs", dated 4/3/89
- d. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants.

5.4. Commitments

- a. LER 9308OP2, Revise AP 0164 to Require Independent Review After Shift Engineer Determination
- b. MOOID9406B_04, Revise AP 0164 To Add Information That Would Require An Evaluation of Affected Test Data If An IST Instrumentation Is Found Out of Tolerance Rec. 3
- c. INS952202_01, Establish Limiting of Full Stroke Time For All Safety Related Power Operated Valves As Required By OM-10 Section 4.2.1.4(A). ST Rec. of BVY 95-124 Violation C, IST
- d. ER960133_01, Loss of As-Found Conditions Hindered Troubleshooting Efforts Following Failure of SB-16-19-11A To Stroke
- e. ER 95-0159, Failure to Perform IST Evaluation on RHRSW Pump C - Include Acceptance Criteria Ranges on Evaluation Forms
- f. INS9331OP1, Revise AP 0164 to Directly Reference AP 4000

5.5. Supplemental References

a. Letter, BVY 92-98, "Vermont Yankee Nuclear Power Corporation Inservice Testing Program Update," requesting authorization to use ASME XI, 1989 Edition and ASME/ANSI Standard OMa-1988 With Clarification, dated August 12, 1992
b. Letter, NVY 92-161, "Vermont Yankee Nuclear Power Station, Approval of the Use of ASME/ANSI Standard OMa-1988 With Clarification," dated September 2, 1992
c. Memo, BRB to RJW/RDP/JTH, "Recommendations to Address Problems with IST Program Management and Implementation", dated 12/22/93
d. Memo, BVY 95-124, JKT to NRC, Reply to a Notice of Violation, Inspection Report No. 50-271/95-22, dated 11/16/95
e. AP 0009, Event Reports
f. AP 0028, Commitment Tracking
g. AP 4000, Surveillance Testing Program
h. AP 6002, Preparing 50.59 Evaluations
i. DP 0301, Calibration And Control Of I/C Measuring And Test Equipment (M/TE) And I/C Shop Equipment
j. PP 7015, Vermont Yankee Inservice Inspection Program
k. PP 7004, VYNPS Motor-Operated Valve Program
l. PP 7006, Primary Containment Leak Rate Testing Program
m. PP 7069, 10CFR50.65 Maintenance Rule Program
n. PP 7202, Check Valve Program
o. PP 7204, Safety & Relief Valve Program
p. PP 7301, AOV Program
q. PP 7801, Quality Assurance Records Program

6.0 FINAL CONDITIONS

None

7.0 ATTACHMENTS

a. Appendix A, IST Program Plan, Sections I, II, & III
b. Appendix B, Valve Program Notes, Test Deferral Justifications, and Relief Requests
c. Table 1, Valve Test Table: CAD & PASS
d. Table 2, Valve Test Table: CRD & HCU
e. Table 3, Valve Test Table: CS
f. Table 4, Valve Test Table: DG
g. Table 5, Valve Test Table: FO
h. Table 6, Valve Test Table: FPC & SFPC
i. Table 7, Valve Test Table: HPCI
j. Table 8, Valve Test Table: HVAC & SBGT
k. Table 9, Valve Test Table: IA, N2 & SA
l. Table 10, Valve Test Table: NB
m. Table 11, Valve Test Table: NM
n. Table 12, Valve Test Table: PCAC
o. Table 13, Valve Test Table: RBCCW
p. Table 14, Valve Test Table: RCIC
q. Table 15, Valve Test Table: RDW
r. Table 16, Valve Test Table: RHR
s. Table 17, Valve Test Table: RWCU
t. Table 18, Valve Test Table: SLC

u. Table 19, Valve Test Table: SW & RHRSW
v. Table 20, *FUTURE*
w. Table 21, IST Instrument List
x. VYPPF 7013.01 IST Pump Reference Data Set
y. VYPPF 7013.02 IST Valve Reference Data Set
z. VYPPF 7013.03 Review of IST Instruments Found Out of Calibration
aa. VYPPF 7013.04 IST Surveillance Return to Normal Test Frequency

APPENDIX A

INSERVICE TESTING PROGRAM PLAN

For The 4th Ten-Year Interval
Effective September 1, 2003

Vermont Yankee Nuclear Power Station

Commercial Service Date: November 29, 1972

Program Plan Document Date:
January 8, 2003

Facility Name:
Entergy Nuclear Vermont Yankee, LLC
320 Governor Hunt Road
Vernon, Vermont 05354-9766

Owner:
Entergy Nuclear Operations, Inc.
185 Old Ferry Road; PO Box 7002
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Prepared By:	[illegible] L. Lukens, Plant IST Engineer	1/9/03 Date
Reviewed By:	[illegible] W. Pelzer	1/13/03 Date
Reviewed By:	Bruce E Hall Quality Assurance	1/16/03 Date
Reviewed By:	[illegible] Operations	January 17, 2003 Date
Reviewed By:	Dennis Girroir D. Girroir, Supervisor Code Programs	01-13-2003 Date
Approved By:	[illegible] J. Dreyfuss, Manager System Engineering	1-20-03 Date

Revision Summary

Revision Number	Affected Pages	Summary
0	Complete rewrite and reformat, affecting all sections	
		The 4th Ten-Year Interval IST Program Plan accompanies the retirement of AP 0054, the streamlining of PP 7013, and the incorporation of IST Program Implementation requirements into the IST Program Plan document, Appendix A of PP 7013. There are now 3 major sections in the IST Program Plan: 1. Appendix A: Section 1, General; Section 2, Pump Testing Program; and Section 3, Valve Testing Program. 2. Appendix B: Valve Table Notes; Cold Shutdown Justifications; Refueling Outage Justifications; and Valve Relief Requests 3. Valve Test Tables: Tables 1-19
		The Valve Test Tables are reorganized. The Tables are now organized alphabetically by system abbreviation. There are 19 separately numbered system tables.

Revision Summary

Revision Number	Affected Pages	Summary
0	Complete rewrite and reformat, affecting all sections	
		The following relief valve and vacuum breaker test requirements and commitments were expanded to include all Code-required tests: PSV-NG-34A, B SR-14-20A, B SR-72-6A, B, C, D SR-78-3A, B RV19-232A, B SR-23-34 SR-23-66 SR-SACC-1A-1 SR-SACC-1A-2 SR-SACC-1B-1 SR-16-19-77 SR-72-1 SR-72-10A, B RV-2-71A, B, C, D SV-2-70A, B RV-70-117A SR-70-1A, B SR-70-6A, B SR-13-25 SR-13-26, SR-13-27 RV-20-82A RV-20-94A SR-10-36A, B SR-10-40 SR-10-72A, B, C, D SR-10-80A, B SR-10-86A, B SR-72-3A, B SR-11-39A, B RV70-260A, B SR-70-13A, B, C, D SR-70-16A, B SR-70-2A, B These changes are administrative. Since the relief valve test procedures OP 4200, OP 4201, and OP 4261 already perform these tests, no changes to those procedures are required to implement this administrative change.

Revision Summary

Revision Number	Affected Pages	Summary
0	Complete rewrite and reformat, affecting all sections	
		Reassigned the following EFCVs from NB to HPCI, consistent with EMPAC: SL-23-37A, B, C, D
		Revised test commitments for the following valves, in accordance with the Bases in the IST Component Database:

Valve	From	To
SSC-23-13	CD-RO	SC-RO
SSC-23-13	n/a	SO-Q
V23-18	SC-CS; SO-CS	CD-RO
V23-56	CD-RO	SO-Q
V23-56	n/a	SC-RO
V72-918C	SC-RO	SC-OC
V72-918E	SC-RO	SC-OC
V2-80A, B, C, D	LJ-2Y	LJ-RO
V2-86A, B, C, D	LJ-2Y	LJ-RO
V70-28	SC-RO	SC-OC
SSC-13-10	CD-RO	SC-RO
V13-38	n/a	SC-RO
V10-57	Category A	Category B
V10-66	Category A	Category B
V70-413	SC-RO	SC-OC
V70-413	SO-RO	SO-OC
V70-92A	SC-RO	SC-OC
V70-92B	SC-RO	SC-OC

Table of Contents

SECTION I GENERAL

I-1 INTRODUCTION

1.1 General

This document is the Fourth Ten–Year Interval Program Plan for Inservice Testing (IST) of Pumps and Valves at the Vermont Yankee Nuclear Power Station (VY) in compliance with the requirements of 10CFR50.55a(f) and Station Technical Specifications. This Program Plan was prepared in accordance with the rules of the ASME Code for Operation and Maintenance of Nuclear Power Plants, ASME OM Code-1998, through the ASME OMb Code-2000 Addenda (OM-1998 through OMb-2000 – "The Code").

1.2 Commercial Operation Date and IST Intervals

Vermont Yankee began commercial operation on November 29, 1972, and the First Ten–Year ISI / IST Interval began on that date. The Third Interval start date was extended from November 30, 1992 to August 31, 1993 (BVY 92-133). This extension used 9 of the allowable 12 months total extension of intervals permitted by the Code.

The Third-Interval IST Program was applicable for the interval from September 1, 1993 through August 31, 2003 [References (p) and (q)]. Therefore, the 4th 10-Year IST Interval is applicable from September 1, 2003 through August 31, 2013.

1.3 Applicable Codes

The Fourth 10-Year Interval Program Plan complies with the OM-1998 Edition through the OMb-2000 Addenda The Third 10–Year Interval IST Program Plan complied with ASME Section XI, 1989 Edition. The Second 10–Year Interval IST Program Plan complied with ASME Section XI, 1983 Edition through Summer, 1983 addenda..

I-2 PURPOSE

The Fourth-Interval Vermont Yankee Inservice Testing (IST) Program establishes testing requirements to assess the operational readiness of certain Safety Class 1, 2, and 3 pumps and valves which are required to:

a) Shut down the reactor to the safe shutdown[1] ("hot shutdown") condition,
b) Maintain the reactor in the safe shutdown condition, or
c) Mitigate the consequences of an accident.

1 Vermont Yankee was originally designed and licensed as a safe shutdown ("hot shutdown") plant. For details refer to VYS 98/05 (File # 3758.TGS), Design Bases Reconstitution of "Hot" versus "Cold" Shutdown Bases, dated January 19, 1998 and DCR 98-007/0, Returning RBCCW Heat Transfer Function to NNS Designation (from SC-3), approved April 15, 1999.

I-3 PROGRAM PLAN DESCRIPTION

The Vermont Yankee Inservice Testing Program Plan comprises three major programmatic sections:

3.1 Appendix A

1. Section I, General
2. Section II, Pumps
3. Section III, Valves

3.2 Appendix B

1. Valve Table Notes
2. Cold Shutdown Justifications
3. Refueling Outage Justifications
4. Valve Relief Requests

3.3 Tables 1 through 19, for Valve IST Requirements and Commitments

Key features common to the Pump and Valve Program Plans are: the Pump and Valve Test Tables that define the scope of the Fourth-Interval IST Program; Relief Requests; and applicable Notes. In addition, the Valve Testing Program Plan contains Cold Shutdown and Refueling Outage Justifications for those tests that are not practicable to perform quarterly.

Administrative and implementing procedures, reference values, test results, and other records required to define and execute the Fourth-Interval IST Program are retained at Vermont Yankee.

I-4 REGULATORY BASIS AND SCOPE

4.1 10CFR50

The fundamental requirement for the testing of pumps and valves comes from 10CFR50.55a(f), which requires, in part, that:

> "Throughout the service life of a boiling or pressurized water-cooled nuclear power facility, pumps and valves which are classified as ASME Code Class 1, Class 2, and Class 3 must meet the inservice test requirements...set forth in Section XI of Editions of the ASME Boiler and Pressure Vessel Code and Addenda that...are incorporated by reference in paragraph (b) of this section...."

Pump and valve inservice testing is also required by 10CFR50 Appendix A, "General Design Criteria For Nuclear Power Plants," GDC 1; and 10CFR50, Appendix B, "Quality Assurance Criteria For Nuclear Power Plants And Fuel Reprocessing Plants," Criterion XI.

Appendix A GDC 1 states in part,

> "Structures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed."

Appendix B Criterion XI, "Test Control," states in part,

> "A test program shall be established to assure that all testing required to demonstrate that structures, system, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. The test program shall include, as appropriate, ...operational tests during nuclear power plant operation of structures, system, and components. Test procedures shall include provisions for assuring that all prerequisites for the given test have been met, that adequate test instrumentation is available and used, and that the test is performed under suitable environmental conditions."

4.2 ASME Boiler and Pressure Vessel Code

The specific regulatory basis for the IST program is 10CFR50.55a(f), "Inservice Testing Requirements." This section of 10CFR50 requires the following:

> The testing performed during the second (and successive) 120–month interval must comply with the requirements of the Code Edition incorporated by 10CFR50.55a(b) 12 months prior to the start of the interval.

For Vermont Yankee, the Fourth 120–month interval begins on September 1, 2003. Therefore, the Code Edition of interest is the one endorsed by NRC in 10CFR50.55a as of September 1, 2002. The Code Edition in effect on September 1, 2002 was the OM-1995 Edition through OMa-1996 Addenda. Reference (gg) provides the basis for using the OM-1998 Edition through the OMb-2000 Addenda for the Fourth 10-year interval at VY. This later Code was incorporated by reference into 10CFR50.55a(b)(3) by Federal Register Volume 67, Number 187 (September 26, 2002).

4.3 OM-1998 and OMb-2000 Addenda

The organization of the new Code is significantly different than the Code used for the Third Interval IST Program Plan. This Program Plan is written to conform generally to the outline structure of the new Code. The new Code contains the following major sections:

- ISTA: General Requirements
- ISTB: Inservice Testing of Pumps
- ISTC: Inservice Testing of Valves
- Appendix I: Inservice Testing of Pressure Relief Devices

This Program Plan generally follows the outline of the Code and typically includes the Code paragraph reference for each topic discussed.

4.4 Limitations and Modifications to the Endorsement of OM-1998 through OMb-2000 Addenda

1. 10CFR50.55a(b)(3)(i): Quality Assurance
2. 10CFR50.55a(b)(3)(ii): Motor-Operated Valve Testing
3. 10CFR50.55a(b)(3)(iii): Code Case OMN-1
4. 10CFR50.55a(b)(3)(iv): Appendix II
5. 10CFR50.55a(b)(3)(v): Subsection ISTD
6. 10CFR50.55a(b)(3)(vi): Exercise Interval For Manual Valves

4.5 Generic Letter 89-04 and NUREG-1482

Generic Letter 89-04 provided mandatory guidance for several areas of IST Program Plan scoping and content that NRC staff had determined to be an industry generic weakness. Subsequent to the Generic Letter, NUREG-1482 was issued, and the Generic Letter is an appendix in the NUREG. The NUREG expands on the guidance provided by the Generic Letter.

NUREG–1482, while voluntary, incorporates the "non–voluntary" guidance in Generic Letter 89-04. In addition, NUREG–1482 provides discussion of some issues that are relevant to IST programs and their implementation.

This IST Program Plan incorporates the recommendations of NUREG-1482, as applicable. This Program Plan describes the testing requirements and The Licensee's commitments for testing those ASME Code Class 1, 2, and 3 components that meet the criteria for inclusion in the IST Program, as described in Section I-4.7 and I-4.8, Pump and Valve IST Scope.

4.6 VY Plant Specific Basis for the IST Program

The Fourth-Interval Vermont Yankee IST Program was developed in accordance with the requirements of the ASME Code for the Operation and Maintenance of Nuclear Power Plants, OM-1998 Edition through the OMb-2000 Addenda, and 10CFR50.55a [Reference (b)]. The Fourth-Interval IST Program provides compliance with Vermont Yankee Technical Specifications 4.6.E.2.

All references to "the Code" made within this IST Program Plan refer to the OM-1998 Edition through the OMb-2000 Addenda unless otherwise specified.

The IST Program Plan identifies the scope of pumps and valves included in the Fourth-Interval IST Program, the testing requirements for those components, and justifications or relief requests to support the testing commitments.

The IST Program Plan provides conformance with 10CFR50.55a(a)(3), (f)(5) and (f)(6).

4.7 Pump Inservice Testing Scope

The Fourth-Interval Pump Inservice Testing Program establishes testing requirements to assess the operational readiness of those Safety Class 1, 2, and 3 centrifugal and positive displacement pumps, provided with an emergency power source, which are required to:

a) Shut down the reactor to the safe shutdown ("hot shutdown") condition,
b) Maintain the reactor in the safe shutdown ("hot shutdown") condition, or
c) Mitigate the consequences of an accident.

Excluded from the above are:

a) Drivers, except where the pump and driver form an integral unit and the pump bearings are in the driver;
b) Pumps that are provided with emergency power solely for operating convenience.
c) Skid-mounted pumps, such as fuel oil, lube oil, and water circulating pumps mounted on the diesels.

4.8 Valve Inservice Testing Scope

The Fourth-Interval Valve Inservice Testing Program establishes testing requirements to assess the operational readiness of certain Safety Class 1, 2, and 3 valves and pressure relief devices, including their actuating and position indicating systems.

The active and passive Safety Class 1, 2, and 3 valves included are those which are required to perform a specific function in:

a) Shutting down the reactor to the safe shutdown ("hot shutdown") condition,
b) Maintaining the reactor in the safe shutdown ("hot shutdown") condition, or
c) Mitigating the consequences of an accident.

The Safety Class 1, 2, and 3 pressure relief devices included are those pressure relief devices included in ASME BPV Section III for protecting systems or portions of systems which perform a required function in:

a) Shutting down the reactor to the safe shutdown ("hot shutdown") condition,
b) Maintaining the reactor in the safe shutdown ("hot shutdown") condition, or
c) Mitigating the consequences of an accident.

The following are excluded from Code testing requirements, provided that they are not required to perform a specific function as specified above:

a) Valves used only for operating convenience such as vent, drain, instrument, and test valves;
b) Valves used only for system control, such as pressure regulating valves;
c) Valves used only for system or component maintenance.

Skid-mounted valves, such as the solenoid valves mounted on the AOVs they actuate and the valves on the HCU skids, are excluded provided they are tested as part of the major component and are justified by the Owner to be adequately tested.

External control and protection systems responsible for sensing plant conditions and providing signals for valve operation are also excluded from Code testing requirements.

Category A and B safety and relief valves are excluded from the requirements of ISTC-3700, Valve Position Verification, and ISTC-3500, Valve Testing Requirements. However, Vermont Yankee has no safety or relief valves that are Categorized as A or B.

I-5 DEFINITIONS

5.1 Active Valves:

Valves which are required to change obturator position to accomplish their required function.

5.2 Ambient Temperature:

The temperature of the environment surrounding a pressure relief valve device at its installed plant location during the phase of plant operation for which the device is required for overpressure protection.

5.3 As-Found Condition:

The condition of a component between inservice tests without activities that could affect the ability to determine component degradation.

5.4 Auxiliary Actuating Device:

A device requiring an external energy source to provide inservice remote actuation capability of a pressure relief valve with inlet static pressure below set-pressure.

5.5 Categories of Valves: (ISTC-1300)

Valves within the scope of the Code, shall be placed in one or more of the following categories. When one or more distinguishing category characteristic is applicable, all requirements of each of the individual categories are applicable, although duplication or repetition of common testing requirements is not necessary.

A: Category A Valves for which seat leakage is limited to a specific maximum amount in the closed position for fulfillment of their required function.

B: Category B Valves for which seat leakage in the closed position is inconsequential for fulfillment of the required function.

C: Category C Valves which are self-actuating in response to some system characteristic, such as pressure (relief valves) or flow direction (check valves) for fulfillment of their required function.

D: Category D Valves which are actuated by an energy source capable of only one operation, such as rupture disks or explosively actuated valves.

5.6 Exempt

Pumps and valves that are <u>exempt</u> from IST requirements are those that <u>do not meet the scope statement in the OM Code</u> (ISTA-1100). That is, they do not perform any of the safety-related functions that define pumps and valves subject to IST. Most exempt components do not have a record in the IST Component database. Although ISTC-1200 is entitled, "Exemptions," the corresponding section was entitled, "Exclusions" in previous Editions, and the discussion describes exclusions. ISTB-1200 is still entitled, "Exclusions."

5.7 **Exercising:**

Demonstration based on direct visual or indirect positive indications that the moving parts of a component function. Exercising of power-operated valves is performed concurrently with stroke-time testing and is not identified as a separate test.

5.8 **Excluded**

Pumps and valves that are excluded from inservice testing are those that provide one of the safety-related functions that define pumps and valves subject to IST, but are specifically excluded from testing requirements by the Exclusions in ISTB-1200 or ISTC-1200. From a programmatic point of view, components that are "excluded" typically have an exclusion basis in the IST Component database, while components that are "exempt" typically do not have a basis in the IST Component database.

5.9 **Full-Stroke Time:**

The time interval from initiation of the actuating signal to the indication of the end of the operating stroke.

5.10 **Group A Pumps (ISTB-2000)**

Pumps that are operated continuously or routinely during normal operation, cold shutdown, or refueling. Most pumps in IST at Vermont Yankee are Group A pumps.

5.11 **Group B Pumps (ISTB-2000)**

Pumps in standby systems that are not operated routinely except for testing. At Vermont Yankee, the following pumps are Group B pumps: HPCI (P-44-1A, B), SLC (P-45-1A, B), CS (P-46-1A, B), and RCIC (P-47-1A)

5.12 **Plant Operation:**

The conditions of startup, operation at power, and hot standby as defined by the plant technical specifications.

5.13 **Obturator:**

Valve closure member (disk, gate, plug, ball, etc.)

5.14 **Passive Valves:**

Valves which are required to maintain obturator position and are not required to change obturator position to accomplish their required function.

5.15 **Preconditioning:**

The modification, maintenance, manipulation, or adjustment of a component performed between inservice tests with the intent of enhancing the results of the inservice tests. This includes activities such as cycling, cleaning, lubricating, agitating, or other specific maintenance or operational activities that may be performed prior to or during inservice testing that could affect the ability to determine component degradation.

5.16 Pump Design Flow

Pump design flow at Vermont Yankee is one of the following:

a) Pump design flow as determined by Engineering analysis
b) Licensing basis flow as determined by UFSAR or Technical Specifications
c) The flow corresponding to the pump best efficiency point (BEP) on the manufacturers pump curve.

5.17 Reactor Coolant System Pressure Isolation Valve (PIV):

A valve that prevents intersystem overpressurization between the reactor coolant system and connected low-pressure systems.

5.18 Trending (ISTB-2000)

A comparison of current data to previous data obtained under similar conditions for the same equipment.

5.19 Vertical Line Shaft Pump (ISTB-2000)

A vertically suspended pump where the pump driver and pump element are connected by a line shaft within an enclosed column. The Service Water pumps and the RHR Service Water pumps are vertical line shaft pumps.

I-6 PRIMARY RESPONSIBILITIES

6.1 The Plant Inservice Test Coordinator (PISTC)

has ultimate IST authority at Vermont Yankee. Personnel shall direct questions regarding ASME XI Inservice Testing to this individual. The PISTC is responsible for:

1. Providing technical direction on all aspects of the IST program.
2. Preparation, maintenance and update of the IST program.
3. Periodic review of Relief Requests, Cold Shutdown and Refueling Outage Justifications.
4. Incorporating plant modification changes into the IST program.
5. Preparation, review and approval of component reference values and acceptance criteria. This action includes completion of a 50.59 Screening per AP 6002 followed by initiation of a Type A Commitment per AP 0028 for implementing department action.
6. Providing direction to responsible departments regarding acceptability of test methods, incorporation of relief request commitments and acceptance criteria into surveillance procedures.
7. Maintaining a file and/or database of current and historical reference values.
8. Review of test data, upon request, to resolve degradation concerns and methodology issues.
9. Reviewing restoration of increased frequency testing (Alert Range) to normal testing in accordance with VYPPF 7013.04.
10. Review of IST related out-of-calibration dispositions. (MOOID9406B_04)
11. Joint review of IST component radiographs with the Project Engineering Program Supervisor.
12. Informing the Shift Manager, System Engineer and Maintenance Engineer of UNSAT IST component radiograph results.
13. Initiating addition/deletion documentation form (VYAPF 4000.01) to the VY Surveillance Program regarding IST component addition/deletion, and initiating this form when a component is removed from the Alert Range.
14. Review and approval of the Cold Shutdown Surveillance Report.
15. Maintain the IST Instrument List (Table 3) and inform the Maintenance Support Lead I&C Engineer regarding changes to this list.
16. Ensuring that check valve and relief valve groupings as identified by implementing department procedures meet Code requirements.
17. Ensuring reference value and check valve radiography records are processed in accordance with AP 6809.
18. Review of IST component specific or system related BMOs for IST Program impact.
19. Preparation of a periodic report summarizing IST related activities.

6.2 System Engineering

is responsible for:

1. Trending IST data on assigned systems. Specifically, this action includes, as applicable, pump hydraulic and peak vibration data, valve stroke time data and check valve manual exercising (torque or force) data.
2. Follow-up with the Operations Surveillance Coordinator for components identified in the Alert range to ensure increased frequency testing is scheduled.
3. Promptly informing the PISTC via telephone or pager regarding Alert, Required Action range or INOP IST components.
4. Action plans and disposition of assigned Event Reports for IST pumps in the Alert range.
5. Taking the necessary action, as a result of IST analysis or Health Report preparation, to initiate corrective action on IST components prior to gross component failure. IST analysis

documentation may be in the form of summary statements contained in the System Engineer's quarterly health report.

6. Initiating the necessary action to return components on increased frequency testing (Alert Range) to the normal testing frequency when justified in accordance with VYPPF 7013.04.
7. Working with the PISTC to develop technical justifications when creating new reference values and acceptance criteria or evaluating post-maintenance test results.
8. Review of new IST reference values and acceptance criteria on assigned systems.

6.3 Reactor Engineering

is responsible for:

1. Scram time data reduction and analysis to provide assurance that proper control rod drive performance is being maintained. Administrative limits have been established to provide margin to the Tech. Spec. limits. NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," Appendix A, Position 7, "Testing Individual Scram Valves for Control Rods in BWRs," allows use of scram insertion times to be used as an alternate method of detecting degradation for the associated CRD valves.
2. Providing a copy of the Approved Scram Time Evaluation Report to the System Engineering Administrative Assistant in accordance with OP 4424.

6.4 Design Engineering

is responsible for:

1. Providing component specific design basis limits to the PISTC upon request if not described in DBDs.
2. Assisting the PISTC regarding component safety function descriptions as identified in the IST Component Basis Database.
3. Evaluating IST instruments to ensure Code accuracy requirements and instrument uncertainty considerations have been satisfied.

6.5 Code Programs

is responsible for:

1. Scheduling radiography and coordination of contract services.
2. Performing joint review of IST related radiograph results with the PISTC.
3. Providing the original IST related radiographs to the PISTC for record storage.

6.6 Appendix J Program Coordinator

is responsible for:

1. Implementation and analysis/trending of leak rate tests for components identified by the IST Program in accordance with the VY Appendix J Program Plan.
2. Implementation and analysis/trending of leak rate tests for components identified in the IST Program Plan in accordance with OP 4028, Non-Appendix J Leak Rate Testing.
3. Evaluation of leak rate test results and initiation of maintenance work orders as necessary.

6.7 Operations

is responsible for:

1. Preparation and maintenance of procedures required for implementation of the Operations portion of the IST Program. The PISTC maintains overall responsibility and authority for acceptance of

test methodology and acceptance criteria development. Operations shall incorporate acceptance criteria into surveillance procedures as directed by the PISTC. Reference values are controlled and maintained by the PISTC.

2. Determining acceptability of Operations surveillance procedure test results when instrumentation used to perform IST is found out-of-calibration. VYPPF 7013.03 part 1 and Part 2 are completed by the instrument user department. (MOOID9406B_04) DP 0160, "Control of Operations Department Measuring and Test Equipment," refers to DP 0301 for identification of "out of cal" conditions while operability of previous test results is satisfied by completion of VYPPF 7013.03.
3. Review of work orders and work performed to ensure that the appropriate PMT surveillance tests are identified after repair, replacement or routine servicing which could affect component performance (AP 0021).
4. Identifying any additional PMT to be performed by the Operations department as a result of work scope changes and notifying the Shift Manager (AP 0021).
5. Contacting the applicable System Engineer AND the Plant Inservice Test Coordinator (PISTC), depending on the extent of maintenance performed, to coordinate evaluation and/or establishment of reference values.
6. Scheduling routine pump and valve operability tests performed by the Operations Department as required by the IST Program Plan via the AP 4000 process.
7. Initiating and approving VYAPF 4000.01 upon notification from the Shift Engineer for components that enter the "Alert" range. (INS9331OP1) A copy of this form shall be sent to the applicable System Engineer.
8. Approving VYAPF 4000.01 upon receipt of a completed VYPPF 7013.04 from the System Engineer or PISTC to restore an Alert range component to normal frequency testing. A copy of VYAPF 4000.01 shall be sent to the applicable System Engineer. A copy of the completed VYPPF 7013.04 shall be placed in the Operations Department Night Order Book by the Operations Surveillance Coordinator.
9. Determining when to cease cold shutdown testing in preparation for plant startup.

6.8 Shift Operations: Shift Manager and Shift Engineer

is responsible for:

1. Evaluating pump and valve operability using acceptance criteria contained in the surveillance procedure. (LER9308OP2) Refer to Section I of this procedure for non-AP 4000 scheduled/non-IST surveillance acceptance criteria guidelines.
2. Initiating or ensuring Event Reports (ER) and Work Order Requests (WR) are prepared when required. IST related Alert range ERs shall be recommended for assignment to the applicable System Engineer.
3. Promptly notifying the applicable System Engineer and the Operations Control Center (OCC) Supervisor via telephone or pager when IST components fall in the "Alert" or "Required Action" range. (INS9331OP1)
4. Signing the surveillance procedure test data form indicating completion of testing evaluation.
5. Performing tests as directed by the surveillance test schedule.
6. Coordinating pump surveillance tests with the Maintenance Department to permit collection of vibration data as required.
7. Coordinating Maintenance support, as required, regarding testing of other IST components (e.g. manually exercising check valves).
8. Ensuring that the appropriate surveillance tests are performed after repair, replacement, or routine servicing which could affect component performance.
9. Performing additional PMT as identified by the Work Party Leader (AP 0021).

10. Returning completed test data forms to the Operations Department Office for filing per AP 6807, Collection, Temporary Storage and Retrieval of QA Records.
11. Rejecting test data and providing a justification if there is sufficient reason to believe that the test data does not represent the true condition of the component, such as transcription error, instrument malfunction, or operator error. (ER950159_05)(FVY 88-22) Whenever test data is rejected, the Shift Manager shall ensure that an ER is initiated, and shall attach any incomplete surveillance forms. (ER96133_01)

NOTE

If a test is under way (regardless of whether test data has been taken) and it is obvious that an instrument is malfunctioning, the test may be halted and the instruments promptly re-calibrated or replaced. One example might be a wildly fluctuating gauge. Note, however, that in many situations where anomalous data is indicated, it may not be clear that the problem lies with the instrument. In these cases, the Shift Manager should attribute the problem to pump performance.

12. Reviewing test data for operability using the acceptance criteria contained in the surveillance procedure. (LER9308OP2)
13. Initiating corrective action as required. If any abnormality or erratic action is detected when performing testing, an evaluation shall be made by the Shift Engineer and Shift Manager regarding the need for corrective action.

6.9 Maintenance

is responsible for:

1. Relief valve test results, check valve disassembly and examination results, check valve non-intrusive testing results, explosive valve test results, and pump vibration data are analyzed and processed by the Maintenance Department.
2. Scheduling routine valve operability tests not initiated via the AP 4000 process and performed by the Maintenance Department.
3. Notifying the Shift Manager and applicable System Engineer promptly via telephone or pager when IST components are "UNSAT" or in the Required Action range (for example, check valve disassembly and examination (D&E) or mechanical exerciser results).
4. Preparation and revision of procedures necessary to implement the Maintenance portion of the IST Program. The Plant Inservice Test Coordinator (PISTC) maintains overall responsibility for acceptance of test methodology and acceptance criteria development/approval. Reference values are controlled and maintained by the PISTC.
5. Assisting the PISTC with technical justifications when creating new reference values or evaluating post-maintenance test results.
6. Increasing component examination OR test samples when test results indicate additional testing is required.
7. Determining the acceptability of Maintenance procedure test results when instrumentation used to perform IST is found out-of-calibration. DP 0201, "Calibration and Control of Measuring and Test Equipment (M/TE)," identifies actions and responsibilities to address "out of cal" conditions with research, documentation, and operability determination. (MOOID9406B_04)

8. Working with the System Engineer regarding "Alert Range" pumps and their restoration to acceptable performance.
9. Maintaining I&C calibrated instruments identified on the IST Instrument List, Table 21, in a calibration program, calibrated to the required accuracy necessary to satisfy IST Program requirements and, when applicable, design basis requirements. DP 0301, "Calibration and Control of I/C Measuring and Test Equipment (M/TE) and I/C Shop Equipment," provides the controls to satisfy the above requirements.
10. Notifying the PISTC and requesting Operations to initiate VYPPF 7013.03, "Review of Instruments Found Out of Calibration", when "out of cal" conditions are identified per DP 0301. VYPPF 7013.03 part 1 and Part 2 are completed by the instrument user department. (MOOID9406B_04)
11. Review of explosive actuated valve data and ensuring batch requirements specified by ISTC-5260, "Explosive Actuated Valves," are satisfied.
12. Maintaining the explosive charge records required by ISTC-5260, "Explosive Actuated Valves."
13. Taking credit for completed maintenance activities in accordance with the AP 4000 process.
14. Providing vibration data collection support during Operations surveillance testing using VYAPF 0211.02. IST overall peak vibration reference values and acceptance criteria are contained in the Operations surveillance procedure. Relief Requests RR-P01, RR-P04, RR-P09 and RR-P10 contain specific commitments regarding vibration spectrum analysis. Vibration spectrum analysis shall be documented as part of the record of test in accordance with applicable commitments. Collection, analysis and trending of additional pump vibration data shall be in accordance with AP 0211, Predictive Maintenance Program.
15. Assisting the PISTC with technical justifications when creating new reference values or evaluating post-maintenance test results.

6.10 Technical Support Programs Surveillance Test Coordinator (STC)

is responsible for:
maintaining the program database, ensuring that Surveillance Test Notices are issued, generating manual test schedules, monitoring of tests not completed, and notification of plant management of program status as required in accordance with AP 4000.

I-7 GENERAL TESTING REQUIREMENTS

7.1 Inservice Testing

1. General

The VY IST Program and associated implementation procedures have been developed in accordance with the OM-1998 Edition through the OMb-2000 Addenda. General requirements are identified in ISTA. Test requirements for pumps are identified in ISTB. Test requirements for valves are identified in ISTC. Relief valve test requirements are identified in OMb-2000, Appendix I.

NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," and the summary of public workshops on NRC procedure 7356, "Inservice Testing of Pumps and Valves," provide additional guidance on issues specific to inservice testing.

The PISTC is responsible for determining the acceptability of test methods described in implementing procedures. The PISTC shall inform the implementing organizations of required changes when test methods are determined to be questionable or in non-compliance.

2. Pumps

Inservice testing shall commence when the pump is required to be operable. (ISTB-3200)

3. Valves

Inservice testing shall commence when the valve is required to be operable. (ISTC-3200)

7.2 Reference Values

1. Pumps (ISTB-3300)

Reference values shall be determined from the results of preservice testing or from the results of the first inservice test. Reference values shall only be established when the pump is known to be operating acceptably. Reference values shall be at points of operation readily duplicated during subsequent inservice tests. Reference values shall be established in a region of relatively stable pump flow. Reference values shall be established within ±20% of pump design flow rate for the comprehensive test. Reference values shall be established within ±20% of pump design flow rate for the group A and group B tests, if practicable. All pump testing at Vermont Yankee is at reference values within ±20% of design flow. All subsequent inservice test results shall be compared to these initial references or to new reference values established in accordance with this program plan procedure. Related conditions that can significantly influence the measurement or determination of the reference value shall be analyzed and documented on VYPPF 7013.01

When required, the PISTC, and as needed, Operations, Maintenance, Predictive Maintenance Coordinator, and System Engineer, shall establish a new reference value or set of values, or Deviations between the previous and new set of reference values shall be evaluated, and verification that the new values represent acceptable pump operation shall be

NOTE

Certain Pump 10CFR50.55a Requests contain a VY commitment to perform full spectrum vibration analysis on a quarterly basis. All reference value and acceptance criteria documentation shall reflect this commitment.

Pump reference values are controlled and documented in accordance with VYPPF 7013.01. This form is controlled by the PISTC. Reference values are quality assurance records, controlled by PP 7801, "Quality Assurance Records Program."

Upon receipt of a new or revised VYPPF 7013.01 and follow-up AP 0028 Type A Commitment, Operations shall incorporate new reference values and acceptance criteria into the applicable surveillance test procedure prior to the next scheduled test.

a. Effect of Pump Replacement, Repair, and Maintenance on Reference Values (ISTB-3310)

When a reference value or set of values may have been affected by repair, replacement, or routine servicing of a pump, a new reference value or set of values shall be determined, OR the previous value shall be reconfirmed by a comprehensive or group A test run before declaring the pump operable. The PISTC shall determine whether the preservice testing requirements, including a 5-point pump curve, apply. Deviations between the previous and new set of reference values shall be identified, and verification that the new values represent acceptable pump operation shall be documented on VYPPF 7013.01.

b. To Establish an Additional Set of Reference Values – Pumps (ISTB-3320)

If it is necessary or desirable, for some reason other than pump replacement, repair or maintenance, to establish an additional set of reference values, a group A or comprehensive test shall first be run at the conditions of an existing set of reference values and the results analyzed. If operation is acceptable, an additional set of reference values may be established as follows:

(1) For centrifugal and vertical line shaft pumps, the additional set of reference values shall be determined from the 5-point pump curve established in accordance with the preservice testing requirements for the pump.
(2) For positive displacement pumps, reference values shall be established at or near pump design pressure, in accordance with the preservice testing requirements of ISTB-5310.

A test shall be run to verify the new reference values before their implementation. Whenever an additional set of reference values is established, the reasons for doing so shall be justified and documented on VYPPF 7013.01.

2. Valves (ISTC-3300)

Reference values shall be determined from the results of pre-service testing or from the results of inservice testing. These tests shall be performed under conditions as near as practicable to those expected during subsequent inservice testing.

Reference values shall be established only when the valve is known to be operating acceptably. If the particular parameter being measured can be significantly influenced by other related conditions, then these conditions shall be analyzed. The PISTC, Operations, Maintenance, and System Engineer, as needed, shall use the data from an inservice test run prior to returning a valve to operable status to establish or revise reference values.

Valve reference values are controlled and documented in accordance with VYPPF 7013.02. This form is controlled by the PISTC. Reference values are quality assurance records, controlled by PP 7801, "Quality Assurance Records Program."

Upon receipt of a new or revised VYPPF 7013.02 and follow-up AP 0028 Type A Commitment, Operations shall incorporate new reference values and acceptance criteria into the applicable surveillance test procedure.

a. Effect of Valve or Actuator Replacement, Repair, and Maintenance on Reference Values (ISTC-3310)

When a valve or its control system has been replaced, repaired, or has undergone maintenance that could affect the valve's performance, a new reference value shall be determined OR the previous value reconfirmed by an inservice test run prior to the time it is returned to service OR immediately if not removed from service. This test is to demonstrate that performance parameters that could be affected by the replacement, repair, or maintenance are within acceptable limits. Deviations between the previous and new reference values shall be identified, analyzed, and documented on VYPPF 7013.02. Verifications that the new values represent acceptable operation shall be documented on VYPPF 7013.02. Safety and relief valves and Nonreclosing pressure relief devices shall be tested as required by the replacement, repair, and maintenance requirements of OMb-2000, Appendix I.

b. To Establish an Additional Set of Reference Values – Valves (ISTC-3320)

If it is necessary or desirable, for some reason other than valve or actuator replacement, repair or maintenance, to establish an additional set of reference values, an inservice test shall first be run at the conditions of an existing set of reference values, OR, if impractical, at the conditions for which the new reference values are required, and the results analyzed. If operation is acceptable, a second test shall be performed under the new conditions as soon as practicable. The results of the second test shall establish the additional set of reference values.

Whenever an additional set of reference values is established, the reasons for doing so shall be documented on VYPPF 7013.02.

7.3 Frequency of Inservice Tests

1. Scheduling of Inservice Tests

a. Surveillance Frequencies

The Code specifies certain intervals other than quarterly for specific valve tests, and specifies that for pumps in the Alert Range, "the frequency of testing shall be doubled...." The following intervals apply to IST. Note that these intervals are not defined either in the Code or in Vermont Yankee Technical Specifications.

- Day........24 hours
- Week........7 days
- Month........31 days

- "doubled-frequency" for quarterly pump tests ....6 weeks
- Quarterly .... 92 days
- 6 months .... 180 days
- Once per cycle .... 18 months
- 2 years (biennially) .... 24 months
- 5 years .... 60 months
- 10 years .... 120 months

Vermont Yankee Technical Specification 1.0.Y defines "Surveillance Frequency": "Unless otherwise stated in these specifications, periodic surveillance tests, checks, calibrations, and examinations shall be performed within the specified surveillance intervals. These intervals may be adjusted plus 25%. The operating cycle interval is considered to be 18 months and the tolerance stated above is applicable."

Pumps and valves are tested quarterly. At Vermont Yankee, quarterly testing is incorporated into the quarterly schedule for each fuel cycle. In accordance with Technical Specifications, these intervals may be adjusted up to 25% to provide scheduling flexibility. Valve testing may, with technical justification, be deferred to Cold Shutdown or to Refueling Outage frequency, if required to establish safe, repeatable test conditions. Testing at intervals other than those permitted by the Code requires prior approval by NRC of a Relief Request or Proposed Alternative.

Pumps and valves in systems out of service shall be tested within 3 months prior to placing the system into service. While in service, pumps and valves shall be tested quarterly.

2. <u>Quarterly Testing</u>

Pumps and valves are required by the Code to be tested "nominally every three months," unless testing at another frequency is required or permitted. "Every three months" means "quarterly," which is defined as at least once every 92 days.

Testing pumps at a frequency less than quarterly (interval exceeding 92 days) is not permitted by the Code. Therefore, an NRC-authorized Relief Request is required to test pumps at an interval greater than quarterly.

The following paragraphs describe testing intervals other than quarterly.

3. <u>Pumps and Valves in Regular Use (ISTB-3410; ISTC-3550)</u>

Pumps and valves that are operated more frequently than every 3 months need not be run or stopped for a special test, provided that the plant records show that each such component was operated at least once every 3 months at the reference conditions, and the quantities specified were determined, recorded, and analyzed in accordance with the Code requirements.

4. <u>Pumps and Valves in Systems Out of Service (ISTB-3420; ISTC-3570)</u>

For a pump or valve in a system declared inoperable or not required to be operable, the test schedule need not be followed. Within 3 months prior to placing the system in an operable status, the component shall be tested and the test schedule followed in accordance with the requirements of the

Code. Pumps that can only be tested during plant operation shall be tested within 1 week following plant startup.

5. Pumps Lacking Required Fluid Inventory (ISTB-3430)

Pumps lacking required fluid inventory (e.g., pumps in dry sumps) need not be tested in accordance with the Code every 3 months. These pumps shall be tested at least once every 2 years. The required fluid inventory shall be provided during this test.

6. Cold Shutdown Testing (ISTC-3520)

Each component covered by the IST Program Plan scope that cannot be tested quarterly has been analyzed to determine when appropriate testing may be performed. If operation of a valve is not practical during station operation, the Code allows several options, including part–stroke exercising during normal station operation, and full–stroke exercising at cold shutdown.

Since the Code allows testing at cold shutdown, this Program Plan does not request relief for valve testing that is delayed until cold shutdown. The IST Program Plan provides a Cold Shutdown Justification (CSJ) for the deferral of testing until cold shutdown. A CSJ is prepared for each valve or group of valves that requires deferral until Cold Shutdown.

Valve exercising to be performed during cold shutdown shall commence within 48 hours of achieving cold shutdown and continue until all testing is complete or the plant is ready to return to power. For extended outages, testing need not begin in 48 hours provided that all valves required to be tested during cold shutdown will be tested before plant startup. All valves tested during cold shutdown outages shall also be tested before startup from refueling outages, unless testing has been completed within the previous 92 days. The Vermont Yankee staff shall make a good faith reasonable effort to schedule and test all cold-shutdown-deferred valves during a cold shutdown.

7. Refueling Outage Testing (ISTC-3520)

Since the Code permits testing at refueling outages for those cases where cold-shutdown testing is impracticable, this Program does not request NRC approval for relief for valve testing that is delayed until the next refueling outage. The IST Program Plan provides a Refueling Outage Justification (ROJ) that documents the basis for delaying testing until the next refueling outage. A ROJ is prepared for each valve or group of valves that requires deferral until refueling.

8. Testing At A Refueling Outage Frequency For Components Tested During Power Ascension

The Code requires that valves tested on a refueling outage frequency be tested prior to returning the plant to operation. However, the Reactor Core Isolation Cooling System (RCIC) and the High Pressure Coolant Injection System (HPCI) are driven by steam turbines. Therefore, consistent with the guidance in NUREG–1482, para. 3.1.1.2, "Testing At A Refueling Outage Frequency For Components Tested During Power Ascension," certain valves in the HPCI and RCIC systems will be tested in accordance with Technical Specifications following refueling outages. This guidance will also be applied to HPCI and RCIC operability testing following maintenance performed during a cold shutdown. The required post–maintenance testing shall be performed during power ascension as from a refueling outage.

9. Manual Valve Testing (ISTC-3540)

The Code permits exercising manual valves as infrequently as once every 5 years. However, it its incorporation of the OM-1998 Edition through the OMb-2000 Addenda, NRC specifically restricted the manual valve exercise interval to 2 years (10CFR50.55a(b)(3)(vi). Vermont Yankee shall exercise manual valves at least once per cycle. Valves that are exercised once per cycle shall be exercised at least once every 18 months, consistent with the previous discussion on Surveillance Frequency.

10. Test Deferral Justifications (ISTC-9200(b) and (c)

In accordance with the Code, certain valves are full stroke exercised during Cold Shutdown conditions when the valve cannot be exercised during normal operation. When the valve cannot be exercised during Cold Shutdown conditions, then the valve is full stroke exercised during Refueling Outages. The technical justification for exercising a valve during Cold Shutdowns or Refueling Outages, rather than during Normal Operations, is provided in a Cold Shutdown or Refueling Outage Justification. Since the Code requires that check valves in a sample disassembly and examination (D&E) program be disassembled and examined during refueling outages, the check valve sample D&E program and bases are described in Refueling Outage Justification.

Cold Shutdown and Refueling Outage Justifications are numbered in a "XXJ-VNN, Revision Z" format, where:

XXJ:	CSJ for Cold Shutdown Justifications, ROJ for Refueling Outage Justifications.
V:	for Valves.
NN:	A unique sequential number,.
Z:	Revision Status.

For example: CSJ-V03, Rev 0, would be the third Cold Shutdown Justification for Valves.

7.4 Instrumentation and Data Collection

1. General

There are several terms describing measured and limiting values that are used in the Code, as well as throughout the IST Program Plan Document and its associated documents. The following terms are defined:

Measured Value: The value of a parameter indicated by the instrumentation used to measure the parameter. The instrument accuracy determines the relationship between the measured value and the actual value of the parameter.

Design Maximum Actuation Time (DMAT): The maximum actual value of a parameter, based on analysis, Design Basis, or Licensing Basis.

Limiting Value: The maximum (or minimum) permissible actual value of a measured parameter. The Limiting Value = (DMAT) + (instrument uncertainty). When the Limiting Value is exceeded, the component shall immediately be declared inoperable. A Limiting Value has no tolerance, since instrument accuracy is included.

2. Instrument Accuracy

Instrumentation requirements for pump testing are specified in ISTB-3500. Instrumentation for pump testing at Vermont Yankee is selected in accordance with these requirements. Using information and concurrence from Maintenance, Operations, and Design Engineering, the PISTC is responsible for the selection of appropriate instrumentation.

Vermont Yankee IST instrument accuracy and calibration requirements are described and controlled in accordance with DP 0301, "Calibration and Control of I/C Measuring and Test Equipment (M/TE) and I/C Shop Equipment"; DP 0201, "Calibration and Control of Measuring and Test Equipment (M/TE)"; or in specific calibration procedures. These procedures and the EMPAC database establish the controls necessary to ensure instruments used for inservice testing meet the Code-specified accuracy requirements. NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants" and the summary of public workshops on NRC procedure 7356, "Inservice Testing of Pumps and Valves," provide additional guidance on instrumentation issues specific to inservice testing. Special exceptions to specific instrumentation requirements identified in the Code have been approved as described in IST Program Relief Requests.

The instruments used for inservice testing at VY are identified in PP 7013, Table 21. The Maintenance Department is responsible for maintaining these instruments within the required range and accuracy. VYPPF 7013.03 is used to document the effect of "out of cal" instruments on past test results for instruments under the control of DP 0301. Instrument range and accuracy requirements are specified in the applicable Operations surveillance procedure. Accuracy requirements for permanent plant instrumentation can be found in the calculation referenced in the surveillance procedure or Setpoint Control program.

3. Precision in Measurement and Calculation

a. Measurements

The precision of a measurement is determined by the instrument used. Test personnel should record measurements to the maximum precision permitted by the specific instrument. For example, if you measure the valve stroke time using a digital stopwatch that displays times to 0.01 seconds, and the reading is 23.90 seconds, record the number as displayed. Recording this measurement as "23.9" implies that this time was measured using a less precise stopwatch.

When an analog instrument is used, the precision is determined by the increments on the scale. Readings are acceptable to a degree of precision no smaller than one-half (½) the smallest marked increment. For example, a gauge that has a full-scale range of 0-12,000 gpm has marked increments of 200 gpm. If the indicated flow is between 6000 gpm and 6200 gpm, then the acceptable readings are 6000 gpm, 6100 gpm, or 6200 gpm, depending on whether the indication is closer to the middle or closer to the line for either 6000 gpm or 6200 gpm. A reading of 6050 gpm would not be possible or acceptable for a gauge with increments of 200 gpm.

b. Calculated Quantities - Pumps

Calculations performed within a surveillance procedure should be to the same precision as the measured quantities. For example, pump differential pressure for certain pumps is determined by subtracting the suction pressure from the discharge pressure. The differential pressure should be calculated with the same precision (number of decimal points) as the individual gauges. If the individual gauges have different precision (one is readable to 0.1 and the other is readable to 1), round the calculation to the same number of decimal places as the least precise individual gauge. For example, if the suction pressure reads 10.3 and the discharge pressure reads 40, the difference (29.7) would be rounded to 30 psid.

IST pump acceptance criteria are typically rounded to one decimal place (x.x) when calculating hydraulic parameters and three decimal places (x.xxx) for vibration parameters.

c. Calculated Quantities - Valves

The acceptance criteria for valve stroke testing are typically rounded to the nearest 0.1 seconds.

4. Acceptance Criteria

a. Acceptance Criteria For Pumps

(1) ISTB-5000, including Tables ISTB-5100-1, -5200-1, 5300-1, and Figure ISTB-5200-1, specify allowable ranges of pump test quantities.

(2) Pump acceptance criteria shall be documented on VYPPF 7013.01 and retained in the "IST Pump Reference Value Binder." Acceptance criteria are quality assurance records, controlled by PP 7801, "Quality Assurance Records Program."

(3) A copy of this information with the follow-up AP 0028 Type A Commitment, if required, is forwarded to Operations for incorporation into the appropriate surveillance procedures.

(4) Tables ISTB-5100-1, -5200-1, 5300-1, and Figure ISTB-5200-1 provide the allowable ranges for pump test parameters. When Limiting Values are more limiting, the Code allowable range shall be truncated to the Limiting Value.

(5) The allowable variance from fixed reference points is discussed in NUREG-1482, Section 5.3. The Code does not provide for a variance from a fixed reference value; however, the NRC has determined that if the design does not support establishing and maintaining flow at an exact value, then achieving a steady flow rate or differential pressure at approximately the set value does not require relief. A total tolerance of ±2 percent of the reference value is allowed without approval from the NRC. For a tolerance greater than ±2 percent (greater than ±2 percent may be necessary depending on the precision of the instrument), a corresponding adjustment to acceptance criteria may be made to compensate for the uncertainty, or an evaluation would be performed and documented justifying a greater tolerance. In using this guidance, the variance and the method for establishing the variance must be documented in the IST program documents or implementing procedures.

b. Acceptance Criteria for IST Stroke Timed Valves (ISTC-5100)

Valve acceptance criteria information shall be documented on VYPPF 7013.02 and retained in the IST Valve Reference Value Binder. A copy of this information and follow-up AP 0028 Type A Commitment is forwarded to Operations for incorporation into the appropriate surveillance procedures. Acceptance criteria are quality assurance records, controlled by PP 7801, "Quality Assurance Records Program."

ISTC-5121(b); -5131(b); -5141(b); and -5151(b) require the Owner to establish Limiting Values of full stroke time. These values are based on design requirements and may truncate the Code allowable acceptance criteria. ISTC-5122; -5132; -5142; and 5152 provide the allowable stroke time ranges for power operated valves, NOT to exceed their Limiting Value.

c. Acceptance Criteria for Category C Check Valves:

A check valve's full-stroke to the open position may be verified by passing the maximum required accident condition flow through the valve. This is considered by the NRC as an acceptable full-stroke. If it can be established by non-intrusive test (NIT) that a measured flow fully opens the check valve, this is also an acceptable full stroke. Any flow rate less than this will be considered a partial-stroke exercise. A valid full-stroke exercise by flow requires that the flow through the valve be known.

The necessary valve obturator movement shall be demonstrated by exercising the valve and observing that the obturator travels to the seat on cessation or reversal of flow, AND opens to the position required to fulfill its safety-related function. Observation may be by observing a direct indicator such as a position indicating device, or by other indicators such as changes in system pressure, flow rate, level, temperature, seat leakage testing, or other positive means. Use of radiography and check valve diagnostic equipment qualifies as "other positive means."

Check valve mechanical exercise acceptance criteria information shall be documented on VYPPF 7013.02 and retained in the IST Valve Reference Value Binder. The mechanical exercise acceptance criteria information and follow-up AP 0028 Type A Commitment is forwarded to Operations or Maintenance as applicable for incorporation into the appropriate surveillance procedures.

d. Acceptance Criteria for Category C Safety and Relief Valves:

OMb-2000, Appendix I outlines specific requirements which must be satisfied regarding as-found testing, acceptance criteria, increased samples, grouping of valves, and periodic testing. Setpoint and leakage acceptance criteria are established by Vermont Yankee.

Safety and relief valve acceptance criteria are controlled by PP 7204, "Safety & Relief Valve Program." Changes to safety and relief valve acceptance criteria are controlled by the procedure revision process; therefore, no specific form is used.

e. Acceptance Criteria for Category D Explosive Valves:

ISTC-5260 "Explosively Actuated Valves," specifies the acceptance criteria for these valves. OP 4203, "Maintenance and Testing of SLC Squib Valves," implements the explosive valve test requirements for the SLC system. OP 5334, "TIP Shear Valve Squib Charge Testing and Replacement," implements the explosive valve test requirements for the TIP system. Changes to explosive valve acceptance criteria are controlled by the procedure revision process; therefore, no specific form is used.

f. Acceptance Criteria for Category A Valve Seat Leakage Rate

ISTC-3620, "Containment Isolation Valves," requires testing these valves in accordance with 10CFR50, Appendix J. Acceptance criteria for these valves are controlled by PP 7006, "Primary Containment Leak Rate Testing Program."

ISTC-3630, "Leakage Rate for Other Than Containment Isolation Valves," specifies the seat leakage testing requirements for Category A valves with a leakage requirement not based on the 10CFR50 Appendix J Program. These valves are tested by OP 4028, "Non-Appendix J Leak Rate Testing," or other implementing surveillance procedures. Changes to valve leak rate acceptance criteria are controlled by the procedure revision process; therefore, no specific form is used.

I-8 SPECIFIC TESTING REQUIREMENTS

8.1 Pump Testing (ISTB-5000)

1. <u>Test Methods</u>

A new feature of the Code for the 4th Ten-Year Interval is the introduction of group A pump testing, group B pump testing, and comprehensive pump testing. As described in the Definitions, Section I-5, group A pumps are those that are run during routine operation, including reactor startup and shutdown. Most of the pumps in the Vermont Yankee IST Program are group A pumps. Group B pumps are those that are in standby systems and are not operated routinely except for testing. At Vermont Yankee, only the Core Spray, HPCI, RCIC, and SLC pumps are group B pumps.

The differences between a group A pump test and a group B pump test are as follows:

a. Group B tests do not require vibration testing
b. Group B tests do not require the 2 minute run after stabilization that the group A test requires.

The comprehensive test is new. The requirements for the biennial comprehensive test are as follows:

a. The comprehensive test shall be performed at least once every 2 years (biennially).
b. The accuracy requirement for pressure and for differential pressure measurements is ±½%, rather than the ±2% requirement for the quarterly group A and group B tests. At Vermont Yankee, all M&TE gauges are ±¼%, so that this requirement does not introduce a new method of testing. The instrumentation acceptable for pump testing is listed in Table 21.
c. The comprehensive pump test reference flow value shall be within ±20% of the pump design flow. At Vermont Yankee, all pump testing already occurs within ±20% of pump design flow, so that this requirement does not introduce a new method of testing.
d. The hydraulic acceptance criteria for the comprehensive pump test are more stringent than those for the quarterly group A and group B tests.
e. The quarterly group A and group B tests for centrifugal pumps (other than vertical line shaft pumps) do not have Alert ranges for hydraulic parameters. The biennial comprehensive test has an Alert range for hydraulic parameters. Therefore, a centrifugal pump in the Alert range will require a comprehensive pump test annually (doubled frequency). However, vertical line shaft pumps and positive displacement pumps continue to have an Alert range for the group A test, as well as the comprehensive test. Therefore, it is still possible to require testing a vertical line shaft or positive displacement pump every 6 weeks (double the quarterly frequency) for a pump in the Alert range.

Certain system designs do not allow the fixed parameter to be set at an exact value because of limitations in the instruments and controls for maintaining steady-state conditions. The NRC has determined that if the design does not allow for establishing and maintaining flow at an exact value, achieving a steady flow rate or differential pressure at approximately the set value does not require relief. A total tolerance of ±2 percent of the reference value is allowed without approval from the NRC.

When a group A test is required, a comprehensive test may be substituted. When a group B test is required, a group A test or a comprehensive test may be substituted. A preservice test may be substituted for any inservice test.

2. Duration of Tests

For the group A and the comprehensive test, after pump conditions are as stable as the system permits, each pump shall be run at least 2 minutes. At the end of this time at least one measurement or observation of each of the required quantities shall be made and recorded. For the group B test, after pump conditions are stable, at least one measurement or determination of the required quantities shall be made and recorded.

3. Centrifugal Pumps, Except Vertical Line Shaft Centrifugal Pumps

   a. Group A Test Procedure

   b. Group B Test Procedure

   c. Comprehensive Test Procedure

4. Vertical Line Shaft Centrifugal Pumps (SW and RHRSW)

   a. Group A Test Procedure

   b. Group B Test Procedure

   c. Comprehensive Test Procedure

5. Positive Displacement Pumps

   a. Group A Test Procedure

   b. Group B Test Procedure

   c. Comprehensive Test Procedure

8.2 Valve Testing (ISTC-3500)

1. Exercising Test Frequency (ISTC-3510)

Active Category A, Category B, and Category C check valves shall be exercised quarterly, except as justified in a Cold Shutdown Justification, Refueling Outage Justification, or NRC-authorized alternative.

2. Exercising Requirements, Category A and B Valves (ISTC-3521)

Category A and B valves shall be full-stroke exercised during operation at power. If full-stroke exercising at power is not practicable, it may be limited to part-stroke during operation at power and full-stroke during cold shutdown. If exercising is not practicable during operation at power, it may be limited to full-stroke exercising during cold shutdowns. If exercising is not practicable during operation at power and full-stroke exercising during cold shutdown is also not practicable, it may be limited to part-stroke during cold shutdowns, and full-stroke during refueling outages. If exercising is not practicable during operation at power or cold shutdown, it may be limited to full-stroke during refueling outages.

Valves full-stroke exercised at cold shutdown shall be exercised during each cold shutdown, except as specified in this paragraph. Valves need not be exercised if the time period since the previous full-stroke exercise is less than 92 days. During extended shutdowns, valves that are required to be operable shall be exercised quarterly. Valve exercising during cold shutdown shall commence within 48 hours of achieving cold shutdown and continue until all testing is complete or the plant is ready to return to operation at power. For extended outages, testing need not be commenced in 48 hours, provided that all valves required to be tested during cold shutdown will be tested before or as part of plant startup. It is not the intent of the Code to keep the plant in cold shutdown to complete cold shutdown testing. Vermont Yankee shall make a good-faith, reasonable effort to complete all cold shutdown testing during each cold shutdown.

All valve testing required to be performed during cold shutdown or a refueling outage shall be completed before returning the plant to operation at power at the conclusion of a refueling outage.

3. Exercising Requirements, Category C Check Valves (ISTC-3522)

Category C check valves shall be exercised as follows:

During operation at power, each check valve shall be exercised or examined in a manner that verifies obturator travel. Each check valve exercise test shall include open and close tests. This is a new requirement for the 4th Ten-Year Interval IST Program Plan. Open and close tests need only be performed at an interval when it is practicable to perform both tests. Test order shall be determined by Operations and the PISTC. Open and close tests are not required to be performed at the same time if they are both performed within the same interval. If exercising is not practicable during operation at power, it shall be performed during cold shutdowns. If exercising is not practicable during operation at power or cold shutdown, it shall be performed during refueling outages.

Valves full-stroke exercised at cold shutdown shall be exercised during each cold shutdown, except as specified in this paragraph. Valves need not be exercised if the time period since the previous exercise is less than 92 days. During extended shutdowns, valves that are required to be operable shall be exercised quarterly. Valve exercising shall commence within 48 hours of achieving cold shutdown and continue until all testing is complete or the plant is ready to return to operation at power. For extended outages, testing need not be commenced in 48 hours, provided that all valves required to be tested during cold shutdown will be tested before or as part of plant startup. It is not the intent of the Code to keep the plant in cold shutdown to complete cold shutdown testing. Vermont Yankee shall make a good-faith, reasonable effort to complete all cold shutdown testing during each cold shutdown.

All valve testing required to be performed during cold shutdown or a refueling outage shall be completed before returning the plant to operation at power at the conclusion of a refueling outage.

4. Valve Obturator Movement (ISTC-3530)

   The necessary valve obturator movement shall be determined by exercising the valve while observing an appropriate indicator, such as indicating lights that signal the required changes of obturator position, or by observing other evidence, such as changes in system pressure, flow rate, level, or temperature, that reflects change of obturator position.

5. Manual Valves (ISTC-3540)

   Manual valves shall be full-stroke exercised at least once every 18 months.

6. Fail-Safe Valves (ISTC-3560)

   Valves with fail-safe actuators shall be tested by observing the operation of the actuator upon loss of actuating power. The actuating power to AOVs is air; the actuating power to HOVs is hydraulic pressure; and the actuating power to SOVs is electric power.

7. Valve Leakage Rate Testing (ISTC-3600)

   a. Containment Isolation Valves (ISTC-3620)

   The Code requires that containment isolation valves shall be tested in accordance with 10CFR50, Appendix J. Containment isolation valves are tested in accordance with the Vermont Yankee Appendix J Testing Program.

   b. Leakage Rate For Other Than Containment Isolation Valves (ISTC-3630)

   The Code requires that Category A valves with a leakage requirement not based on the Appendix J Program shall be tested to verify that their seat leakage is within acceptable limits. This includes such valves as reactor coolant system pressure isolation valves (RCS PIVs) and ADS accumulator inlet check valves.

8. Valve Position Verification (ISTC-3700)

   Valves with remote position indication shall be observed locally at least once every 2 years to verify that valve operation is accurately indicated.

9. Instrumentation (ISTC-3800)

   See Section I-7.4.

10. Power-Operated Valves (ISTC-5100)

   Power-Operated Relief Valves (ISTC-5110): Vermont Yankee has no Power-Operated Relief Valves, as defined in ISTC-2000.

   a. Valve Stroke Testing

   Active power-operated valves shall be stroke time tested while being exercised in accordance with ISTC-3500. The Limiting Value of full-stroke time is specified on the individual Valve Reference Data Set (VYPPF 7013.02). The stroke time shall be measured to the nearest 0.1 seconds. Any abnormality or erratic action shall be recorded, and an ER shall be written.

Valves with reference stroke times (ST_{ref}) less than 1.33 seconds may be classified as "fast-acting" valves, but they need not be. The classification of fast-acting shall be documented on the Reference Data Set, VYPPF 7013.02.

b. Stroke Test Acceptance Criteria

(1) Motor-Operated Valves (ISTC-5120)

- For MOVs with $ST_{ref} > 10$ seconds, the acceptable range is $0.85{*}ST_{ref} \leq ST \leq 1.15{*}ST_{ref}$
- For MOVs with $ST_{ref} \leq 10$ seconds, the acceptable range is $0.75{*}ST_{ref} \leq ST \leq 1.25{*}ST_{ref}$
- MOVs with $ST_{ref} < 2$ seconds may be classified as "fast-acting." Valves that are classified as fast-acting have a stroke-time acceptance criterion of $\leq$2 seconds.

(2) Pneumatically-Operated Valves (ISTC-5130)

- For AOVs with $ST_{ref} > 10$ seconds, the acceptable range is $0.75{*}ST_{ref} \leq ST \leq 1.25{*}ST_{ref}$
- For AOVs with $ST_{ref} \leq 10$ seconds, the acceptable range is $0.50{*}ST_{ref} \leq ST \leq 1.50{*}ST_{ref}$
- AOVs with $ST_{ref} < 2$ seconds may be classified as "fast-acting." Valves that are classified as fast-acting have a stroke-time acceptance criterion of $\leq$2 seconds.

(3) Hydraulically-Operated Valves (ISTC-5140)

- For HOVs with $ST_{ref} > 10$ seconds, the acceptable range is $0.75{*}ST_{ref} \leq ST \leq 1.25{*}ST_{ref}$
- For HOVs with $ST_{ref} \leq 10$ seconds, the acceptable range is $0.50{*}ST_{ref} \leq ST \leq 1.50{*}ST_{ref}$
- HOVs with $ST_{ref} < 2$ seconds may be classified as "fast-acting." Valves that are classified as fast-acting have a stroke-time acceptance criterion of $\leq$2 seconds.

(4) Solenoid-Operated Valves (ISTC-5150)

- For SOVs with $ST_{ref} > 10$ seconds, the acceptable range is $0.75{*}ST_{ref} \leq ST \leq 1.25{*}ST_{ref}$
- For SOVs with $ST_{ref} \leq 10$ seconds, the acceptable range is $0.50{*}ST_{ref} \leq ST \leq 1.50{*}ST_{ref}$
- SOVs with $ST_{ref} < 2$ seconds may be classified as "fast-acting." Valves that are classified as fast-acting have a stroke-time acceptance criterion of $\leq$2 seconds.

c. Stroke Test Corrective Action

See Section I-9.3, Corrective Action

11. Manual Valves (ISTC-5210)

Manual valves shall be tested at least once every 18 months, as described above. If a valve fails to exhibit the required change of obturator position, the valve shall be immediately declared inoperable. Manual valves equipped with remote position indication shall receive a position indication verification test at least once every two years.

12. Check Valves (ISTC-5220)

a) The necessary valve obturator movement during exercise testing shall be demonstrated by performing both an open AND a close test.
b) If a mechanical exerciser is used to exercise the valve, the force or torque required to move the obturator and fulfill its safety function shall meet the acceptance criteria specified by the Owner. Valves that are exercised mechanically are tested in a way that satisfies the other Code requirements for such valves: missing obturator; sticking; binding; loss or movement of any weights; and the acceptance criteria consider the design, application, and historical performance of the valves.
c) If the above test methods are impractical for certain check valves, or if sufficient flow cannot be achieved or verified, a sample disassembly and examination (D&E) program shall be used to verify valve obturator movement. The details and bases of the check valve sample disassembly and examination program are provided in a program description (ROJ-V25).
d) Check Valve Condition Monitoring Program
Vermont Yankee has not yet implemented a Check Valve Condition Monitoring Program in accordance with Appendix II as an alternative to the requirements of ISTC-3510; -3520; -3540; and -5221.
e) Series Check Valves in Pairs
Vermont Yankee has no series check valve pairs in the IST Program.

The check valve disassembly and examination grouping criteria and sampling program are controlled by PP 7202, "Check Valve Program," and implemented by OP 4222, "Disassembly and examination of Check Valves." Changes to the disassembly and examination criteria are controlled by the procedure revision process; therefore, no specific form is used.

13. Vacuum Breaker Valves (ISTC-5230)

Simple check valves used as vacuum breakers shall be tested as Check Valves in accordance with ISTC-5220. Capacity-certified Class 2 & 3 vacuum breakers shall be tested in accordance with OMb-2000, Appendix I at least once every 10 years. Primary containment vacuum breakers shall be tested in accordance with OMb-2000, Appendix I at least once every 6 months.

14. Safety Valves and Relief Valves (ISTC-5240)

Safety valves and relief valves shall meet the inservice testing requirements of OMb-2000, Appendix I.

15. Rupture Disks (ISTC-5250)

Class 2 & 3 rupture disks shall be replaced in accordance with OMb-2000, Appendix I-1370 at least once every 5 years, unless historical data indicates a requirement for more frequent replacement. Control rod drive HCU rupture disks are not within the scope of this requirement.

16. Explosively-Actuated Valves (ISTC-5260)

Explosively actuated valve records shall be kept in accordance with ISTC-5260(a) and (b), and explosively actuated valves shall be tested in accordance with ISTC-5260(c) and (d). The service life records shall include the following:

a. The date of manufacture

b. Batch number

c. Installation date

d. The date when the service life expires

In no case shall the service life exceed 10 years. At least once every 2 years or each fuel cycle, whichever is less, the service life records of each valve shall be reviewed to verify the service lives of the charges have not been exceeded and will not be exceeded prior to the next refueling. Replacement of explosive charges shall be scheduled to ensure that the maximum service life is not exceeded. At least 20% of the charges in explosively actuated valves shall be fired and replaced at least once every 2 years. If a charge fails to fire, all charges with the same batch number shall be removed, discarded, and replaced with charges from a different batch. Replacement charges shall be from batches from which a sample charge shall have been tested satisfactorily and with a service life such that the maximum service life is not exceeded.

I-9 MONITORING, ANALYSIS, AND EVALUATION

9.1 Trending

1. Pumps (ISTB-6100)

The System Engineer reviews the pump hydraulic data and vibration overall peak velocity data, looking for signs of component degradation. The System Engineer is responsible for taking the necessary action when concerns are identified during data analysis. The hydraulic and vibration test parameters measured or determined during periodic testing shall be trended.

2. Valves

The System Engineer reviews the data looking for signs of component degradation and is responsible for taking the necessary action when concerns are identified during data analysis. The test parameters measured or determined during periodic testing shall be trended.

9.2 Analysis and Records

1. Pumps

Routine testing of pumps in the IST Program is scheduled and performed by the Operations department with the Maintenance department providing vibration data collection.

The IST acceptance criteria for each pump are specified in the surveillance procedure. Operations personnel record the hydraulic test data and obtain the overall peak vibration values taken by Maintenance personnel and provided to the Shift Engineer.

Following data collection, the Shift Engineer and Shift Manager have the necessary information to determine operability of the specific pump (ER950159_02 & 03). Certain Pump Relief Requests contain VY commitments to perform full spectrum vibration monitoring on a quarterly basis. Documented evidence of vibration spectrum monitoring is required to satisfy these commitments.

Maintenance uploads data from the vibration data collector to a PC for additional analysis. The Predictive Maintenance Coordinator routinely reviews the vibration spectra for each vibration measurement location, looking for changes in the signature (an indication of potential component degradation). The Predictive

Maintenance Coordinator is responsible for taking the necessary action to inform the System Engineer when concerns are identified during periodic data analysis.

If the test data falls in the Acceptable Range for all test parameters, the surveillance procedure is signed off by the Shift Engineer and the Shift Manager and forwarded to the Control Room Supervisor (CRS). The CRS electronically updates the AP 4000 surveillance database to take credit for the completed surveillance.

A copy of the surveillance data form is forwarded to the responsible System Engineer for additional trending and analysis. The original, signed procedure is the "Record Of Test" required by the Code. The Shift Engineer signature satisfies ISTA-9230(j) as the signature of the person responsible for analyzing the test. This document is controlled by the Operations department and is a QA record in accordance with station procedures. The Record of Test is retained by the Operations Department until it is incorporated into the electronic records management system, in accordance with station procedures.

When returning a pump from increased frequency testing to its normal test frequency, the System Engineer shall perform a thorough evaluation and complete VYPPF 7013.04. The PISTC shall initiate VYAPF 4000.01. Operations shall send a completed copy of VYAPF 4000.01 to the System Engineer.

2. Valves

a. General

Routine testing of valves in the IST Program is scheduled and performed by the Operations department. The IST acceptance criteria for each power-operated valve are specified in the surveillance procedure. Operations personnel record the valve exercise, stroke times, and fail-safe credit as required by the procedure.

Following data collection, the Shift Engineer and Shift Manager have the necessary information to determine operability of the specific valve and close the procedure.

If the test data falls in the Acceptable Range for all test parameters, the surveillance procedure is signed by the Shift Engineer and the Shift Manager and forwarded to the Control Room Supervisor (CRS). The CRS electronically updates the AP 4000 surveillance database to take credit for the completed surveillance.

A copy of the surveillance data form is forwarded to the responsible System Engineer for trending and analysis purposes. The signed, original procedure is the "Record Of Test" required by the Code. The Shift Engineer signature satisfies ISTA-9230(j), as the signature of the person responsible for analyzing the test. The Record of Test is retained by the Operations department until it is incorporated into the electronic records management system, in accordance with station procedures.

If the test data falls in the Required Action range for any test parameter, the component shall be immediately declared inoperable or immediately retested in accordance with Section I-9.3, "Corrective Action," of this Program Plan. The Shift Engineer or Shift Manager is responsible for initiating an Event Report and the necessary notifications in accordance with station policy and procedures.

If the test data falls outside the Limiting Value or if the valve fails to stroke, the valve shall be declared inoperable. No retest is permitted. Actions should be taken to preserve the as-found conditions, assisting in the troubleshooting process. Every effort should be put forth to preserve as-found plant conditions to allow Maintenance and Engineering to troubleshoot an event without compromise. In the case of a plant emergency, the preservation of as-found conditions is considered secondary to the operational safety of the plant. (ER960133_01)

b. Check Valve Disassembly Test Data

Routine disassembly and examination of check valves is scheduled and performed by the Maintenance department. The IST acceptance criteria are specified in the maintenance procedure or repetitive task work order. Maintenance personnel record the results for parameters required by the procedure or work order. IST check valves are included in the VY Check Valve Program (PP 7202) and disassembled and inspected using generic disassembly and examination procedure OP 4222.

If the examination result is satisfactory, the procedure/work order is signed off and forwarded to the Maintenance Surveillance Coordinator. The Maintenance Surveillance Coordinator electronically updates the AP 4000 surveillance database to take credit for the completed surveillance.

If the examination result is unsatisfactory, the component is inoperable and the Supervisor Maintenance Support (Mechanical) is responsible for initiating an ER and the necessary notifications in accordance with Section I-9.3, "Corrective Action," of this program plan in addition to other actions as may be required by station policy.

If the unsatisfactory check valve is part of a sample disassembly group, Maintenance Support shall ensure that the remaining valves in the group are disassembled and inspected during the same outage.

The original, signed procedure or work order is the "Record Of Test" required by the Code. The Supervisor Maintenance Support (Mechanical) signature satisfies ISTA-9230(j) as the signature of the person responsible for analyzing the test. This document is a quality assurance record and is handled in accordance with PP 7801, "Quality Assurance Records Program."

c. Check Valve Non-Intrusive (NIT) Test Data

Routine non-intrusive testing of check valves is scheduled and performed by the Maintenance department. The IST acceptance criteria are specified in the maintenance procedure or repetitive task work order.

Maintenance personnel record the results for parameters required by the procedure. IST check valves are included in the VY Check Valve Program (PP 7202) and non-intrusively tested using generic non-intrusive testing procedure OP 4223.

The responsible Maintenance Engineer reviews the acoustic or ultrasonic traces looking for changes in the signature (an indication of component degradation). This individual is responsible for taking the necessary action to notify the System Engineer when concerns are identified anytime during periodic data analysis.

If the trace review and test results are satisfactory, the procedure or work order is signed off and forwarded to the Maintenance Surveillance Coordinator. The Maintenance Surveillance Coordinator electronically updates the surveillance database to take credit for the completed surveillance.

The original procedure or work order containing the responsible Maintenance Engineer's report is then forwarded to the PISTC for review. The PISTC reviews the data to ensure compliance with IST Program requirements.

If the NIT result is unsatisfactory, the component shall be declared inoperable, and the Maintenance Engineer is responsible for initiating an ER and the necessary notifications in accordance with Section I-9.3, "Corrective Action," of this Program Plan. Based on the required notifications, the System Engineer and the PISTC are involved in the resolution process.

If the unsatisfactory check valve is part of a sample NIT program group, the Maintenance Engineer shall ensure that the remaining valves in the group are non-intrusively tested (or disassembled and inspected) during the same outage.

The original, signed procedure or work order is the "Record of Test" as required by the Code. The Maintenance Engineer signature satisfies ISTA-9230(j) as the signature of the person responsible for analyzing the test. This document is a quality assurance record and is handled in accordance with PP 7801, "Quality Assurance Records Program."

d. <u>Check Valve- Radiography Data</u>

Routine radiography of check valves is scheduled and performed by Project Engineering. IST acceptance of radiography results relies on the joint interpretation of the Supervisor Code Programs or designee and the PISTC.

If the radiography results are satisfactory, the work order or radiographer's report is signed off and forwarded to the Supervisor Code Programs or designee. The Supervisor Code Programs or designee electronically updates the AP 4000 surveillance database to take credit for the completed surveillance.

If the radiograph result is unsatisfactory, the component is inoperable, and the PISTC is responsible for initiating an Event Report and the necessary notifications in addition to other actions as may be required by station policy. A work request is also initiated by the PISTC to correct the unsatisfactory condition.

If the unsatisfactory check valve is part of a sample radiography program group, the remaining valves in the group shall also be radiographed during the same outage. The PISTC informs the Supervisor Code Programs or designee to increase the sample as applicable.

The original, signed radiography report and the film are the "Record Of Test" as required by ISTA-9230(j). The Supervisor Code Programs or designee signature and the signature of the PISTC satisfy the Code as the signature of the person responsible for analyzing the test. This quality assurance record is forwarded to the Document Control Center (DCC) for record retention in accordance with PP 7801.

e. <u>Explosive Actuated Valve Test Data</u>

Routine explosive (squib) valve testing is scheduled and performed by the Maintenance Department. The Standby Liquid Control (SLC) and Traversing Incore Probe (TIP) systems contain squib valves. The IST acceptance criteria are specified in the appropriate Maintenance procedure (OP 4203 or OP 5334).

Following data collection and squib valve detonation, Maintenance Support has the necessary information to determine operability of the squib vales and close the surveillance.

If the test result is satisfactory, the surveillance procedure is signed off and forwarded to the Maintenance Surveillance Coordinator. The Maintenance Surveillance Coordinator electronically updates the AP 4000 surveillance database to take credit for the completed surveillance.

The original, signed procedure is the "Record of Test" as required by the Code. The Maintenance Supervisor or Maintenance Engineer signature satisfies ISTA-9230(j) as the signature of the person responsible for analyzing the test. This document is a quality assurance record and is handled in accordance with PP 7801, "Quality Assurance Records Program."

f. Valve Leak Rate Data

Routine local leak rate testing (LLRT) of Appendix J valves is scheduled by the Appendix J Program Coordinator and performed by the Operations department. IST acceptance of Appendix J LLRT results relies on the criteria established in accordance with the Appendix J Program.

Routine leak rate testing of non-Appendix J valves is scheduled by the Appendix J Program Coordinator and performed by the Operations department. IST acceptance of non-Appendix J leak rate results relies on the criteria established in accordance with licensing or design basis requirements as applicable.

If the leak rate results are satisfactory, the procedure is signed off. The Appendix J Program Coordinator electronically updates the AP 4000 surveillance database to take credit for the completed surveillance. No additional analysis or trending is required beyond the actions determined by the Appendix J Program Coordinator. The Appendix J Program Coordinator provides the System Engineers with LLRT status reports during outages to keep responsible individuals informed.

If the LLRT result is unsatisfactory the component is inoperable, and the Appendix J Program Coordinator is responsible for initiating an ER in addition to other actions as may be required by station policy.

The original, signed procedure is the "Record Of Test" as required by the Code. The signature of the person completing the procedure satisfies ISTA-9230(j) as the signature of the person responsible for analyzing the test. This quality assurance record is handled in accordance with PP 7801, "Quality Assurance Records Program."

g. Excess Flow Check Valve (EFCV) Test Data

Routine testing of the EFCVs is scheduled and performed by the Maintenance Department (I&C). The IST acceptance criteria are specified in the maintenance procedure (OP 4378). Maintenance personnel record the test results in accordance with the procedure.

If a test result is unsatisfactory, the component shall be declared inoperable, and Maintenance shall ensure that an ER is initiated and that the necessary notifications are made in accordance with Section I-9.3, "Corrective Actions," in this Program Plan in addition to other actions as may be required by Station policy.

When an EFCV is determined to be inoperable, Maintenance shall ensure that the performance criterion, "less than or equal to one failure per year on a three-year rolling average," is not exceeded (RR-V19). Maintenance shall initiate corrective action as required in accordance with OP 4378 to improve EFCV performance.

The original, signed procedure is the "Record Of Test" as required by ISTA-9230(j). The Maintenance signature satisfies the Code requirement as the person responsible for analyzing the test. This document shall be retained as a quality record in accordance with PP 7801, "Quality Assurance Records Program."

h. Relief Device Test Data

Routine testing or replacement of relief devices is scheduled and performed by the Maintenance department. IST relief devices are included in the Safety & Relief Valve Program (PP 7204) and are bench tested using generic procedure OP 4261 for Class 2 and 3 devices and OP 4200 and OP 4201 for Class 1 devices. Sample and grouping criteria in accordance with Appendix I of the OM Code are prescribed in Program Procedure PP 7204.

Rupture discs are replaced using repetitive preventive maintenance work orders.

If the test result is satisfactory, the work order is signed off and forwarded to the Maintenance Surveillance Coordinator. The Maintenance Surveillance Coordinator electronically updates the AP 4000 surveillance database to take credit for the completed surveillance.

If the test result is unsatisfactory, the component is inoperable, and Maintenance is responsible initiating an ER in addition to other actions as may be required by Station policy.

If the unsatisfactory relief valve is grouped and part of a sample program, Maintenance shall, upon setpoint failure notification, ensure that two additional valves in the same group are tested. If either one of these two additional valves fails, all the remaining valves in the group shall be tested.

The signed, original procedure or work order is the "Record Of Test" as required by ISTA-9230(j). This document is retained by the Maintenance department and is a QA record handled in accordance with PP 7801, "Quality Assurance Records Program."

9.3 Corrective Action

1. Pumps (ISTB-6200)

If the test data falls in the Alert Range for any test parameter the Shift Engineer or Shift Manager is responsible for initiating an Event Report and the necessary notifications in accordance with Section I-6, Responsibilities, of this Program Plan. Operations shall initiate the test frequency change VYAPF 4000.01 to double the frequency of testing until the cause of the deviation is determined and the condition corrected. Operations shall send a copy of VYAPF 4000.01 to the applicable System Engineer. The System Engineer shall, upon receipt of the Alert Range test results, follow-up and ensure that the pump has been placed on increased frequency testing and pursue resolution to the change in component performance. The System Engineer shall, in a timely manner, enlist support as necessary to determine the cause and establish short term corrective actions. This should be completed prior to the next test (that is, 6 weeks). Long term corrective action plans and actions to prevent recurrence shall be established as soon as practical.

If the test data falls in the Required Action Range for any test parameter, the component shall be declared inoperable until the cause of the deviation is determined and the condition corrected in accordance with ISTB-6200. The Shift Engineer or Shift Manager is responsible for initiating an Event Report and the necessary notifications in accordance with station policy and procedures. Based on the required notifications the System Engineer, Maintenance, and the PISTC are involved in the resolution process.

ISTB-6200 provides an additional alternative to declaring a pump inoperable until the cause is determined and the condition corrected. Using ISTB-6200(c), the pump may be used as follows. In cases where the pump's test parameters are within either the Alert or the Required Action range and the pump's continued use at the changed values is supported by an analysis, a new set of reference values may be established. This analysis shall include the following:

- Verification of the pump's operational readiness
- A pump-level and a system-level evaluation of operational readiness
- The cause of the change in pump performance
- An evaluation of all trends indicated by available data
- The results of this analysis shall be documented in the Record of Tests

The System Engineer and Fluid Systems Design, with concurrence of the PISTC, shall perform the analysis described above. A new set of reference values shall be established after the PISTC concurs with the conclusions in the analysis. The new reference values shall be documented on VYPPF 7013.01, and the analysis of pump and system operational readiness, cause, and trends, and any corrective action plan or compensatory actions shall be documented as attachments to the VYPPF 7013.01.

2. Power-Operated Valves (ISTC-5123; -5133; 5143; 5153)

If a valve fails to exhibit the required change of obturator position or exceeds the Limiting Value of full-stroke time, the valve shall be immediately declared inoperable. An Event Report shall be initiated in accordance with AP 0009.

Valves with measured stroke times that meet the Limiting Value but do not meet the acceptance criteria as documented on VYPPF 7013.02 shall be immediately retested or declared inoperable. If the valve is retested and the result is acceptable, the cause of the initial deviation shall be analyzed and the results documented on the Record Of Test (the signed surveillance test procedure and the Event Report). The results of both the initial unsatisfactory test and the successful test shall be documented on an Event Report.

If the valve is retested and the second set of data is still within the Limiting Value and also does not meet the acceptance criteria, the data shall be analyzed within 96 hours to verify that the new stroke time represents acceptable valve operation, or the valve shall be declared inoperable. The results of both unsatisfactory tests shall be documented on an Event Report.

Valves that are declared inoperable may be repaired, replaced, or the data may be analyzed to determine the cause of the deviation and the valve shown to be operating acceptably. Valve operability based upon analysis shall have the results of the analysis documented in the Record of Tests (the ER and subsequent revision of VYPPF 7013.02). Acceptable operation will be defined by analysis or review to include, as a minimum, the actual component performance and acceptance criteria in comparison to the component and system design requirements.

Before returning a repaired or replacement valve to service, a test demonstrating satisfactory operation shall be performed.

3. Check Valves (ISTC-5224)

If a check valve fails to exhibit the required change of obturator position, it shall be declared inoperable. Before returning a repaired or replacement check valve to service, a test demonstrating satisfactory operation shall be performed.

I-10 RECORDS AND REPORTS

10.1 Records

The information to be contained in pump records is specified in ISTB-9100, and the information to be contained in valve records is specified in ISTC-9110 and OMb-2000, Appendix I-5100. At Vermont Yankee, this information is in EMPAC, RIMS, Technical Specifications, UFSAR, and DBDs. Certain information is duplicated in the IST Component database for ease of retrieval and convenience in printing IST information.

10.2 Test Plans

Vermont Yankee has prepared the IST Program Plan in accordance with the requirements of ISTA-9210, ISTB-9200, and ISTC-9200. In addition, this test plan contains the information suggested in NUREG-1482, and generally follows the NUREG-suggested format. In addition to the information in the IST Program Plan, pump hydraulic test circuits, location of measurements, reference values, and acceptance criteria are described by the Operations surveillance test procedures.

10.3 Record of Tests

At Vermont Yankee, the original, signed surveillance test procedure or work order contains the information required by ISTA-9230 for pumps and valves, and by I-5200, "Record of Tests," for pressure relief devices. Reference values and acceptance criteria are maintained in hard-copy. The QA record of the reference data set is the one that is attached to the AP 0028 Type A commitment that is sent to Operations to make necessary changes to the surveillance procedures. These reference data sets (RDSs) satisfy the ISTB-3110 and ISTC-3310 requirement for the Record of Test to document the evaluation and justification for changes to reference values. These RDSs are controlled by PP 7013 and the information is documented on VYPPF 7013.01 and VYPPF 7013.02

10.4 Record of Corrective Action

ISTA-9240 requires that the Owner maintain records of corrective action. These records shall include a summary of the corrective actions made, the subsequent inservice tests or examinations, confirmation of operational adequacy, and the printed name and signature of the person responsible for corrective action and verification of results. OMb-2000, Appendix I-5300 contains additional requirements concerning modification to pressure relief devices or valves. The Vermont Yankee Corrective Action Program (PP 7017 and AP 0009) documents the corrective actions, which includes a cause determination by the responsible department or group, signed by the person responsible for the corrective action, and a satisfactory performance of the required surveillance test (verification of results).

I-11 TECHNICAL POSITIONS AND CLARIFICATIONS

11.1 As Found Testing and Preconditioning

Where practical, components shall be tested in the as-found condition. Preconditioning shall not be performed.

11.2 Full-Stroke Exercising of Valves

Active power-operated valves and manual valves, except check valves, shall be exercised fully open and fully closed during periodic testing. These valves shall be both fully opened and fully closed, regardless of which directions are stroke-timed. Valves that are throttled shall be opened or closed, as determined by Operations, and then cycled through a full open/close cycle and returned to the throttled position. Full-stroke exercising in both directions fully meets the requirements of the Code.

11.3 Valve Position Indication Testing

All valves with remote (that is, in the Main Control Room) position indication shall be tested for position indication verification in both directions. This includes both passive and active valves with safety functions in either or both directions. Only by testing position indication in both directions can position indication be assured for the position of interest.

11.4 Safety Position of Safety and Relief Valves

The safety function and the ASME Section III Code design function of a safety or relief valve is to open to prevent system overpressure. After a pressure relief valve opens, it is not required by the Code to reclose. Prior to opening, a pressure relief valve is relied upon to provide a passive pressure boundary function. The Vermont Yankee IST Program Plan conservatively lists the safety function of tested pressure relief valves as both open and close. However, reclosure of a pressure relief valve after opening to perform its overpressure protection function is not a required safety function.

11.5 Safety and Relief Valve Sequence of Testing

OM-1987 Part 1 specifies a particular sequence of testing for all tests on safety and relief valves. An ASME Code Committee interpretation clarified that it was not the intent of the Code to require all tests in a specific sequence. A subsequent Edition of the OM Code removed this confusion. Prior to maintenance or set-pressure adjustment, visual examination, as-found seat leakage testing, and setpoint testing shall be performed in the specified sequence. The remaining tests shall be performed after maintenance or set-pressure adjustments.

I-12 RELIEF REQUESTS DISCUSSION

12.1 General

Specific requests for relief are obtained in accordance with 10CFR50.55a(a)(3), (f)(4)(iv), (f)(5), and (f)(6). Where conformance with the requirements of the Code have been determined to be impracticable, alternate testing is proposed that would provide an acceptable level of quality and safety. Where conformance with the requirements of the Code would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety, alternate testing is proposed that would provide sufficient information to assess the operational readiness of the component tested.

The Relief Requests describe the components and tests involved, the existing Code requirement, the basis for relief, the proposed alternate testing, and the status of the USNRC evaluation to the Relief Request. In general, Relief Requests may not be implemented prior to NRC authorization.

If testing requirements are determined to be impracticable during the course of the interval, additional or modified Relief Requests will be submitted in accordance with 10CFR50.55a(f)(5)(iv).

Relief Requests are numbered in a "RR-YNN, Revision Z" format, where:

RR:	for Relief Request.
Y:	P for Pumps, V for Valves.
NN:	A unique sequential number.
Z:	Revision Status.

For example, RR-V09, Rev 0, would be the 9th Relief Request for Valves.

12.2 Periodic Review

Relief Requests, Cold Shutdown Justifications, and Refueling Outage Justifications shall be reviewed periodically for continued applicability. This review shall be documented. Additions, deletions, or changes to Relief Requests or test deferral justifications shall be made as required. This review should be performed within 90 days following each refueling outage.

12.3 Relief Request Changes for the 4th Ten-Year Interval

The relief requests that are being submitted with the 4th Interval IST Program Plan have been renumbered to make the numbering consecutive. Several Relief Requests were withdrawn during the previous intervals, resulting in many unused numbers. Therefore, renumbering was performed to make the list more compact.

12.4 Current Relief Requests For VY

The following Relief Requests apply to the Vermont Yankee Fourth Ten-Year Interval IST Program and are being submitted to NRC for authorization:

RR-P01
RR-P02
RR-P03
RR-P04

RR-V01
RR-V02

I-13 PROGRAM ADMINISTRATION

13.1 Procedure Forms and Attachments

The forms and attachments associated with this Program Plan Procedure may be completed by filling out a printed hard copy of the form or by using a computer-generated form. If the form is computer-generated, it shall meet the requirements of the Procedure Writers Guide, AP 0098.

13.2 Pump Reference Values

This section provides detailed instructions for the establishment and revision of IST pump reference values in accordance with the Code and the VY IST Program Plan.

Reference values shall be determined from the results of pre-service testing or from the results of inservice testing. These tests shall be performed under conditions as near as practicable to those expected during subsequent inservice testing.

Reference values shall only be established when the pump is known to be operating acceptably. If the particular parameter being measured can be significantly influenced by other related conditions, then these conditions shall be analyzed. The PISTC, and as needed, Operations, Maintenance Engineer and System Engineer, shall use the data from an inservice test run prior to returning a pump to operable status to establish or revise reference values.

Pump reference values are controlled and documented in accordance with VYPPF 7013.01. This form is controlled by the PISTC. Reference values are lifetime quality assurance records, controlled by PP 7801, "Quality Assurance Records Program."

Upon receipt of a new or revised VYPPF 7013.01 and follow-up AP 0028 Type A Commitment, Operations shall incorporate new reference values and acceptance criteria into the applicable surveillance test procedure.

1. Effect of PUMP Replacement, Repair, and Maintenance on Reference Values

   When a reference value or set of values may have been affected by repair, replacement, or routine servicing of a pump, a new reference value or set of values shall be determined OR the previous value reconfirmed by an inservice test run prior to declaring the pump operable.

   Deviations between the previous and new set of reference values shall be identified, and verification that the new values represent acceptable pump operation shall be placed in the record of tests (VYPPF 7013.01).

   a. New Pump Reference Value Required

   NOTE

   The PISTC shall perform the following steps when a reference value or set of values has been affected by pump replacement, repair, design change or maintenance.

   Using VYPPF 7013.01 document the following:

(1) Component specific background information.
(2) Test results compared to the previous reference data. Review the deviations and identify that the deviations can be attributed to the replacement, repair or maintenance performed.
(3) An analysis of the new test data. Review the test data to verify that the new values represent acceptable pump operation.
(4) A brief description of component specific design requirements.
(5) A conclusion summary.
(6) New hydraulic and vibration acceptance criteria values.
(7) Appropriate attachments to support the conclusion summary.
(8) Required signatures (PISTC, Predictive Maintenance Coordinator and System Engineer).

Forward a copy of VYPPF 7013.01 and follow-up AP 0028 Type A Commitment to Operations for incorporation of the new reference data set into the applicable Operations surveillance procedure.

b. Pump Reference Value Reconfirmed

NOTE

Upon receipt of the data from Operations, the System Engineer shall perform the following steps when a reference value, or set of values is not believed to have been affected by minor pump repair or maintenance.

After the post-maintenance surveillance test is performed with results in the acceptable range, review the data and compare each parameter to the existing reference value.

If the test data remains in close proximity with the reference value make a note in the IST trend electronic file that the existing reference values were reconfirmed. Otherwise inform the PISTC that the minor repair or maintenance appears to have affected the reference value and consideration should be given to establishing a new reference value in lieu of re-confirmation.

In the event the minor repair or maintenance had a negative effect on pump performance, consideration should be given to requesting corrective action to restore pump performance.

2. To Establish an Additional Set of Reference Values - PUMPS

If it is necessary or desirable, for some reason other than pump replacement, repair or maintenance, to establish an additional set of reference values, an inservice test shall first be run at the conditions of an existing set of reference values and the results analyzed. IF operation is acceptable, a second test run at the new reference conditions shall follow as soon as practical. The results of the second test shall establish the additional set of reference values.

Whenever an additional set of reference values is established, the reasons for doing so shall be justified and documented on VYPPF 7013.01.

As needed, the PISTC, Operations, the Mechanical Maintenance Engineer, Predictive Maintenance Coordinator, and System Engineer, shall perform the following using form VYPPF 7013.01:

(1) Request the Operations Department to run an inservice test, first at the operating conditions of the existing reference values and the second test at the operating conditions of the proposed reference values. The procedural format used to obtain the second set of data shall be determined on a case-by-case basis.
(2) Analyze the data from the inservice test run at the operating conditions of the initial reference values in accordance with surveillance procedure requirements.
(3) If the test data falls in the Acceptable Range for the existing reference values, proceed with establishment of the second set of values.
(4) If the initial test data falls in the Alert or Required Action Range for the existing reference values, inform the Shift Manager of the need to initiate appropriate corrective actions. Additional reference values shall not be established at this time.
(5) Review the data from the inservice test run at the operating conditions of the new reference values to verify that the new values represent acceptable pump operation.
(6) If the test data is considered acceptable, this data shall establish the additional set of reference values.
(7) If the test data is not considered acceptable based on analysis or engineering evaluation, inform the Shift Manager that corrective actions may be required, and initiate an Event Report in accordance with AP 0009. Additional reference values shall not be established at this time.

Upon establishment of the additional set of reference values, complete VYPPF 7013.01 and follow-up with a AP 0028 Type A Commitment. Forward a copy of these forms to Operations for incorporation of the new additional reference data set into the applicable Operations surveillance procedure.

13.3 Valve Reference Values

This section provides detailed instructions for the establishment and revision of IST valve reference values in accordance with the Code and the VY IST Program Plan.

Reference values shall be determined from the results of pre-service testing or from the results of inservice testing. These tests shall be performed under conditions as near as practicable to those expected during subsequent inservice testing.

Reference values shall only be established when the valve is known to be operating acceptably. If the particular parameter being measured can be significantly influenced by other related conditions, then these conditions shall be analyzed. The PISTC, and as needed, Operations, Maintenance Engineer, and System Engineer, shall use the data from an inservice test run prior to returning a valve to operable status to establish or revise reference values.

Valve reference values are controlled and documented in accordance with VYPPF 7013.02. This form is controlled by the PISTC. Reference values are categorized as lifetime quality assurance records, controlled by PP 7801, "Quality Assurance Records Program."

Upon receipt of a new or revised VYPPF 7013.02, supporting 10CFR50.59 review in accordance with AP 6002, and follow-up AP 0028 Type A Commitment, Operations shall incorporate new reference values and acceptance criteria into the applicable surveillance test procedure.

1. Effect of VALVE or Actuator Replacement, Repair, and Maintenance on Reference Values

When a valve or its control system has been replaced, repaired, or has undergone maintenance that could affect the valve's performance, a new reference value shall be determined OR the previous value reconfirmed by an inservice test run prior to the time it is returned to service OR immediately if not removed from service, to demonstrate that performance parameters which could be affected by the replacement, repair, or maintenance are within acceptable limits.

Deviations between the previous and new reference values shall be identified and analyzed. Verification that the new values represent acceptable operation shall be documented on VYPPF 7013.02.

a. New Valve Reference Value Required

> **NOTE**
>
> The PISTC shall perform the following steps when a reference value or set of values has been affected by valve replacement, repair, design change or maintenance.

Using VYPPF 7013.02, document the following:

(1) Component specific background information.
(2) Test results compared to the previous reference data. Review the deviations and identify that the deviations can be attributed to the replacement, repair or maintenance performed.
(3) An analysis of the new test data. Review the test data to verify that the new values represent acceptable valve operation. Whenever practical, verification of new reference values should be made using more than one set of test data. In this case the reference value shall be based on the data from the first test and the data from the second test shall fall in the acceptable range established from the first test data OR the average of multiple baseline tests may be used to establish the new reference value.
(4) A brief description of component specific design requirements.
(5) A conclusion summary.
(6) Acceptance criteria values.
(7) Appropriate attachments to support the conclusion summary.
(8) Required signatures (PISTC and System Engineer).

Forward a copy of VYPPF 7013.02 and follow-up AP 0028 Type A Commitment to Operations for incorporation of the new reference values into the applicable Operations surveillance procedure.

b. Valve Reference Value Reconfirmed

> **NOTE**
>
> Upon receipt of the data from Operations, the System Engineer shall perform the following steps when a reference value or set of values is not believed to have been affected by minor valve repair or maintenance.

After the post-maintenance surveillance test is performed with results in the acceptable range, review the data and compare each parameter to the existing reference value.

If the test data remains in close proximity with the reference value make a note in the IST trend electronic file that the existing reference values were reconfirmed. Otherwise inform the PISTC that the minor repair or maintenance appears to have affected the reference value and consideration should be given to establishing a new reference value in lieu of re-confirmation.

In the event the minor repair or maintenance had a negative effect on valve performance, consideration should be given to requesting corrective action to restore valve performance.

2. To Establish an Additional Set of Reference Values - VALVES

If it is necessary or desirable, for some reason other than valve or actuator replacement, repair or maintenance, to establish an additional set of reference values, an inservice test shall first be run at the conditions of an existing set of reference values, OR, if impractical, at the conditions for which the new reference values are required, and the results analyzed. **IF** operation is acceptable, a second test shall be performed under the new conditions as soon as practical. The results of the second test shall establish the additional set of reference values.

Whenever an additional set of reference values is established, the reasons for doing so shall be documented on VYPPF 7013.02.

The PISTC, and as needed, Operations, Mechanical Maintenance Engineer, and System Engineer, shall perform the following using VYPPF 7013.02:

(1) Request the Operations Department to run an inservice test, first at the operating conditions of the initial reference values and the second test at the operating conditions of the proposed reference values. The procedural format used to obtain the second set of data shall be determined on a case-by-case basis.
(2) Analyze the data from the inservice test run at the operating conditions of the initial reference values in accordance with surveillance procedure requirements.
(3) If the test data falls in the Acceptable Range for the initial reference values, proceed with establishment of the second set of values.
(4) If the initial test data falls in the Required Action Range for the existing reference values, inform the Shift Manager of the need to initiate appropriate corrective actions. Additional reference values shall not be established at this time.
(5) Review the data from the inservice test run at the operating conditions of the new reference values to verify that the new values represent acceptable valve operation.
(6) If the test data is considered acceptable, this data shall establish the additional set of reference values.
(7) If the test data is not considered acceptable based on analysis or engineering evaluation, inform the Shift Manager that corrective actions may be required, and initiate an Event Report in accordance with AP 0009. Additional reference values shall not be established at this time.

Upon establishment of the additional set of reference values, complete VYPPF 7013.02 and follow-up with a AP 0028 Type A Commitment, if required. Forward a copy of these forms to Operations for incorporation of the new additional reference data set into the applicable Operations surveillance procedure.

13.4 Determination of Design Basis Limiting Values

The initial step in determining IST acceptance criteria is the research and identification of design basis limiting values. This information is generally specified in the UFSAR or Technical Specifications or in approved engineering documents such as DBDs, engineering calculations, and VY engineering letters associated with the system file. It is imperative that this information be identified during the process of determining IST acceptance criteria to eliminate the possibility of allowing components to operate outside their design basis values.

In the event design basis information does not exist at the component level for a specific IST component, Fluid Systems Design Engineering is responsible for documenting this conclusion.

For components with no specific design basis limiting values, the PISTC may calculate administrative limits using Code guidance and good engineering judgment as described in Tables 1 and 2 of this Program Plan.

After design basis limiting information has been identified, the PISTC shall record this information and the source references in the IST Component Database.

13.5 IST Acceptance Criteria

ISTB-5000 outlines specific requirements which must be satisfied regarding allowable ranges of pump test quantities. Tables ISTB-5100-1; ISTB-5200-1; ISTB-5300-1 and ISTB-5300-2 provide the allowable ranges for test parameters. When design basis Limiting Values are more limiting, the Code allowable range shall be truncated to the Limiting Value.

Pump acceptance criteria information shall be documented on VYPPF 7013.01 and retained in the System Engineering IST Pump Reference Value Binder. A copy of this information and follow-up AP 0028 Type A Commitment, if required, is forwarded to the Operations Department for incorporation into the appropriate surveillance procedure. Acceptance criteria are lifetime quality assurance records, controlled by PP 7801, "Quality Assurance Records Program."

13.6 Cold Shutdown Testing

The PISTC initially identifies components that require testing during cold shutdown conditions using IST Program Plan commitments.

Technical Support is responsible for maintaining the Cold Shutdown Surveillance Schedule in accordance with changes submitted by the PISTC. Upon PISTC approval of the proposed cold shutdown valve list, Work Control generates the required cold shutdown schedule task items.

During cold shutdowns, testing shall begin within 48 hours of reaching cold shutdown. Cold shutdown testing on individual valves is not required if the time period since the previous test is less than 3 months. Valves tested at a cold shutdown frequency may include valves tested while decreasing power to cold shutdown or while increasing power to steady state power operation (NUREG-1482, 3.1.1.1). All valves tested during cold shutdown outages shall also be tested prior to startup from refueling outages, unless testing has been completed in the previous 3 months.

During the first cold shutdown following a refuel outage, the list of cold shutdown surveillances shall be reviewed by Operations, with concurrence from the PISTC, to determine the initial sequence of cold shutdown testing to be used throughout the operating cycle.

Valve testing during cold shutdown shall commence within 48 hours of achieving cold shutdown and shall continue until all testing is complete or the plant is ready to return to power. Operations shall make a "good faith, reasonable effort" to test valves during the cold shutdown. For extended outages, testing need not be commenced within 48 hours provided that all valves required to be tested during cold shutdown are tested prior to plant startup.

Since the Code does not include schedules for cold shutdown testing, an acceptable method is for the valves tested in the preceding cold shutdown to be the last valves on the schedule for the next cold shutdown, except for valves tested each cold shutdown. This method is identified in NUREG-1482, Section 3.1.1.1, "IST Cold Shutdown Testing." Operations ensures that cold shutdown tests are performed in sequence, based on previous completion dates.

Testing should begin with the surveillance test having the earliest completion, considering plant conditions and test prerequisites. Operations is responsible for providing the technical basis for any tests not performed. If scheduling permits, a partial procedure may be completed with the balance of the procedure performed during a subsequent cold shutdown.

The Operations Department determines when cold shutdown testing should cease to allow preparation for returning the plant to power. In the event startup is delayed, consideration should be given to continuing cold shutdown testing.

13.7 Non-AP 4000 Scheduled and Non-IST-Required Surveillance Testing

When non-routine, non-AP 4000, or non-IST-required surveillance tests are performed using procedures containing IST acceptance criteria to obtain additional data, the following guidelines apply:

The IST Alert Range, if identified in the procedure, does not require action to place the component on increased frequency testing and does not require an ER to be initiated if the data recorded falls in the Alert Range. Testing of this nature is typically driven by existing ERs to collect data as part of a corrective action plan. System Engineer notification by the Shift Engineer is the appropriate response.

The IST Required Action Limits and the Limiting Values shall to be used anytime the surveillance procedure is performed at the conditions stated in the procedure. The actions identified in Section I-9.3, Corrective Action, of this Program Plan are applicable.

I-14 FLOW DIAGRAMS

Table I-1 provides a listing of the Flow Diagrams that depict the components, subsystems, and systems contained within the Fourth-Interval IST Program. Drawing number G-191155 explains the symbols and designations provided on the Flow Diagrams.

The Safety Classifications depicted on the Flow Diagrams are subject to the limitations stated in the PP 7003, Vermont Yankee Safety Classification Program.

"For Information Only" copies of the Flow Diagrams shall be provided with each USNRC Submittal. The copies shall be current as of the date of the IST Program Plan submittal. Controlled copies of the Flow Diagrams are maintained at Vermont Yankee to ensure that all system additions and modifications are addressed in the Fourth-Interval IST Program.

Table I-1

LIST OF INSERVICE TESTING FLOW DIAGRAMS

TEST TABLE	SYSTEM	FLOW DIAGRAM	FLOW DIAGRAM TITLE
01	CAD	VY-E-75-002	Containment Atmosphere Dilution System
02	CRD	G-191170	Control Rod Drive Hydraulic System
03	CS	G-191168	Core Spray System
04	DGSA	G-191160 Sh 7	Diesel Generator Starting Air System
05	FO	G-191162 Sh 2	Fuel Oil - Miscellaneous Systems
06	FPC	G-191173 Sh 1	Fuel Pool Cooling & Cleanup System
06	FPC	G-191173 Sh 2	Fuel Pool Cooling & Cleanup System
07	HPCI	5920-870	HPCI Turbine Oil Piping Diagram
07	HPCI	G-191169 Sh 1	High Pressure Coolant Injection System
07	HPCI	G-191169 Sh 2	High Pressure Coolant Injection System
08	HVAC	G-191237 Sh 2	HVAC - Turbine, Service & Control Room Building
08	HVAC	G-191238	HVAC - Reactor Building
09	IA	G-191160 Sh 1	Instrument Air System
09	IA	G-191160 Sh 2	Instrument Air System
09	IA	G-191160 Sh 3	Instrument Air System
09	IA	G-191160 Sh 4	Instrument Air System
09	IA	G-191160 Sh 8	Instrument Air System
09	IA	G-191175 Sh 2	Nitrogen Supply System
n/a	N/A	G-191155	Piping and Instrumentation Symbols
10	NB	G-191167	Nuclear Boiler
10	NB	G-191267 Sh 1	Nuclear Boiler Vessel Instrumentation
10	NB	G-191267 Sh 2	Nuclear Boiler Vessel Instrumentation
11	NM	5920-271	Neutron Monitoring System
01	PASS	G-191165	Sampling System
12	PCAC	G-191175 Sh 1	Primary Containment & Atmosphere Control
13	RBCCW	G-191159 Sh 3	RCW Cooling Water System
13	RBCCW	G-191159 Sh 5	Recirculation Pump Cooling Water
14	RCIC	5920-7049	RCIC Turbine Oil Piping Diagram
14	RCIC	G-191174 Sh 1	Reactor Core Isolation Cooling System
14	RCIC	G-191174 Sh 2	Reactor Core Isolation Cooling System
15	RDW	G-191177 Sh 1	Radwaste Systems
15	RDW	G-191177 Sh 3	Radwaste Systems
16	RHR	G-191172	Residual Heat Removal System
17	RWCU	G-191178 Sh 1	Reactor Water Clean Up System
09	SA	G-191160 Sh 5	Service Air System
09	SA	G-191160 Sh 6	Service Air System
18	SLC	G-191171	Standby Liquid Control System
19	SW	G-191157 Sh 1	Condensate Feedwater and Air Evacuation
19	SW	G-191157 Sh 2	Condensate Feedwater and Air Evacuation
19	SW	G-191159 Sh 1	Service Water System
19	SW	G-191159 Sh 2	Service Water System

I-15 REFERENCES

a. License No. DPR-28 (Docket No. 50-271).

b. United States Code of Federal Regulations, Title 10 Chapter 1, Part 50, Section 50.55a (67FR187, dated September 26, 2002).

c. ASME OM Code-1998 Edition, through OMb-2000 Addenda, "Code For Operation And Maintenance Of Nuclear Power Plants"

d. ASME/ANSI Standard OMa-1988 Addenda to ASME/ANSI OM-1987, "Operation and Maintenance of Nuclear Power Plants".

e. Letter, Mr. J.P. Pelletier, VYNPC, to Document Control Desk, USNRC, "Vermont Yankee Nuclear Power Corporation Inservice Testing Program Update," BVY 92-98, dated August 13, 1992.

f. Letter, Mr. P.M. Sears, USNRC, to Mr. L.A. Tremblay, VYNPC, "Vermont Yankee Nuclear Power Station, Approval of the Use of ASME/ANSI Standard OMa-1988 With Clarification," NVY 92-161, dated September 2, 1992.

g. Letter, Mr. J.G. Partlow, USNRC, to All Holders of Light Water Reactor Operating Licenses and Construction Permits, "Supplement to Minutes of the Public Meetings on Generic Letter 89-04", dated September 26, 1991.

h. Letter, Mr. J.G. Partlow, USNRC, to All Holders of Light Water Reactor Operating Licenses and Construction Permits, "Minutes of the Public Meetings on Generic Letter 89-04", NVY 89-239, dated October 25, 1989.

i. Letter, Mr. W.P. Murphy, VYNPC, to Document Control Desk, USNRC, "Response to USNRC Generic Letter 89-04: Guidance on Developing acceptable Inservice Testing Programs", BVY 89-90, dated October 3, 1989.

j. Letter, Mr. S.A. Varga, USNRC, to All Holders of Light Water Reactor Operating Licenses and Construction Permits, "Guidance on Developing Acceptable Inservice Testing Programs (Generic Letter 89-04)", NVY 89-75, dated April 3, 1989.

k. Letter, Mr. W.P. Murphy, VYNPC, to Dr. Thomas E. Murley, USNRC, "Response to USNRC Generic Letter 87-06: Periodic Verification of Leak-Tight Integrity of Pressure Isolation Valves", FVY 87-64, dated June 11, 1987.

l. Letter, Mr. R.W. Reid, USNRC, to Mr. R.H. Groce, YAEC, "NRC Staff Guidance for Preparing Pump and Valve Testing Program Descriptions and Associated Relief Requests Pursuant to 10CFR50.55a(g)," dated January 10, 1978.

m. Letter, Mr. R.W. Reid, USNRC, to Mr. R.H. Groce, YAEC, "NRC Staff Guidance for Complying with Certain Provisions of 10CFR50.55a(g), 'Inservice Inspection Requirements'," dated November 17, 1976.

n. Vermont Yankee Updated Final Safety Analysis Report.

o. Vermont Yankee Technical Specifications.

p. Letter, Mr. J.P. Pelletier, VYNPC, to Document Control Desk, USNRC, "Submittal of Vermont Yankee Nuclear Power Corporation Third-Interval Inservice Testing Program Plan and Safety Evaluation Responses," BVY 92-133, dated November 30, 1992.

q. Letter, Mr. D.H. Dorman, USNRC, to Mr. J.P. Pelletier, VYNPC, "Relief from the ASME Section XI Requirement to Update (On a 120-Month Interval) the Inservice Inspection and Testing Programs at Vermont Yankee (TAC No. M85067)," NVY 93-031, dated April 6, 1993.

r. Letter, Mr. D.H. Dorman, USNRC, to Mr. D.A. Reid, VYNPC, "Safety Evaluation of the Inservice Testing Program Relief Requests for Pumps and Valves, Vermont Yankee Nuclear Power Station (TAC No. M85067)," NVY 93-151, dated September 3, 1993.

s. Letter, Mr. D.A. Reid, VYNPC, to Document Control Desk, USNRC, "Proposed Change No. 168 to the Vermont Yankee Technical Specifications - Auxiliary Electric Power System Technical Specifications and Associated Revision to the Vermont Yankee Inservice Testing Program," BVY 93-30, dated August 4, 1993.

t. Letter, Mr. W.R. Butler, USNRC, to Mr. D.A. Reid, VYNPC, "Issuance of Amendment No. 138 to Facility Operating License No. DPR-28, Vermont Yankee Nuclear Power Station (TAC No. M87171)," NVY 94-45, dated March 22, 1994.

u. Letter, Mr. D.H. Dorman, USNRC to Mr. D.A. Reid, "Safety Evaluation of the Inservice Test Program Relief Requests for Pumps and Valves, Vermont Yankee Nuclear Power Station (TAC No. M85067)".

v. Letter, Mr. P.F. McKee, USNRC to Mr. D.A. Reid, "Safety Evaluation of Relief Requests and Action Item Responses for the Third Interval Pump and Valve Inservice Testing Program - Vermont Yankee Nuclear Power Station, (TAC No. M91450)," NVY 95-88, dated June 12, 1995.

w. Letter, Mr. P.F. McKee, USNRC to Mr. D.A. Reid, "Safety Evaluation of Relief Request RR-V12 for the Third Interval Pump and Valve Inservice Testing Program - Vermont Yankee Nuclear Power Station (TAC No. M92018)," NVY 95-100, dated July 27, 1995.

x. USNRC NUREG-1482, dated April 1995, "Guidelines for Inservice Testing at Nuclear Power Plants".

y. USNRC NUREG/CR-6396, dated February 1996, "Examples, Clarifications, and Guidance on Preparing Requests for Relief from Pump and Valve Inservice Testing Requirements".

z. Letter, Mr. K. N. Jabbour, USNRC to Mr. D. A. Reid, "Safety Evaluation of Relief Requests for the Third Interval Pump and Valve Inservice Testing Program - Vermont Yankee Nuclear Power Station (TAC No. M97544)," NVY 98-03, dated January 15, 1998.

aa. Letter, Mr. W. M. Dean, USNRC to Mr. G. A. Maret, "Request for Alternative Testing Regarding the Inservice Testing (IST) Program at Vermont Yankee Nuclear Power Station (TAC No. MA4273)," NVY 99-03, dated January 14, 1999.

bb. Letter, Mr. W. M. Dean, USNRC to Mr. G. A. Maret, "Request for Alternative Testing Regarding the Inservice Testing (IST) Program at Vermont Yankee Nuclear Power Station (TAC No. MA4273)," NVY 99-15, dated February 12, 1999.

cc. Letter, Ms. E. G. Adensam, USNRC to Mr. G. A. Maret, "Safety Evaluation of the Inservice Testing Program for Pumps and Valves, Third Interval Plan, Revision 19, Vermont Yankee Nuclear Power Station (TAC No. MA4503)," NVY 99-29, dated March 12, 1999.

dd. Letter, Mr. J. W. Clifford, USNRC to Mr. R. J. Wanczyk, "Safety Evaluation of the Inservice Testing Program for Pumps and Valves, Third Interval Plan, Request for Alternative Testing, Vermont Yankee Nuclear Power Station (TAC Nos. MA6502 and MA6503)," NVY 99-99, dated October 21, 1999.

ee. Letter, Mr. J. W. Clifford, USNRC to Mr. S. L. Newton, "Inservice Testing Program Relief Request RR-V17 for Vermont Yankee Nuclear Power Station," NVY 2000-01, dated January 3, 2000.

ff. Letter, Mr. J. W. Clifford, USNRC to Mr. M. A. Balduzzi, "Vermont Yankee Nuclear Power Station Program Relief Request For Excess Flow Check Valve Testing In the Pump and Valve Inservice Tests (RR-V19) (TAC No. MB0415) dated April 2, 2001.

gg. Email, Jim Devincentis, ENVY, to L. Lukens, "10CFR50.55a," dated December 17, 2000

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SECTION II PUMP INSERVICE TESTING PROGRAM

II-1 PUMP PROGRAM TEST TABLE

Table II-1, "Pump Listing" lists all pumps included in the Fourth-Interval Pump IST Program.

This Table identifies all pumps subject to inservice testing, the inservice test parameters, testing frequency, and any applicable relief requests and remarks. The column headings in Table II-1 are listed and explained below:

Pump Number

The Asset Number that identifies the pump. The pump number corresponds to the Enterprise Maintenance Planning and Control (EMPAC) Database used at Vermont Yankee. Table II-1 is sorted by Pump Number.

Description: The common name for the pump.

Drawing / Coord

The Flow Diagram which depicts the pump. If the pump appears on multiple Flow Diagrams, then the primary Flow Diagram identifier is listed. The coordinate location (e.g., D-05) on the Flow Diagram where the pump appears.

Safety Class

The safety classification of the pump, as determined in accordance with administrative procedure PP 7003, "Safety Classification Program."

Pump Type / OM Group

The pump type:

CENT	for Centrifugal pumps.
VERT	for Vertical line shaft pumps.
PD-RECIP	for Positive Displacement Reciprocating pumps.
PD-ROT	for Positive Displacement Rotary pumps.

The OM Pump Group:

A
B

Code Req.

The OM Code requirements for the Inservice Test Parameters to be determined and recorded during testing. The abbreviations correspond to those provided in Table 2 of Part 6 of the Code:

N	for Speed, (if variable speed).
dP	for differential Pressure, (for centrifugal and vertical line shaft pumps).
P	for discharge Pressure, (for positive displacement pumps).
Q	for Flow Rate.
Skid	Skid-mounted component; tested functionally as part of the larger component.
Vv	for Vibration, velocity, peak.

Test Freq

The test frequency associated with each test type.

OC	for Once Per Operating Cycle
Q	for Quarterly
RO	for Reactor Refueling Outage

Relief Request

The Relief Request number associated with the subject pump and test type or test frequency, where applicable.

Prog. Commit.

The testing committed to by the IST Program. This is the Code requirement, unless the Code requirement has been modified by an approved Relief Request.

Remarks

Clarifying comments or other remarks related to the subject pump and test type or test frequency, where applicable.

Table II-1 Pump Listing

System	Pump Number	Nomenclature	Drawing Coord.	Safety Class	Pump Type OM Grp.	Speed	Code Req.	Relief Request	Prog. Commit.	Remarks
CS	**P-46-1A**	CS Pump	G-191168 J-11	2	Centrifugal B	Fixed	dP-Q Q-Q Vv-Q	n/a n/a n/a	dP-Q Q-Q Vv-Q	
CS	**P-46-1B**	CS Pump	G-191168 J-14	2	Centrifugal B	Fixed	dP-Q Q-Q Vv-Q	n/a n/a n/a	dP-Q Q-Q Vv-Q	
FO	**P-92-1A**	DFOT Pump	G-191162 Sh 2 E-5	3	Pos. Displ. Rotat. A	Fixed	P-Q Q-Q Q-Q Vv-Q	n/a RR-P03 RR-P03 n/a	P-Q Q-OC Q-Q Vv-Q	
FO	**P-92-1B**	DFOT Pump	G-191162 Sh 2 D-5	3	Pos. Displ. Rotat. A	Fixed	P-Q Q-Q Q-Q Vv-Q	n/a RR-P03 RR-P03 n/a	P-Q Q-OC Q-Q Vv-Q	
FO	**P-92-2A**	Diesel Generator DG-1-1A Engine Driven Fuel Oil Pump	G-191162 Sh 2 F-11	3	Pos. Displ. Rotat. n/a (Skid)	Variable Speed	n/a	n/a	Skid-Q	
FO	**P-92-2B**	Diesel Generator DG-1-1B Engine Driven Fuel Oil Pump	G-191162 Sh 2 D-11	3	Pos. Displ. Rotat. n/a (Skid)	Variable Speed	n/a	n/a	Skid-Q	
FPC	**P-19-2A**	Standby Fuel Pool Cooling Pump	G-191173 Sh 2 G-12	3	Centrifugal A	Fixed	dP-Q Q-Q Vv-Q	n/a n/a n/a	dP-Q Q-Q Vv-Q	

Table II-1 Pump Listing

System	Pump Number	Nomenclature	Drawing Coord.	Safety Class	Pump Type OM Grp.	Speed	Code Req.	Relief Request	Prog. Commit.	Remarks
FPC	**P-19-2B**	Standby Fuel Pool Cooling Pump	G-191173 Sh 2 I-12	3	Centrifugal A	Fixed	dP-Q Q-Q Vv-Q	n/a n/a n/a	dP-Q Q-Q Vv-Q	
HPCI	**P-44-1A**	HPCI (Booster) Pump	G-191169 Sh 2 G-10	2	Centrifugal B	Variable Speed	dP-Q dP-Q N-Q Q-Q Vv-Q	n/a n/a n/a n/a RR-P02	dP-Q dP-Q N-Q Q-Q Vv-Q	
HPCI	**P-44-1B**	HPCI (High Pressure) Pump	G-191169 Sh 2 G-11	2	Centrifugal B	Variable Speed	dP-Q dP-Q N-Q Q-Q Vv-Q	n/a n/a n/a n/a n/a	dP-Q dP-Q N-Q Q-Q Vv-Q	
HPCI	**P-87-1A**	HPCI Gland Seal Condensate Pump	G-191169 Sh 2 K-17	3	Pos. Displ. Recip. n/a (Skid)	Fixed	n/a	n/a	Skid-Q	
HVAC	**SP-1**	Control Room HVAC Chilled Water Pump	G-191237 Sh 2 E-4	3	Centrifugal A	Fixed	dP-Q Q-Q Vv-Q	n/a n/a n/a	dP-Q Q-Q Vv-Q	
RCIC	**P-213-1A**	RCIC Gland Seal Condensate Pump	G-191174 Sh 2 K-13	3	Pos. Displ. Recip. n/a (Skid)	Fixed	n/a	n/a	Skid-Q	
RCIC	**P-47-1A**	RCIC Pump	G-191174 Sh 2 F-8	2	Centrifugal B	Variable Speed	dP-Q N-Q Q-Q Vv-Q	n/a n/a n/a RR-P04	dP-Q N-Q Q-Q Vv-Q	

Table II-1 Pump Listing

System	Pump Number	Nomenclature	Drawing Coord.	Safety Class	Pump Type OM Grp.	Speed	Code Req.	Relief Request	Prog. Commit.	Remarks
RHR	**P-10-1A**	RHR (LPCI) Pump	G-191172 L-5	2	Centrifugal A	Fixed	dP-Q Q-Q Vv-Q	n/a n/a n/a	dP-Q Q-Q Vv-Q	
RHR	**P-10-1B**	RHR (LPCI) Pump	G-191172 L-12	2	Centrifugal A	Fixed	dP-Q Q-Q Vv-Q	n/a n/a n/a	dP-Q Q-Q Vv-Q	
RHR	**P-10-1C**	RHR (LPCI) Pump	G-191172 J-5	2	Centrifugal A	Fixed	dP-Q Q-Q Vv-Q	n/a n/a n/a	dP-Q Q-Q Vv-Q	
RHR	**P-10-1D**	RHR (LPCI) Pump	G-191172 J-12	2	Centrifugal A	Fixed	dP-Q Q-Q Vv-Q	n/a n/a n/a	dP-Q Q-Q Vv-Q	
RHRSW	**P-8-1A**	RHR Service Water Pump	G-191159 Sh 1 K-11	3	Vertical Line Shaft A	Fixed	dP-Q Q-Q Vv-Q	n/a n/a n/a	dP-Q Q-Q Vv-Q	
RHRSW	**P-8-1B**	RHR Service Water Pump	G-191159 Sh 1 A-11	3	Vertical Line Shaft A	Fixed	dP-Q Q-Q Vv-Q	n/a n/a n/a	dP-Q Q-Q Vv-Q	
RHRSW	**P-8-1C**	RHR Service Water Pump	G-191159 Sh 1 K-11	3	Vertical Line Shaft A	Fixed	dP-Q Q-Q Vv-Q	n/a n/a n/a	dP-Q Q-Q Vv-Q	
RHRSW	**P-8-1D**	RHR Service Water Pump	G-191159 Sh 1 B-11	3	Vertical Line Shaft A	Fixed	dP-Q Q-Q Vv-Q	n/a n/a n/a	dP-Q Q-Q Vv-Q	

Table II-1 Pump Listing

System	Pump Number	Nomenclature	Drawing Coord.	Safety Class	Pump Type OM Grp.	Speed	Code Req.	Relief Request	Prog. Commit.	Remarks
SLC	**P-45-1A**	SLC Pump	G-191171	2	Pos. Displ. Recip.	Fixed	P-Q	n/a	P-Q	
			H-8		B		Q-Q	n/a	Q-Q	
							Vv-Q	n/a	Vv-Q	
SLC	**P-45-1B**	SLC Pump	G-191171	2	Pos. Displ. Recip.	Fixed	P-Q	n/a	P-Q	
			J-8		B		Q-Q	n/a	Q-Q	
							Vv-Q	n/a	Vv-Q	
SW	**P-7-1A**	Service Water Pump	G-191159 Sh 1	3	Vertical Line Shaft	Fixed	dP-Q	n/a	dP-Q	P1
			C-2		A		Q-Q	RR-P01	Q-RO	
							Vv-Q	n/a	Vv-Q	
SW	**P-7-1B**	Service Water Pump	G-191159 Sh 1	3	Vertical Line Shaft	Fixed	dP-Q	n/a	dP-Q	P1
			B-2		A		Q-Q	RR-P01	Q-RO	
							Vv-Q	n/a	Vv-Q	
SW	**P-7-1C**	Service Water Pump	G-191159 Sh 1	3	Vertical Line Shaft	Fixed	dP-Q	n/a	dP-Q	P1
			K-2		A		Q-Q	RR-P01	Q-RO	
							Vv-Q	n/a	Vv-Q	
SW	**P-7-1D**	Service Water Pump	G-191159 Sh 1	3	Vertical Line Shaft	Fixed	dP-Q	n/a	dP-Q	P1
			J-2		A		Q-Q	RR-P01	Q-RO	
							Vv-Q	n/a	Vv-Q	

II-2 PUMP NOTES

1. In accordance with the June 12, 1995 Safety Evaluation Report (Reference v) the following commitments were made relating to inservice testing of the Vermont Yankee Service Water Pumps (P7-1A, B, C, D):

   Quarterly Testing (As-found for each pump)

   a. Differential Pressure Measurement (for information only)

   b. Full Spectrum Vibration Signatures (for information only)

   c. Overall Vibration Measurements (compared to Code limits)

   Once Per Operating Cycle

   1. One of the four service water pumps will be disassembled, inspected and refurbished as necessary. Additionally, in no case shall a service water pump exceed a period of 4 cycles of operation without being disassembled, inspected and refurbished as necessary.

   Refueling Outage

   1. All Code-specified testing will be performed at a flow rate greater than or equal to design flow.

   2. A head vs. flow curve will be generated to provide information so that the performance of the pump can be compared to the degree possible with the as-found quarterly data and previous refueling outage head curve data.

   The approval of relief request RR-P01 is not subject to the performance of shutoff head testing or motor amperage monitoring as originally proposed in RR-P01.

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II-3 PUMP TESTING PROGRAM RELIEF REQUESTS

Fourth Interval Program Pump Relief Request Number	Third Interval Program Pump Relief Request Number
RR-P01	RR-P01
RR-P02	RR-P04
RR-P03	RR-P09
RR-P04	RR-P10

10 CFR 50.55a Request Number

RR-P01

Relief Requested In Accordance with 10 CFR 50.55a(f)(5)(iii)

Inservice Testing Impracticality

(Note: Licensees request under 10 CFR 50.55a(f)(5)(iii).
The NRC grants under 10 CFR 50.55a(f)(6)(i).)

1. ASME Code Component(s) Affected:

Pump Number	Safety Class	Drawing Number	Dwg. Coord.
P7-1A	3	G-191159 Sh 1	C-02
P7-1B	3	G-191159 Sh 1	B-02
P7-1C	3	G-191159 Sh 1	K-02
P7-1D	3	G-191159 Sh 1	J-02

These pumps are the station Service Water pumps. They have the safety function to provide cooling water to systems and equipment required to operate under accident conditions and to provide an inexhaustible supply of water for standby cooling system operation.

2. Applicable Code Edition and Addenda: OM-1998 Edition through OMb-2000 Addenda

3. Applicable Code Requirement: ISTB-3400, Frequency of Inservice Tests; Table ISTB-3400-1: Group A pumps shall have a Group A test performed quarterly.

4. Impracticality of Compliance:
Relief is requested on the basis that compliance with the Code requirements is impractical and that the proposed alternatives provide an acceptable level of quality and safety.

The four Service Water pumps are two-stage, vertical line shaft centrifugal pumps that are submerged in and take a suction from the Connecticut River. They supply all the station Service Water System requirements. The station Service Water System is a dual header system comprising two parallel headers each containing two pumps. The two parallel headers supply both the turbine and reactor auxiliary equipment, including the Residual Heat Removal Service Water System. A header interconnection is provided downstream of the pumps. Normally, the valves in the interconnecting line are open, permitting any of the pumps to supply the cooling water to both headers and to balance system operation. In addition, a cross-tie is provided to the non-nuclear safety station Fire Protection System. This 12-inch cross-tie valve is normally closed, with a 1-inch cross-tie and a restricting orifice providing pressurization of the Fire Protection System header.

The service water pumps at Vermont Yankee are not provided with individual pump flow indication. Furthermore, the service water headers are not provided with flow indication that could be used to determine pump flow. During normal operations, individual service water pump flow rate cannot be fixed or directly measured. It is therefore not possible to operate the service water pumps at the fixed reference value required for a Group A test.

Sufficient straight sections of piping are required to measure flow rate accurately, through the use of either permanently or temporarily installed instrumentation, such as non-intrusive flow measurement devices. The only sufficiently long straight sections of piping in each of the two parallel headers are buried between the intake structure and the entrance to the reactor building. Use of this piping is considered impractical because these sections of the two parallel headers are buried piping.

Based on the above, significant redesign and modification of the station Service Water System would be required to obtain direct measurement of pump flow. Such redesign and modification would be costly and burdensome to Vermont Yankee.

The Service Water system has a test flow loop, which is connected to the Fire Protection System header. This permits testing individual pumps, one at a time. However, this test loop does not provide Service Water flow to heat loads. Rather, the flow is discharged to the intake structure. The Service Water cross-tie valves must be shut, one Service Water subsystem is aligned to supply cooling water, and the other Service Water subsystem is aligned to the test loop. In the subsystem aligned to the test loop, one pump is stopped and the other is the pump under test. Therefore, to test one pump, it is necessary to provide all Service Water cooling loads with one subsystem, comprising two Service Water pumps. During approximately 7 months of the year, Connecticut River water temperatures preclude this method when the plant is operating, due to elevated heat sink temperatures and heat removal capacity. Therefore, this test loop cannot be regularly used for quarterly testing each quarter.

5. Burden Caused by Compliance
The burden imposed by compliance with the Code requirement would be a redesign of the Service Water system to provide a flow element and sufficient straight piping runs downstream of each Service Water pump. This system redesign would be so extensive that it could not be accomplished within the building that currently houses the Service Water pumps, since these straight piping runs would have to be approximately 12 feet long (10 pipe diameters for 14-inch pipe).

6. Proposed Alternative and Basis for Use
A review of the historical test data for these pumps indicates that theses pumps are highly reliable and have not been susceptible to frequent or unanticipated failures. Plant operating experience has shown that the performance of the Service Water pumps degrades slowly over an extended period due to normal system wear. During the 3rd Ten-Year Inservice Testing Interval, one Service Water pump was replaced, disassembled, and inspected each operating cycle, with each pump being replaced and inspected at least once every 6 years. The results of those inspections and replacements demonstrated that the service life of a Service Water pump is considerably greater than 6 years, and that pump performance can be reliably trended and predicted using data gathered during pump capacity testing performed each refueling outage. Therefore, replacement of Service Water pumps on a fixed interval is not proposed for this Relief Request. Service Water pumps will be replaced when periodic testing indicates that replacement is prudent.

During each refueling outage, a head-flow curve will be generated in accordance with ISTB-5210, and the pump comprehensive test will be performed in accordance with ISTB-5223. This will provide information so that the performance of the pump can be compared to the degree possible with the quarterly test data and previous refueling outage head curve data. Overall peak and full spectrum vibration measurements will be also be taken at each of the points used to generate the head curve to provide additional operational information.

On a quarterly basis, a test will be performed by measuring pump differential pressure and motor vibration, and the data will be compared to the degree possible with the head-flow curve obtained during the refueling outage.

7. Duration of Proposed Alternative

This relief is requested for the duration of the Vermont Yankee 4th Inservice Testing Ten-Year Interval (September 1, 2003 through August 31, 2013).

8. Precedents
A similar request was approved for the 3rd Ten-Year Interval (TAC No. M85067, dated September 3, 1993). This request differs from the one previously approved in that VY does not propose to disassemble and examine Service Water pumps on a fixed frequency, but rather as indicated by the results of periodic testing.

10 CFR 50.55a Request Number

RR-P02

Information to Support NRC Re-Approval of a 10 CFR 50.55a Request for Use During a New 10-Year Interval Inservice Testing Program

1. Previous 10 CFR 50.55a Request Approved by NRC
ASME Code Component(s) Affected:

Pump Number	Safety Class	Drawing Number	Dwg. Coord.
P44-1A/B	2	G-191169 Sh 2	G-11

P44-1A/B is the High Pressure Coolant Injection (HPCI) main/booster pump combination. The HPCI pump has the safety function to provide: 1) adequate core cooling and reactor vessel depressurization following a small break loss of coolant accident, and 2) reactor pressure control during reactor shutdown and isolation.

This alternative was requested by Vermont Yankee on November 20, 1998 (BVY 98-155) and approved for the 3rd Inservice Testing Ten-Year Interval as RR-P04, Revision 1, on January 14, 1999 (TAC No. MA4273).

2. Changes to the Applicable ASME Code Section
Applicable Code Edition and Addenda:
OM-1998 Edition through OMb-2000 Addenda

Applicable Code Requirement:
ISTB-5123(e), Comprehensive Test Procedure: "All deviations from the reference values shall be compared with the ranges of Table ISTB-5100-1 and corrective action taken as specified in ISTB-6200. The vibration measurements shall be compared to both the relative and absolute criteria shown in the alert and required action ranges of Table ISTB-5100-1."

The relative and absolute vibration acceptance criteria in Table ISTB-5100-1 are unchanged from the relative and absolute criteria in ASME/ANSI OMa-1988, Part 6, Table 3.

3. Component Aging Factors
This request is not affected by component aging factors. The vibration readings on the HPCI pump have been relatively constant since this alternative was first approved. The current Alert Range for the HPCI pump vibration points I-3, O-3, and I-4 is >2.5V_r to 6V_r or >0.575 in/sec to 0.7 in/sec. This is somewhat higher than the Table ISTB-5100-1 Acceptance Criteria of >2.5V_r to 6V_r or >0.325 in/sec to 0.7 in/sec; hence the requirement for NRC authorization to use the higher acceptance criteria.

4. Changes in Technology for Testing the Affected ASME Code Component(s)
This request is not affected by changes in technology. The vibration readings have been taken using accepted vibration monitoring methods. The issue is the actual vibration of the HPCI pump and turbine combination. Significant improvement was made in reducing the vibration of HPCI pump and turbine. Of the 10 vibration points measured during inservice testing, only 3 have not been reduced below the Code Alert Range limits. The root cause of the high vibration levels was determined to be 2nd order acoustical and structural resonances, which are part of the design and installation of the HPCI pump and turbine. While substantial improvement was made by modifying the pump impeller, it is not believed that significant further improvements can be realized. The operating history of the system indicates that these vibration levels do not jeopardize the operational readiness of the system.

5. Confirmation of Renewed Applicability
This alternative is requested on the basis that the proposed alternatives would provide an acceptable level of quality and safety.

The HPCI pump has a notable history regarding analysis and resolution of high vibration issues. During the 1985 through 1987 timeframe, vibration consultants with specialized equipment were used to identify phase angles, natural and resonance frequencies, etc. providing a thorough analysis of existing conditions. The root cause of the higher vibration levels was determined to be a 2nd order acoustical resonance in the piping connecting the low pressure (LP) and high pressure (HP) pumps, and the presence of a structural resonance at the 2nd order in the horizontal direction on the HP pump.

These resonance conditions are design related and have existed since initial pump installation. The HPCI Booster pump impeller was modified in 1989, based on the consultant's recommendations to reduce the 2nd order vibration levels; however, the overall peak levels remained higher than the OM-6 Table 3a acceptable range of 0.325 in/second. Vermont Yankee concluded that these high levels did not indicate pump mechanical degradation and do not represent phenomena that could prevent the pump from performing its intended function. The NRC approved IST Program Relief Request RR-P04 in 1993 which permitted the overall peak vibration acceptable range to be expanded to 0.675 in/sec. VY reviewed the overall peak values and determined that the acceptable range limit could be lowered from 0.675 to 0.575 in/sec. This lower acceptance value was the result of continuing efforts to reduce the vibration levels on this complex system (i.e., turbine, HP pump, gearbox, and booster pump combination). These lower acceptance criteria were incorporated into Revision 1 of the previously approved request, as well as the clarification that this request applies only to the 3 vibration monitoring points identified above.

Therefore, based on the information provided in the previous 10 CFR 50.55a request, information contained within the NRC approval documents, and information above, the circumstances and basis continues to be applicable to the proposed request.

6. Duration of Re-Approved 10 CFR 50.55a Request
This request is applicable for the Vermont Yankee 4th 10-Year Inservice Testing Interval (September 1, 2003 through August 31, 2013).

10 CFR 50.55a Request Number

RR-P03

Information to Support NRC Re-Approval of a 10 CFR 50.55a Request for Use During a New 10-Year Interval Inservice Testing Program

1. Previous 10 CFR 50.55a Request Approved by NRC

Pump Number	Safety Class	Drawing Number	Dwg. Coord.
P92-1A	3	G-191162 Sh 3	E-05
P92-1B	3	G-191162 Sh 3	D-05

These pumps are the Diesel Fuel Oil Transfer pumps. They have a safety function to provide diesel fuel oil to the diesel oil day tank during Emergency Diesel Generator operations.

This alternative was requested by Vermont Yankee on November 30, 1992 (BVY 92-133), and authorized by NRC on September 3, 1993 (TAC No. M85067)

2. Changes to the Applicable ASME Code Section
ISTB-5322, Positive Displacement Pumps; Group B Test Procedure: "The test parameter value identified in Table ISTB-3000-1 shall be determined and recorded as required by this paragraph...."

Table ISTB-3000-1 requires that flow be measured or determined for the Group B test for positive displacement pumps.

Table ISTB-3000-1 does not require that discharge pressure be measured or determined for the Group B test for positive displacement pumps, as did OM-6, Table 2. However, the flow measurement is the topic of this proposed alternative. Therefore, the Code change has no effect on this request.

3. Component Aging Factors
The basis of this request is that compliance with the Code requirement would result in hardship or unusual difficulty. There has been no evidence of component degradation in the diesel generator fuel oil transfer pumps over the past 30 years. The current reference flow value is 11.2 gpm, compared to the manufacturer's pump curve value of 10 to 11 gpm, and these pumps have been tested with flow rates greater than 11.0 gpm since at least 1990.

4. Changes in Technology for Testing the Affected ASME Code Component(s)

Vermont Yankee continues to evaluate methods of obtaining system flow for a Code-compliant quarterly test. To date, no system has been identified that will provide the required accuracy in the installed piping configuration.

5. Confirmation of Renewed Applicability
Relief is requested on the basis that compliance with the Code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety and that the proposed alternatives would provide an acceptable level of quality and safety.

During quarterly inservice testing, pump flow rate cannot be directly measured.

The Emergency Diesel Generator fuel oil supply system consists of two parallel trains, one for each diesel. Fuel oil is supplied to the diesel engine from an 800-gallon day tank. Makeup to each diesel day tank is accomplished automatically from the 75,000-gallon storage tank by operation of the respective Diesel Fuel Oil Transfer pump. The diesel day tank is sized for three hours of continuous full load operation, based on a diesel fuel oil consumption rate of approximately 3.4 gpm. The Diesel Fuel Oil Transfer pumps are positive displacement pumps with a design capacity of approximately 8.7 gpm.

It is considered impractical to directly measure pump flow rate on a quarterly basis. There is no flow rate instrumentation installed in the Fuel Oil Transfer system. Sufficient straight sections of piping are required (typically 10 to 15 pipe diameters; or approximately 3 to 5 feet) to measure flow rate accurately using either permanently or temporarily installed instrumentation, such as non-intrusive flow measurement devices. The only sufficient straight sections of piping exist in the buried sections of the supply headers, under heat tracing, or in overhead runs that are normally inaccessible without erecting scaffolding. Installation of permanent flow rate instrumentation would require significant system modification, which would be costly and burdensome to Vermont Yankee.

Diesel Fuel Oil Transfer pump flow rate can be determined indirectly by measuring the level change in the diesel day tank versus the pump operating time required to make that change. However, to establish test conditions that allow for evaluation of the test results against the acceptance criteria of Table ISTB-5300-1, the test must be performed with the respective Emergency Diesel Generator secured. This eliminates the variable of the diesel fuel oil consumption rate when the diesel is running.

In addition, to provide measurement accuracy consistent with Table ISTB-3500-1, the automatic pump start feature on low diesel day tank level must be disabled and the diesel day tank volume reduced prior to the test through operation of the respective Emergency Diesel Generator.

Disabling the automatic start feature of the Diesel Fuel Oil Transfer pump on low diesel day tank level prevents the Emergency Diesel Generator from operating automatically, rendering an engineered safety system inoperable, and requires entry into a Technical Specifications Limiting Condition of Operation.

During quarterly inservice testing of each Diesel Fuel Oil Transfer pump, it will be verified that the pump is capable of supplying fuel oil to the respective diesel day tank at a flow rate greater than that required by the operating Emergency Diesel Generator. This is verified by an increase in diesel day tank level during the diesel surveillance testing. In addition, full spectrum vibration monitoring and measurement of pump discharge pressure will be performed with the results evaluated against the acceptance criteria of Table ISTB-5300-1 for the Group A Test.

Once each operating cycle the flow rate of each Diesel Fuel Oil Transfer pump will be determined during the Comprehensive Test by measuring the level change in the diesel day tank and the pump operating time required to make that change. This will be performed with the respective Emergency Diesel Generator secured, the automatic pump start feature on low diesel day tank level disabled, and the diesel day tank volume reduced prior to the test through operation of the respective Emergency Diesel Generator. This testing will provide measurement accuracy consistent with Table ISTB-3500-1, and the results will be evaluated against the acceptance criteria of Table ISTB-5300-1 for the Comprehensive Test.

This testing is considered consistent with the pump type and service and provides an acceptable level of quality and safety, based on the following:

a) A review of the pump design flow rate versus the diesel fuel oil consumption rate indicates a significant excess capacity (11.0 gpm actual, compared to 3.4 gpm required). Therefore, operational readiness of the pumps would still be assured with substantial degradation, provided that pump bearing vibration is not excessive. Assurance of acceptable pump bearing vibration levels is provided through the full spectrum vibration monitoring.

b) A review of Vermont Yankee maintenance records and industry experience, indicates that the pumps are highly reliable and that the above testing methods are acceptable for assessing pump operational readiness and determining potential degradation. There has been no detectable degradation of pump capacity since at least 1990, and both fuel oil transfer pumps are still exceeding the manufacturer's curve after 30 years.

At Vermont Yankee, four failures have occurred in 30 years of plant operations. Of these, three were related to electrical components, and one was related to high bearing vibrations. In addition, minor shaft seal leakage has been noted and corrected. There has not been a diesel fuel oil transfer pump failure attributable to the pump or motor since prior to 1996. Each of the above failure modes is adequately monitored during the quarterly inservice testing through visual examination of the pump seals, proper starting and operation of the pump upon low diesel day tank level, and full spectrum vibration monitoring.

Therefore, based on the information provided in the previous 10 CFR 50.55a request, information contained within the NRC approval documents, and information above, the circumstances and basis continues to be applicable to the proposed request.

6. Duration of Re-Approved 10 CFR 50.55a Request
This request is applicable for the Vermont Yankee 4th 10-Year Inservice Testing Interval (September 1, 2003 through August 31, 2013).

10 CFR 50.55a Request Number

RR-P04

Information to Support NRC Re-Approval of a 10 CFR 50.55a Request for Use During a New 10-Year Interval Inservice Testing Program

1. Previous 10 CFR 50.55a Request Approved by NRC

Component:

Pump Number	Safety Class	Drawing Number	Dwg. Coord.
P47-1A	2	G-191174 Sh 2	F-08

P47-1A is the Reactor Core Isolation Cooling (RCIC) pump. This pump is powered by a steam driven turbine and has a safety function to operate to provide water to the reactor vessel to ensure adequate core cooling in the event that the reactor is isolated from its normal heat sink (the main condenser). The pump is a horizontal, multi-stage, centrifugal pump, designed to provide 416 gpm at rated speed. The RCIC system at VY is designed and qualified for at least 12 hours of continuous or intermittent operation in support of core cooling following transient or accident events.

This alternative was requested by Vermont Yankee on November 20, 1998 (BVY 98-155) and approved for the 3rd Inservice Testing Ten-Year Interval as RR-P10, Revision 2, on January 14, 1999 (TAC No. MA4273).

2. Changes to the Applicable ASME Code Section

Applicable Code Edition and Addenda:
OM-1998 Edition through OMb-2000 Addenda

Applicable Code Requirement:
ISTB-5123(e), Comprehensive Test Procedure: "All deviations from the reference values shall be compared with the ranges of Table ISTB-5100-1 and corrective action taken as specified in ISTB-6200. The vibration measurements shall be compared to both the relative and absolute criteria shown in the alert and required action ranges of Table ISTB-5100-1."

The relative and absolute vibration acceptance criteria in Table ISTB-5100-1 are unchanged from the relative and absolute criteria in ASME/ANSI OMa-1988, Part 6, Table 3.

3. Component Aging Factors

This request is not affected by component aging factors.

The resonance condition is design related and has existed since initial pump installation. Surveillance test documentation collected over a number of years demonstrates that no appreciable degradation has taken place. On 2/18/90 the outboard bearing was replaced three times in an effort to demonstrate that a degraded bearing condition did not exist. The vibration readings on the RCIC pump have been relatively constant since this alternative was first approved. The current Alert Range for the RCIC pump vibration point O-4 is $>2.5V_r$ to $6V_r$ or >0.575 in/sec to 0.7 in/sec. This is somewhat higher than the Table ISTB-5100-1 Acceptance Criteria of $>2.5V_r$ to $6V_r$ or >0.325 in/sec to 0.7 in/sec; hence the requirement for NRC authorization to use the higher acceptance criteria.

4. Changes in Technology for Testing the Affected ASME Code Component(s)

This request is not affected by changes in technology. The vibration readings have been taken using accepted vibration monitoring methods. The issue is the actual vibration of the RCIC pump and turbine combination.

It has been determined that with a single vibration point that is characteristically at the high end of the Code acceptable range, the ability of the RCIC pump and turbine to perform their design basis function is not compromised, and the burden of redesigning the pump impeller or other design aspects of the pump and turbine installation is not warranted or justified.

5. Confirmation of Renewed Applicability

This alternative is requested on the basis that the proposed alternatives would provide an acceptable level of quality and safety.

This alternative (Rev. 0) was previously submitted in 1995. A one-year interim approval was granted, and VY was requested to perform additional investigation and provide an enhanced justification. The alternative was subsequently deleted (Rev. 1) from the IST Program with the issuance of revision 18. The VY course of action in 1995 was to use the OM-6 limits. This alternative was revised again (Rev. 2) to address specifically the pump outboard bearing in the vertical direction (VY vibration point 0-4). The pump inboard bearing horizontal/vertical and the outboard bearing horizontal/axial points will be evaluated using the criteria in Table ISTB-5100-1, which are unchanged from OM-6, Table 3.

Past testing and analysis performed on the RCIC System by Vermont Yankee and independent vibration consultants in 1988 and 1997 confirms characteristic pump vibration levels in the outboard bearing vertical direction, at the high end of the acceptance range criteria stated in Table ISTB-5100-1. This testing and analysis meets the intent of ISTB-6400 and its accompanying footnote 1.

The root causes of the higher vibration levels have been determined to be:

a) Excitement in the outboard bearing support in the vertical direction at or near the fourth and fifth orders (vane pass frequency).
b) The presence of a natural frequency at 320 Hz in the outboard bearing vertical direction.

In the pump speed range of 4,000 to 4,500 RPM the fourth (267-300 Hz) and fifth (333-375 Hz) orders do not coincide with the 320 Hz natural frequency peak but are influenced by it. In general, the 4th order is more sensitive to resonance as pump speed and the corresponding 4th order vane pass frequency are increased toward the 320 Hz natural frequency. The 5th order is influenced somewhat less as speed is lowered, and the corresponding 5th order vane pass frequency is decreased toward the 320 Hz natural frequency.

An analysis performed by the vibration consultant in 1988 documented that the 4th order peak value of 0.511 in/sec. at 4500 rpm dropped to 0.177 in/sec. when speed was decreased to 4342 rpm. The recommendation at that time was to reduce the speed for surveillance testing. When the surveillance speed was lowered to approximately 4300 rpm, the overall peak vibration level in the outboard vertical direction remained approximately 0.3 in/sec. An analysis performed by the same vibration consultant in 1997 documented the relationship of the natural frequency to the 4th and 5th order vane pass frequencies using improved vibration technology. The recommendation at that time was again to reduce the speed for surveillance testing if possible. If a speed reduction was not possible, then changing the number of 1st stage impeller vanes and modifications to the outboard bearing support were recommended. Surveillance testing is currently performed to satisfy both Technical Specification and IST requirements using a reference speed of 4300 rpm.

With only one vertical direction vibration point exceeding the OM-6 vibration criteria, it was determined that to pursue 1st stage impeller replacement or to perform the analysis to qualify a bearing support modification results in a hardship without a compensating increase in quality and safety of the plant. Spectrum analysis of the latest surveillance test data shows that the primary source of the vibration continues to coincide with vane pass frequency of the pump. Vane pass frequency is inherent in all pumps and normally does not present a problem unless it happens to excite resonant frequencies. The vane pass frequencies do not coincide exactly with the natural frequency; therefore, a full resonance condition does not exist. The identified vane pass frequencies are on the periphery of resonance excitement, thereby causing higher than expected vibration in the outboard vertical direction. This condition on the outboard bearing, in one direction, is not of a magnitude that would prevent the RCIC pump from performing its intended safety function.

Although existing vibration levels in the RCIC pump outboard bearing vertical direction are at the high end of the Code acceptance criteria, they are acceptable and reflect the unique operating characteristics of the VY RCIC pump. It has been concluded that there are no vibration concerns that would indicate pump degradation or prevent the pump from performing its intended function. The pump vendor certified in a 9/14/98 memo that the pump could be run at 0.575 in/sec. and would not be expected to exhibit reduced reliability given the intermittent and short duration (<24 hours) operation in support of core cooling following analyzed events.

To allow for practicable vibration monitoring of the RCIC pump, alternate vibration acceptance criteria are required. Full spectrum vibration monitoring will be performed during each quarterly test and the following criteria will be used for RCIC pump vibration point O-4:

Test Parameter	Acceptable Range	Alert Range	Required Action Range
V_v	≤ 2.5 Vr but not > 0.575 in/sec.	> 2.5 Vr to and including 6 Vr but not > 0.70 in/sec.	> 6 Vr or > 0.70 in/sec.

Therefore, based on the information provided in the previous 10 CFR 50.55a request, information contained within the NRC approval documents, and information above, the circumstances and basis continues to be applicable to the proposed request.

6. Duration of Re-Approved 10 CFR 50.55a Request
This request is applicable for the Vermont Yankee 4th 10-Year Inservice Testing Interval (September 1, 2003 through August 31, 2013).

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SECTION III VALVE INSERVICE TESTING PROGRAM

III-1 VALVE TEST TABLE CONTENTS

Program Procedure PP 7013, Tables 1-19, list all valves and pressure relief devices that are included in the Fourth Ten-Year Interval Valve IST Program. These Tables identify all valves and pressure relief devices subject to inservice testing, the inservice test requirements, testing frequency, and any applicable relief requests and remarks. Tables 1-19 are organized by System. The column headings in Tables 1-19 are listed and explained below.

Valve Number / Description

Valve Number
The Asset Number that identifies the valve or pressure relief device. The valve number corresponds to the Asset Number listed in the EMPAC Database used at Vermont Yankee.

Description
The common name for the valve or pressure relief device.

Flow Diagram / Coord

Flow Diagram
The Flow Diagram which depicts the valve or pressure relief device. If the valve or pressure relief device appears on multiple Flow Diagrams, then the primary Flow Diagram identifier is listed.

Coord
The coordinate location (e.g., D-05) on the Flow Diagram where the valve or pressure relief device appears.

Safety Class

The safety class of the valve or pressure relief device as it appears on the Flow Diagram and EMPAC. The safety classification of the valve or pressure relief device shown on the Flow Diagrams is determined in accordance with AP 6006, "Safety Classification of Structures, Systems, Components and Parts."

OM Cat; Active / Passive

OM Cat
The valve category as defined by Paragraph 1.4 of Part 10 of the Code.

- A: Valves for which seat leakage is limited to a specific maximum amount in the closed position for fulfillment of their required function.
- B: Valves for which seat leakage in the closed position is inconsequential for fulfillment of their required function.
- C: Valves which are self-actuating in response to some system characteristic, such as pressure (relief valves) or flow direction (check valves) for fulfillment of their required function.
- D: Valves which are actuated by an energy source capable of only one operation, such as rupture disks or explosively actuated valves.

Active/Passive

The valve classification as defined by Paragraph 1.1 of Part 10 of the Code.

Active: Those valves that are required to change obturator position to accomplish their required function.

Pass: Those valves that are required to maintain obturator position and are not required to change obturator position to accomplish their required function.

Valves that are not required either to change obturator position or to maintain obturator position have a pressure-boundary maintenance function only, and they are not within the scope of the Code or the IST Program.

Size

The nominal pipe size (NPS) of the valve, in inches.

Valve Type / Actuator

Valve Type
The valve body style designator where:

Abbreviation	Description
3-WAY	for 3-Way Valves
Ball	for Ball Valves
Butterfly	for Butterfly Valves
Check	for simple (swing, rotating disk, nozzle, lift, etc.) Check Valves
Ex Flow Check	for Excess Flow Check Valves
Gate	for Gate Valves
Globe	for Globe Valves
Stop Check	for Globe Stop Check Valves
Rupture Disk	for Rupture Disks
SQUIB	for explosively actuated valves
SRV	for Safety Valves and Relief Valves

Actuator

The type of actuator provided with the valve body where:

Abbreviation	Description
Air	for Air Operated Valves
EXP	for Explosive Charge Valves
Hydraulic	for Hydraulically Operated Valves
Manual	for Manually Operated Valves
Motor-AC	for Motor Operated Valves, AC powered motor
Motor-DC	for Motor Operated Valves, DC powered motor
Self	for Self Actuated Valves (i.e. Check Valves, Relief Valves, etc.)
Solenoid	for Solenoid Operated Valves

Normal Position / Safety Position / Fail Position

These 3 fields indicate the valve's position during normal plant operation, its required position when performing its safety-related function, and its fail position, where:

Abbreviation	Description
C	for Closed
DE	Dependent On System Demand (Normal Position Only)
LC	for Locked Closed
LO	for Locked Open
n/a	Not Applicable (Fail Position for Manually Actuated and Self-Actuated Valves)
O	for Open
O/C	for Open and Closed (Safety Position Only)
Th	for Throttled

Code Requirement

The test required to be performed by the Code, including test type abbreviation, the required frequency, and the required stroke direction in which the test is to be performed. See Section III-2 for abbreviations.

CSJ / ROJ / RR

This field is the reference to a test deferral or NRC-authorized alternative. The Valve Testing Program Cold Shutdown Justifications (CSJs), Refueling Outage Justifications (ROJs), and NRC-authorized Relief Requests and Alternatives (RRs) are listed in PP 7013, Appendix B.

Program Commit.

This is the Vermont Yankee IST Program Testing Commitment for the valve. If the Program Commitment is different from the Code Requirement, the reference in the CSJ / ROJ / RR field explains the difference. See Section III-2 for abbreviations.

Notes

When appropriate, clarifying comments or other remarks will be included for the affected valve, pressure relief device, test type or test frequency. The notes are listed in PP 7013, Appendix B.

III-2 VALVE TABLE CODES

Test specifications are in the following format:

TT-FF

Where, TT is the test abbreviation (FE, STC, FS, LJ, LT etc.)
FF is the test frequency (Q, 5Y, CS, etc.)

The following abbreviations are used in the IST Program Plan Test Tables:

Abbrev. (TT)	TEST DESCRIPTION
D&E	Check Valve Disassembly & Examination
dP	Pump Differential Pressure
EX	Explosive valve test
FE	Full-Stroke Exercise: specified as a Code requirement for check valves
FST	Fail-Safe Test
LEF	Leakage Test for Excess Flow Check Valve
LJ	Cat. A Leakage Test for CIVs, In Accordance With Appendix J
LT	Cat. A Leakage Test, Non-Appendix J
N	Pump Speed
n/a	No Test Required: the Code Requirement for Augmented Tests
P	Pump Pressure
PIT	Position Indication Verification Test
PSO	Cat. A/B/C Partial Stroke Open
Q	Pump Flow
RD	Rupture Disk Replacement
SC	Cat. A/B/C Full Stroke Close
SKID	Operability Verified During Testing Of Major Component (Skid-Mounted)
SO	Cat. A/B/C Full Stroke Open
STO	Cat. A/B Power Operated Stroke Time Open
Vv	Pump Vibration, Velocity
STC	Cat. A/B Power Operated Stroke Time Closed

Abbrev. (FF)	FREQUENCY CODES
1 M	One Month
6 M	Six Months
30 M	Thirty Months
2Y	Two Years
5Y	Five Years
10Y	Ten Years
CS	Cold Shutdown
OC	Once Per Cycle
Perf.	Performance Based (Appendix J Option B)
Q	Quarterly (at least once every 92 days)
RO	Refueling Outage (during the RFO only)

Abbrev. (TT)	RELIEF VALVE TEST CODES
AA	Class 1 SRV Air Actuator Test
BA	Class 1 SRV Bellows Alarm Switch Test
BD	Class 2&3 SRV Balancing Device (Bellows)
LA	Class 1, 2, & 3 SRV As-Found Seat Leakage
LL	Class 1, 2, & 3 SRV As-Left Seat Leakage
PD	Class 1 SRV Auxiliary Pressure Detector (Element) Actuation Setpoint Test
PI	Class 1 SRV Position indication verification
SP	Class 1, 2, & 3 Relief valve set point test
SV	Class 1 SRV Solenoid Valve Test
VE	Class 1, 2, & 3 SRV Visual Exam

END

I. VALVE TEST TABLE NOTES

Fourth Interval Program Note Number	Third Interval Note Number
1	1
2	3
3	4
4	9
5	13
6	15
7	16
8	18
9	19
10	21
11	22
12	24
13	25
14	n/a

Valve Table Notes

1 Full stroke exercising and timing tests of the MSIVs are accomplished quarterly when reactor power is decreased to less than 75 percent.

2 Testing of CRD Cooling Water Supply Check valve, V3-138, is not required when the corresponding control rod has been declared inoperable and its directional control valves disarmed in accordance with the provisions of Technical Specifications 3.3.A.2.

3 The Standby Liquid Control system explosively actuated valves are tested by ISTC-5260; T.S. 4.4.A.4, and T.S. 4.4.A.5.

4 Not Used

5 Not Used

6 The performance of pressure sensing instrumentation testing for PCAC Vacuum Relief from Secondary Containment Iso Valves, SB-16-19-11A and 11B, is performed (OP 4376) as required by OM-1 subsection 3.3.2.3 and Technical Specification 4.7.A.5.a.

7 The Control Rod Drive Scram Inlet and Outlet Valves, CV-3-126 and CV-3-127, will be tested in accordance with the requirements of Tech. Spec Surveillance 4.3.C.1 after refueling outages and prior to operation above 30% power.

8 The Scram Exhaust To Discharge Volume Check Valves, V3-114, will be tested in accordance with the requirements of Tech. Spec Surveillance 4.3.C.1 after refueling outages and prior to operation above 30% power.

9 The CRD Charging Water to Accumulator Check Valves, V3-115, closure verification will be performed by the accumulator pressure decay test (OP 4111) during refueling outages.

10 This valve is a RCS PIV and is leak-tested at nominal operating reactor pressure.

11 These valves are required to operate for the Alternate Cooling Mode (ACS) of the Service Water System and are included in the IST Program based on a commitment to NRC. References: OP-2181; NRC Inspection Report 94-03; BMO 97-61.

12 This portion of the Fuel Pool Cooling System is normally not in service, but is required during refueling operations. Testing is required within 3 months prior to placing this portion of the system in an operable status, and this valve shall be exercised at a quarterly frequency while in service (ref. ISTC-3570).

13 This portion of the Fuel Pool Cooling System is normally not in service, but is required during refueling operations. Testing is required within 3 months prior to placing this portion of the system in an operable status and shall be exercised at a quarterly frequency while in service. This valve is radiographed within 90 days prior to each refueling outage, and tested quarterly thereafter as long as it is required to be operable (ref. ISTC-3570).

Valve Table Notes

14 The Code-specified required order of testing for the relief valve tests is found in Appendix I. See Appendix I-3310 (Class 1 with auxiliary actuating devices); I-3320 (Class 1 without auxiliary actuating devices); and I-3350 (Class 2&3).

II. VALVE COLD SHUTDOWN JUSTIFICATIONS

Fourth Interval Program CSJ Number	Third Interval CSJ Number
1	1
2	4
3	6
4	8
5	10
6	14
7	15

COLD SHUTDOWN JUSTIFICATION

CSJ-V01

System	Reactor Building Closed Cooling Water
Valves	V70-117
Category	A
Class	2

Function
Valve V70-117 is the reactor building closed cooling water return containment isolation valve. This valve has a safety function in the closed position to provide primary containment isolation.

Quarterly Test Requirements
Stroke-Time Closed (STC)

Cold Shutdown Test Justification
This valve cannot be full-stroke exercised closed during normal (power) operation since shutting this valve would stop cooling water flow to vital primary containment equipment, including the primary containment air coolers and the reactor recirculation pumps.

Quarterly Partial Stroke Testing
Quarterly partial stroke testing is not practicable, since this would reduce cooling water flow to primary containment heat loads, with the same potential consequences as full-stroke closure. Stroke-timed valves cannot be partially stroke-timed.

Cold Shutdown Testing
This valve will be stroke timed closed during Cold Shutdowns when system configuration permits in accordance with ISTC-3521(c).

COLD SHUTDOWN JUSTIFICATION

CSJ-V02

System Nuclear Boiler
Valves V2-53A; V2-53B; V2-54A; V2-54B
Category B
Class 1
Function
These valves are the reactor recirculation pump discharge isolation and bypass valves. They have a safety function in the closed position to limit primary system coolant loss following a LOCA and to ensure low pressure coolant injection flow is properly directed to the reactor.

Quarterly Test Requirements
Stroke Time Closed (STC)

Cold Shutdown Test Justification
These valves cannot be exercised closed during reactor power operation since cycling these valves would result in a reactor recirculation pump trip, a reactivity transient, and probable reactor scram.

Quarterly Partial Stroke Testing
Partial stroking of these valves would have the same potential consequences as full-stroke testing.

Cold Shutdown Testing
These valves will be stroke timed closed during Cold Shutdowns when system configuration permits in accordance with ISTC-3521(c).

COLD SHUTDOWN JUSTIFICATION

CSJ-V03

System	High Pressure Coolant Injection
Valves	V23-18
Category	C
Class	2

Function
This valve is the High Pressure Coolant Injection (HPCI) discharge to Feedwater Line "A" check valve The valve has a safety function in the open position to pass HPCI flow to the reactor and in the closed position to prevent backflow of feedwater into the HPCI piping.

Quarterly Test Requirements
Stroke Open
Stroke Closed

Cold Shutdown Test Justification
This valve cannot be exercised open during normal (power) operation since flow through this valve must be injected into the reactor coolant system. This would thermally shock the reactor nozzles and cause a positive reactivity excursion. Manual operation of the valve during power operations is not possible since the valve is located in the steam tunnel. Steam tunnel entry during power operations is restricted for ALARA reasons.

Quarterly Partial Stroke Testing
Partial stroking of this valve would have the same reactivity, thermal shock, and ALARA consequences as full-stroke testing

Cold Shutdown Testing
This valve will be manually exercised open and closed during Cold Shutdowns when the steam tunnel is accessible in accordance with ISTC-3521(c).

COLD SHUTDOWN JUSTIFICATION

CSJ-V04

System Residual Heat Removal
Valves V10-17; V10-18
Category A
Class 2
Function
These valves are the Residual Heat Removal (RHR) shutdown cooling supply isolation valves. They have a safety function in the closed position to provide primary containment and RCS pressure isolation, and in the open position to provide RHR pump suction during shutdown cooling operation.

Quarterly Test Requirements
Stroke-Time Open (STO)
Stroke-Time Closed (STC)

Cold Shutdown Test Justification
These valves cannot be stroke timed open during reactor power operation since there is a 100 psig interlock that prevents opening these valves during power operation. This interlock is required to prevent overpressurization of the low pressure piping in the RHR shutdown cooling subsystem.

Quarterly Partial Stroke Testing
Partial stroke testing is not possible because of the 100 psig interlock.

Cold Shutdown Testing
These valves will be stroke timed open and stroke timed closed during Cold Shutdowns when system configuration permits in accordance with ISTC-3521(c).

COLD SHUTDOWN JUSTIFICATION

CSJ-V05

System Reactor Core Isolation Cooling
Valves V13-22
Category C
Class 2
Function
This valve is the Reactor Core Isolation Cooling (RCIC) discharge to Feedwater Line "B" check valve. The valve has a safety function in the open position to pass RCIC flow to the reactor and in the closed position to prevent backflow into the RCIC system.

Quarterly Test Requirements
Stroke Open (SO)
Stroke Closed (SC)

Cold Shutdown Test Justification
This valve cannot be exercised open during normal (power) operation since flow through this valve must be injected into the reactor coolant system. This would thermally shock the reactor nozzles and cause a positive reactivity excursion.

This valve is located in the steam tunnel which is inaccessible during power operations. Additionally, there is no means to manually exercise this valve.

Quarterly Partial Stroke Testing
Partial stroking of this check valve would have the same reactivity, thermal., and ALARA consequences as full-stroke testing.

Cold Shutdown Testing
This valve will be exercised open and closed during Cold Shutdowns when system configuration permits in accordance with ISTC-5221.

COLD SHUTDOWN JUSTIFICATION

CSJ-V06

System	Residual Heat Removal
Valve(s)	V10-46A; V10-46B
Category	A/C
Class	1

Function
These valves are the Low Pressure Coolant Injection (LPCI) injection check valves. They have a safety function in the open position to pass LPCI flow to the reactor, and in the closed position for primary containment isolation and RCS pressure isolation.

Quarterly Test Requirements
Stroke Open (SO)
Stroke Closed (SC)

Cold Shutdown Test Justification
These valves cannot be exercised open during normal (power) operation since the Residual Heat Removal (RHR) pump discharge cannot overcome reactor pressure. Manual exercising is not possible during plant operation because the valves are located inside the inerted drywell and are not accessible during plant operation.

Quarterly Partial Stroke Testing
Partial stroke testing is prevented by reactor pressure and the inaccessibility of the valves inside the drywell.

Cold Shutdown Testing
These valves will be exercised open and closed with flow during Cold Shutdown when system configuration permits in accordance with ISTC-5221.

COLD SHUTDOWN JUSTIFICATION

CSJ-V07

System	Residual Heat Removal
Valves	V10-48A; V10-48B; V10-48C; V10-48D
Category	C
Class	2

Function
These valves are the RHR pump discharge check valves. These valves have a safety function to open to pass RHR pump discharge flow for all modes of RHR/LPCI system operation. These valves also have a safety function to close to prevent the backflow of water through an idle RHR pump.

Quarterly Test Requirements
Stroke Open (SO)
Stroke Closed (SC)

Cold Shutdown Test Justification
It is not practical to perform a full-stroke open exercise of these valves on a quarterly basis during plant operation. These valves are exercised during the performance of the quarterly RHR pump surveillance. During plant operation, the only practical flow path for these pumps is in the torus to torus flow path. The RHR pumps do not have sufficient head to flow to the recirculation loops with the reactor coolant system at normal operating pressure. Typical RHR pump flowrates in the torus to torus flow configuration are approximately 6,500 gpm for the RHR pump test. The required design accident condition flow rate to perform a full-stroke exercise is 7,300 gpm which can only be achieved when the RHR system is in the vessel to vessel flow configuration.

Quarterly Partial Stroke Testing
These valves will be partial-stroke opened during the quarterly surveillance test. This test has a flow rate of approximately 90% of the design flow rate. They will be stroked closed during the quarterly surveillance, in accordance with ISTC-5221.

Cold Shutdown Testing: These valve will be full-stroke opened during Cold Shutdown during the vessel-to-vessel flow test, in accordance with ISTC-5221.

III. VALVE REFUELING OUTAGE JUSTIFICATIONS

Fourth Interval Program ROJ Number	**Third Interval ROJ Number**
1	3
2	4
3	5
4	6
5	7
6	8
7	11
8	12
9	14
10	15
11	22
12	23
13	24
14	25
15	26
16	27
17	29
18	33
19	35
20	36
21	37
22	39
23	40
24	n/a

REFUELING OUTAGE JUSTIFICATION

ROJ-V01

System	Nuclear Boiler
Valves	V2-27A; V2-27B; V2-28A; V2-28B; V2-96A; V2-96B
Category	V2-27B and V96B are Category C. The other 4 are Category A/C.
Class	2

Function

Valves V2-27A and V2-28A are the outboard and inboard containment isolation check valves for the "A" Feedwater Line, respectively. They have a safety function in the closed position to provide primary containment isolation, and in the open position to pass High Pressure Coolant Injection flow to the reactor.

Valves V2-96A and V2-28B are the outboard and inboard containment isolation check valves for the "B" Feedwater Line, respectively. They have a safety function in the closed position to provide primary containment isolation, and in the open position to pass Reactor Core Isolation Cooling flow to the reactor.

Valve V2-96B is the third check valve in the "A" Feedwater Line. The valve has a safety function in the closed position to prevent diversion of High Pressure Coolant Injection flow in the "A" Feedwater Line.

Valve V2-27B is the third check valve in the "B" Feedwater Line. The valve has a safety function in the closed position to prevent diversion of Reactor Core Isolation Cooling flow in the "B" Feedwater Line.

Quarterly Test Requirements

Stroke Open (SO)
Stroke Closed (SC)

Refueling Outage Test Justification

These valves cannot be exercised closed during normal (power) operation because the feedwater system is required to maintain reactor vessel water level. Interruption of feedwater to perform the exercise test of these valves would result in a reactor scram.

These valves can only be stroke close tested via a leak type or non-intrusive test.

Quarterly Partial Stroke Testing

These valves are fully open during normal power operation. This will be documented on the Record of Test as a full-stroke open test, in accordance with ISTC-5221. However, partial closure is not practicable for the same reason (maintaining reactor water level) that full-stroke closure is not practicable.

Cold Shutdown Testing

Stroke closed testing during Cold Shutdowns is impracticable due to the significant test equipment and system configuration changes required. Additionally, valves V2-27B, V2-28B and V2-96A cannot be stroke closed during Cold Shutdowns, since this would require isolating the flow path from the Feedwater/Condensate Systems and the Reactor Water Cleanup System, resulting in an inability to control reactor vessel level with normal systems.

Refueling Outage Testing

V2-27A, V2-28A, V2-28B and V2-96A will be stroke close tested each Refueling Outage during leakage rate testing performed in accordance with ISTC-3620.

V2-27B and V2-96B will be stroke close tested each Refueling Outage using non-intrusive testing or disassembly in accordance with ISTC-5221.

REFUELING OUTAGE JUSTIFICATION

ROJ-V02

System	Nuclear Boiler
Valves	V2-37A; V2-37B; V2-37C; V2-37D
Category	A/C
Class	2

Function
These valves are the Main Steam Relief Valve (MSRV) actuator air supply check valves. They have a safety function in the open position to charge the automatic depressurization system (ADS) accumulators, and in the closed position to maintain pressure in the ADS accumulators on a loss of the instrument nitrogen supply.

Quarterly Test Requirements
Stroke Open (SO)
Stroke Closed (SC)

Refueling Outage Test Justification
These valves are located in the drywell and thus cannot be full-stroke exercised during normal power operations or Cold Shutdowns when the drywell is inerted. These valves can only be stroke close tested via a leak test or non-intrusive test, which would require isolating the instrument nitrogen supply to the MSRVs.

Quarterly Partial Stroke Testing
These valves are inaccessible when the drywell is inerted, and cannot therefore be partial stroked during power operation.

Cold Shutdown Testing
Testing during Cold Shutdowns is impracticable because the Drywell must be de-inerted and due to the significant system configuration changes and test equipment required.

Refueling Outage Testing
These valves are exercised each refueling outage in accordance with ISTC-5221. They are full-stroked open by passing the required air flow through them prior to the leak test (ISTC-3630) that verifies closure.

REFUELING OUTAGE JUSTIFICATION

ROJ-V03

System	Nuclear Boiler
Valves	V2-82A; V2-82B; V2-82C; V2-82D; V2-87A; V2-87B; V2-87C; V2-87D
Category	A/C
Class	2

Function

These valves are the Main Steam Isolation Valve (MSIV) actuator air supply check valves. They have a safety function in the closed position to ensure MSIV capability is maintained via the MSIV accumulators on a loss of instrument air or nitrogen supply.

Quarterly Test Requirements

Stroke Open (SO)
Stroke Closed (SC)

Refueling Outage Test Justification

Valves V2-82A through D are located in the drywell and thus cannot be stroke close tested during normal power operations or Cold Shutdowns when the drywell is inerted.

Valves V2-87A through D are located in the main steam tunnel which is inaccessible during power operations, thus, these valves cannot be stroke close tested during normal power operations.

These valves can only be stroke close tested via a leak type or non-intrusive test which would require isolating the instrument air or nitrogen to the MSIVs. Testing during Cold Shutdowns is impracticable due to the significant system and test equipment configurations required.

Quarterly Partial Stroke Testing

These valves cannot be partial-stroke tested at power because they are inaccessible at power.

Cold Shutdown Testing

Cold shutdown testing of the inboard MSIV accumulator check valves (V2-82A-D) is not practicable because it would require de-inerting the drywell. Cold shutdown testing of the outboard MSIV accumulator check valves (V2-87A-D) is not practicable because of the significant system configuration changes and test equipment required.

Refueling Outage Testing

These valves are exercised each refueling outage in accordance with ISTC-5221. They are full-stroked open by passing the required air flow through them prior to the leak test (ISTC-3630) that verifies closure.

REFUELING OUTAGE JUSTIFICATION

ROJ-V04

System Control Rod Drive Hydraulic
Valves (Typical of 89 each)
CV-3-126; CV-3-127; SO-3-120; SO-3-121; SO-3-122; SO-3-122; SO-3-123; V3-114; V3-115; V3-137
Category V3-115: Category A/C; V3-114 & V3-137: Category C; The rest are Category B.
Class 2
Function
Valves CV-3-126 & 127 are the Control Rod Drive (CRD) scram valves. These valves have a safety function in the open position to pass scram accumulator discharge to the control rod drives for a reactor scram.

Valves SO-3-120, -121, -122, & 123 are the HCU directional control valves. They have a safety function in the closed position to prevent diversion of scram water.

Valves V3-114 are the scram exhaust to the discharge volume check valves. These valves have a safety function in the open position to pass scram exhaust flow to the discharge volume. These valves have a safety function in the closed position to prevent the scram discharge volume from operating the drive in the event that the scram discharge volume pressure should exceed reactor pressure following a scram.

Valves V3-115 are the charging water to the CRD accumulator check valves. These valves have a safety function in the closed position to prevent diversion of scram accumulator discharge into the charging header.

Valves V3-137 are the Drive Water Supply Check Valves. These valves have a safety function in the closed position to prevent a loss of inventory to the drive water riser.

Quarterly Test Requirements
Check Valve Stroke Open (SO); Power-Operated Valve Stroke Time Open (STO)
Check Valve Stroke Closed (SC); Power-Operated Valve Stroke Time Closed (STC)

Refueling Outage Test Justification
Exercising valves CV-3-126, CV-3-127, V3-114 and V3-137 during power operation would require scramming the plant solely for testing purposes. Since scram insertion times are the acceptance criteria for valve stroke times, testing will be performed in accordance with Technical Specifications 4.3.C.1 and 2. These sections require that all control rods be subjected to scram-time measurements on a refueling outage basis and that 50% of the control rods be measured for scram times every 16 to 32 weeks.

Valves SO-3-120 through 123 are verified operable at least once a week in accordance with Technical Specifications 4.3.A.2 for each partially or fully withdrawn operable control rod. For a control rod that is fully inserted, the safety function of these valves is fulfilled. All control rods drives are verified operable in accordance with Technical Specifications 4.3.B.1 each Refueling Outage.

Closure testing of V3-115 requires that the CRD pumps be stopped to depressurize the charging water header. This would result in a loss of CRD cooling water, RPV reference leg keep-fill, and recirculation pump seal purge. These are unacceptable consequences.

Closure testing of V3-114 requires a scram signal to be in and the scram discharge volume to be pressurized. This condition is beyond operating parameters as specified in Technical Specification 3.3., therefore testing can only be performed during a refueling outage when test conditions can be met.

Quarterly Partial Stroke Testing
Solenoid-operated and air-operated valves cannot be partial-stroke exercised. Partial stroke testing of the check valves requires the same plant configuration as full-stroke exercising, and exposes the plant to the same unacceptable consequences.

Cold Shutdown Testing
Completion of rod scram time testing for all 89 rods during a cold shutdown would require plant resources that are not justified by the marginal value of the testing. Control rods are scram timed throughout the fuel cycle.

Refueling Outage Testing
The accumulator pressure decay test (OP 4111) will be performed during refueling outages, and the Technical Specification required control rod testing will be performed during refueling outages. This testing satisfies the testing requirements for HCU valves in accordance with ISTC-1200 as skid-mounted components.

REFUELING OUTAGE JUSTIFICATION

ROJ-V05

System Control Rod Drive Hydraulic
Valves V3-412A; V3-412B; V3-413A; V3-413B
Category A/C
Class 2
Function
These valves are the recirculation pump seal purge supply check valves. They have a safety function in the closed position to provide primary containment isolation.

Quarterly Test Requirements
Stroke Open (SO)
Stroke Closed (SC)

Refueling Outage Test Justification
These valves can only be exercised closed using a leakage test or non-intrusive test, which would require isolating the seal purge to the recirculation pumps. To preclude adverse affects on seal life, the recirculation pumps would have to be secured.

Quarterly Partial Stroke Testing
Partial-stroke exercising of these valves has the same negative consequences to recirculation pump seals as full-stroke exercising.

Cold Shutdown Testing
Testing during Cold Shutdowns is impracticable due to the significant system configuration changes and test equipment required.

Refueling Outage Testing
These valves are exercised each refueling outage in accordance with ISTC-5221. They are full-stroked open by passing the required air flow through them prior to the leak test (ISTC-3630) that verifies closure.

REFUELING OUTAGE JUSTIFICATION

ROJ-V06

System Standby Liquid Control
Valves V11-16; V11-17
Category C
Class 1
Function
These valves are the Standby Liquid Control (SLC) injection line check valves. They have a safety function in the open position to pass borated water into the reactor, and in the closed position to provide primary containment isolation.

Quarterly Test Requirements
Stroke Open (SO)
Stroke Closed (SC)

Refueling Outage Test Justification
Exercising these valves open during power operation would require injecting water into the reactor coolant system. Injection of demineralized water would create a reactivity excursion and potential for reactor trip. Injection of borated water would require removing the SLC system from service to clean the borated solution from the piping. Either method would require replacing the explosive actuated valves.

Full-stroke closed testing requires the removal of at least one explosive actuated valve.

Quarterly Partial Stroke Testing
Partial stroke testing involves the same consequences as full-stroke testing.

Cold Shutdown Testing
Performing a demineralized water injection during cold shutdown would be excessively burdensome, requiring significant system configuration changes and test equipment setup.

Refueling Outage Testing
These valves will be full-stroke exercised open during refueling outages when the SLC system can be tested without creating a reactivity excursion.

These valves will be exercised closed each Refueling Outage during leakage rate testing performed in accordance with ISTC-3620.

REFUELING OUTAGE JUSTIFICATION

ROJ-V07

System Neutron Monitoring System
Valves V7-1
Category A/C
Class 2
Function
This valve is one of two Neutron Monitoring System (NMS) Traversing Incore Probe (TIP) Purge primary containment isolation valves. This valve, in conjunction with SOV-7-107, has a safety function in the closed position to provide primary containment isolation.

Quarterly Test Requirements
Partial Stroke Open (SO)
Stroke Closed (SC)

Refueling Outage Test Justification
This valve can only be tested closed using a leak test or non-intrusive test that requires securing the nitrogen purge to the NMS TIP system. The nitrogen purge is required during reactor power operation and Cold Shutdown to prevent condensation and corrosion in the NMS TIP system. Therefore, flow through the valve during normal operation satisfies the forward flow test continuously, in accordance with ISTC-5221 and ISTC-3550.

Quarterly Partial Stroke Testing
Partial stroke-closed testing is not practicable because of the consequences of stopping nitrogen flow to the TIP system.

Cold Shutdown Testing
Cold Shutdown testing is not practicable because of the consequences of stopping nitrogen flow to the TIP system.

Refueling Outage Testing
This valve will be exercised closed each Refueling Outage during leakage rate testing performed in accordance with ISTC-3620. The forward flow partial exercise will be documented on the Record of Test.

REFUELING OUTAGE JUSTIFICATION

ROJ-V08

System Control Rod Drive Hydraulic
Valves V3-162A; V3-162B
Category A/C
Class 2
Function
These valves are the Control Rod Drive (CRD) scram discharge volume vent check valves. They have a safety function in the closed position to isolate the scram discharge volume during a scram condition, thereby preventing reactor coolant inventory loss.

Quarterly Test Requirements
Partial Stroke Open (SO)
Stroke Closed (SC)

Refueling Outage Test Justification
These valves can only be exercised closed using a leak test or non-intrusive test which would require removing the CRD system from service.

Quarterly Partial Stroke Testing
Partial stroke testing would involve removing the CRD system from service. Therefore, partial stroke testing is not practicable.

Cold Shutdown Testing
Testing during Cold Shutdowns is impracticable due to the significant system configuration changes and test equipment required.

Refueling Outage Testing
These valves are partial stroked open as part of the scram discharge volume drain-down, and they will be exercised closed each Refueling Outage during leakage rate testing performed in accordance with ISTC-3620.

REFUELING OUTAGE JUSTIFICATION

ROJ-V09

System Service Water
Valves V70-1A; V70-1B; V70-1C; V70-1D
Category C
Class 3
Function
These valves are the station service water pump discharge check valves. They have a safety function in the open position to provide cooling water to systems and equipment required to operate under accident conditions and to provide an inexhaustible supply of water for standby cooling system operation. They have a function in the closed position to prevent the diversion of cooling water through an idle station Service Water pump.

Quarterly Test Requirements
Stroke Open (SO)
Stroke Closed (SC)

Refueling Outage Test Justification
The pump design flow, as defined by the best efficiency point (BEP) on the manufacturer's pump curve, is 4,000 gpm. Since pump flows are not individually measurable with the present system configuration, individual check valve flow cannot be determined. To determine individual pump and check valve flow, one subsystem of Service Water must be shutdown, so that one of the pumps in that subsystem can be run through the test loop. This can only be performed under plant conditions that will support adequate service water heat removal capacity with only two SW pumps. Depending on seasonal cooling load requirements, all four service water pumps may be operating during power operation, and in some cases, during cold shutdown. Therefore, it is also not practicable to reverse flow test these check valves on a quarterly basis or during cold shutdown due to the need to secure service water pumps.

Quarterly Partial Stroke Testing
These check valves are partially open continuously when their associated SW pump is running. Closure requires securing the associated SW pump, which is not practicable, as described above.

Cold Shutdown Testing
Cold shutdown conditions frequently do not permit securing two SW pumps, which is a requirement for full-flow testing, as described above. Therefore, cold shutdown testing is also not practicable.

Refueling Outage Testing
These check valves have been verified to be in their full open and closed position during normal operation using radiography. The flows recorded during this verification ranged between approximately 1,800 – 3,000 gpm. Thus there is reasonable assurance that these check valves are in a full open position at flows much less than the design flow of 4,000 gpm.

These check valves have also been verified to be in their full open position during surveillance testing using a non-intrusive technique (Acoustical and Ultrasonic trace analysis derived from the MOVATS Universal Diagnostic System (UDS)). This non-intrusive test (NIT) was performed (baselined) during RFO 21 and verified again during RFO 22. The valves proved to full open at pump start and close when pump is stopped. The open and close of these valves is also highly audible.

These valves will be full stroke exercised both open and closed during refuel outages in accordance with ISTC-3522 and ISTC-5221. This flow exercise will be verified full open and closed on a sample basis using NIT each refuel outage. This sampling NIT plan is not required for Code compliance, but is performed as an enhancement and continuing verification that these check valves open fully at less than the required design flow rate. Reverse flow is also verified by running one pump at a reference condition during refuel outages and taking credit for the adjacent idle pump check valve closure based on the running pump being capable of meeting the reference condition and acceptance criteria.

Partial forward flow credit will be taken during the quarterly pump surveillance test.

The following table, which is based on testing during each refueling outage, illustrates the NIT sample plan.

Sample testing using nonintrusive techniques (NITs) and the flow testing (FT) procedure

VY RFO	Valve **V70-1A**	Valve **V70-1B**	Valve **V70-1C**	Valve **V70-1D**
21~22	FT/NIT	FT/NIT	FT/NIT	FT/NIT
23	FT/NIT	FT	FT	FT
24	FT	FT/NIT	FT	FT
25	FT	FT	FT/NIT	FT
26	FT	FT	FT	FT/NIT

REFUELING OUTAGE JUSTIFICATION

ROJ-V10

System	Nuclear Boiler Vessel Instrumentation
Valves	V2-3-430A; V2-3-430B; V2-3-432A; V2-3-432B; V2-3-433A; V2-3-433B; V2-3-435A; V2-3-435B
Category	A/C
Class	2

Function
These valves are the reactor vessel instrumentation reference leg back fill inlet check valves. These valves are required to close to prevent the reference legs from emptying in the event of a break in the non-safety related portion of the back-fill system and to provide primary containment isolation.

Quarterly Test Requirements
Partial Stroke Open (PSO)
Stroke Closed (SC)

Refueling Outage Test Justification
These valves cannot be exercised during power operations or during cold shutdowns since shutting these valves would isolate filling water to the reference leg lines for reactor vessel pressure and level instrumentation. The function of the reference leg backfill system is to ensure that the reactor water level reference leg fluid does not become saturated with non-condensable gases. Full closure of these valves is verified during local leakage rate tests when the test boundary is drained and vented, which could introduce non-condensable gases into the reference legs.

Quarterly Partial Stroke Testing

Cold Shutdown Testing
These valves are partially open during cold shutdown. However, closure during cold shutdown is not practicable due to the potential for loss of the reference leg keep-fill function.

Refueling Outage Testing
These valves will be exercised closed each Refueling Outage during leakage rate testing performed in accordance with ISTC-3620.

REFUELING OUTAGE JUSTIFICATION

ROJ-V11

System Instrument Air System
Valves V72-89B; V72-89C
Category A/C
Class 2
Function
These valves are the Instrument Air to the Drywell Containment Isolation Valves. These valves have a safety function to close to prevent the release of fission products from the drywell to the reactor building in the event of an accident.

Quarterly Test Requirements
Partial Stroke Open (PSO)
Stroke Closed (SC)

Refueling Outage Test Justification
It is not practical to verify the closure function of these valves on a quarterly or cold shutdown basis. The only means to verify closure of these valves is to perform a leakage test or to use a non-intrusive testing method.

In order to assure closure of these valves to perform a leakage rate test or non-intrusive test, it would be necessary to isolate instrument air to the main steam isolation valves inside containment. Additionally, in order to perform a leakage type test, it would be necessary to open system drains and vents. Isolation of this line could result in closure of the air operated main steam isolation valves and subsequent reactor scram.

Quarterly Partial Stroke Testing
Although these valves are normally inservice, it is not practicable to cycle the air-operated valves supplied by these valves to verify partial opening. Partial closure testing is not practicable, since leak-rate testing is the only practicable test method for closure.

Cold Shutdown Testing
Cold shutdown testing is impracticable for the same reasons as testing at power.

Refueling Outage Testing
These valves will be partial-stroked open and stroked closed each Refueling Outage during leakage rate testing performed in accordance with ISTC-3620.

REFUELING OUTAGE JUSTIFICATION

ROJ-V12

System Standby Fuel Pool Cooling
Valves V19-224
Category C
Class 3
Function
V19-224 is normally open during plant operation to allow cooling flow to pass to the fuel storage pool. The safety function of this valve is to close to provide isolation capability of the non-seismic normal fuel pool cooling system from the standby fuel pool cooling system.

Quarterly Test Requirements
Partial Stroke Open (PSO)
Stroke Closed (SC)

Refueling Outage Test Justification
It is not practicable to full-stroke exercise this valve to the closed position on a quarterly basis or during cold shutdowns. This valve is normally open to allow cooling flow from the normal fuel pool cooling pumps to the fuel storage pool. Additionally this valve is located directly upstream of check valve V19-18. The only practical means to verify the closure of this valve is to pressurize the volume between V19-223, V19-53 and V19-46 and V19-224 utilizing a differential pressure or leakage test or by performing a non-intrusive test when normal fuel pool cooling system flow through the demineralizer is isolated. The use of non-intrusive techniques to verify closure on a quarterly basis or during cold shutdowns is not practical. These valves are not located in an easily accessible location, and scaffolding is required to setup the necessary equipment.

NUREG-1482, subsection 4.1.4, states, "The NRC has determined that the need to setup test equipment is adequate justification to defer backflow testing of a check valve until a refueling outage".

Quarterly Partial Stroke Testing
Partial opening of this valve is provided during normal operation of the spent fuel pool cooling system (FPC). Partial closure testing requires the same test equipment setup as full-closure testing.

Cold Shutdown Testing
Partial opening of this valve is provided during normal operation of the spent fuel pool cooling system (FPC), including plant cold shutdown conditions. Closure testing during cold shutdown is not practicable based on the difficulty of setting up test equipment.

Refueling Outage Testing
The partial stroke open will be documented on the Record of Test for the stroke closure test. The closure function of this valve will be verified during refueling outages by a leakage test in accordance with ISTC-3620 or by performing a non-intrusive test in accordance with ISTC-5221.

REFUELING OUTAGE JUSTIFICATION

ROJ-V13

System Reactor Building Closed Cooling Water
Valves V70-113
Category A/C
Class 2
Function
This valve is the RBCCW system drywell supply line containment isolation valve. This valve has a safety function to close to prevent the release of fission products from the drywell to the reactor building in the event of an accident.

Quarterly Test Requirements
Partial Stroke Open (PSO)
Stroke Closed (SC)

Refueling Outage Test Justification
It is not practical to verify the closure function of this valve on a quarterly or cold shutdown basis. To assure closure of this valve, it is necessary to perform a leakage rate test or non-intrusive test. Non-intrusive testing requires extensive test equipment setup and system alignment changes. Leakage rate testing would require isolation of the RBCCW system supply to the drywell and opening of system drains and vents. Isolation of this line would result in a loss of cooling flow to important plant equipment such as the recirculation pumps, possibly resulting in their failure.

Quarterly Partial Stroke Testing
Since this valve is normally inservice, supplying RBCCW loads in the Primary Containment, it is at least partially open during normal operation. Partial closure testing is not practicable, since it requires the same system configuration changes and test equipment setup as full stroke closure testing.

Cold Shutdown Testing
Testing during cold shutdown is not practicable because of the extensive system configuration changes and test equipment setup required.

Refueling Outage Testing
This valve will be partial stroked open and full stroke closed each Refueling Outage during leakage rate testing performed in accordance with ISTC-3620.

REFUELING OUTAGE JUSTIFICATION

ROJ-V14

System High Pressure Coolant Injection
Valves V23-56; V23-3; V23-4
Category C; A/C; A/C
Class 2
Function
V23-56 is the HPCI Turbine Drain Condensate Exhaust Line Containment Isolation Valve. This valve is normally closed during plant operation. This valve has a safety function to open to pass turbine exhaust condensate to the torus.

V23-3 and V23-4 are the HPCI Turbine Steam Exhaust Line Containment Isolation Valves. These valves are normally closed during plant operation. These valves have a safety function to open to pass turbine exhaust steam to the torus. These valves have a safety function to close for containment isolation and are included in the Appendix J leak rate testing program.

Quarterly Test Requirements
Stroke Open (SO)
Stroke Closed (SC)

Refueling Outage Test Justification
It is not practical to verify the closure function of V23-3 and V23-4 on a quarterly or cold shutdown basis. During normal operation the HPCI steam and condensate exhaust lines are required to be available to support operation of the HPCI turbine. The only practical means to verify the closure of V23-4 and V23-4 is a leakage test during Appendix J testing. These valves are not located in an easily accessible location and scaffolding is required to setup the necessary equipment. Therefore, the level of difficulty and the need to setup test equipment is the basis for the Refueling Outage Justification.

Quarterly Partial Stroke Testing
All three check valves are stroked open during quarterly surveillance testing. V23-56 cannot be verified to be fully open during routine surveillance testing. Therefore, this will be credited as a partial stroke open. The full-stroke open test for V23-3 and V23-4 and the partial stroke open test for V23-56 shall be documented in the Record of Test for the quarterly surveillance. However, partial stroke close testing is not practicable, since partial stroke close testing requires the same test equipment setup as full stroke testing.

Cold Shutdown Testing
NUREG-1482, subsection 4.1.4, states, "The NRC has determined that the need to setup test equipment is adequate justification to defer backflow testing of a check valve until a refueling outage".

Refueling Outage Testing
The closure function of V23-3 and V23-4 will be verified during refueling outages by the Appendix J leakage test in accordance with ISTC-3620.

The full stroke open and the full stroke closed test of V23-56 will be performed during refueling outages by a leakage test in accordance with ISTC-5221.

REFUELING OUTAGE JUSTIFICATION

ROJ-V15

System	Reactor Core Isolation Cooling
Valves	V13-6; V13-7
Category	A/C
Class	2

Function
V13-6 and V13-7 are the RCIC Turbine Steam Exhaust Line Containment Isolation Valves. These valves are normally closed during plant operation. These valves have a safety function to open to pass turbine exhaust steam to the torus. These valves have a safety function to close for containment isolation and are included in the Appendix J Program for leak rate testing.

Quarterly Test Requirements
Stroke Open (SO)
Stroke Closed (SC)

Refueling Outage Test Justification
It is not practical to verify the closure function of these valves on a quarterly or cold shutdown basis. During normal operation the RCIC turbine exhaust line is required to be available to support operation of the RCIC turbine. The only practical means to verify the closure of V13-6 and V13-7 is a leakage test during Appendix J testing. Leak rate testing to verify closure on a quarterly basis or during cold shutdowns is not practical. These valves are not located in an easily accessible location and scaffolding is required to setup the necessary equipment.

Quarterly Partial Stroke Testing
These valves are stroked open during routine surveillance testing, and the full-stroke open will be documented in the Record of Test. However, partial stroke closure testing requires the same plant conditions and test equipment setup as full stroke closure testing. Therefore, quarterly partial stroke closure testing is not practicable.

Cold Shutdown Testing
NUREG-1482, subsection 4.1.4, states, "The NRC has determined that the need to setup test equipment is adequate justification to defer backflow testing of a check valve until a refueling outage".

Refueling Outage Testing

The closure function of these valves will be verified during refueling outages by a leakage test in accordance with ISTC-3620.

REFUELING OUTAGE JUSTIFICATION

ROJ-V16

DELETED

REFUELING OUTAGE JUSTIFICATION

ROJ-V17

System Residual Heat Removal; Nuclear Boiler
Valves V10-18A; V10-18A5; V2-39AA; V2-74A
Category A/C
Class 2
Function
V10-18A has a safety function to open to provide overpressure protection for Penetration X-12. V10-18A and associated piping are configured as an equalizing line across V10-18. V10-18A also has a safety function to close as one of the inboard containment isolation valves for Penetration X-12.

V10-18A5 has a safety function to open to provide V10-18 bonnet pressure locking protection. V10-18A5 also has a safety function to close as a PIV.

V2-39AA has a safety function to open to provide overpressure protection for Penetration X-41. V2-39A and associated piping are configured as an equalizing line across FCV-2-39. V2-39AA will open when pressure on the penetration side of FCV-2-39 is greater than reactor side of FCV-2-39. V2-39AA also has a safety function to close for primary containment isolation of penetration X-41.

V2-74A has a safety function to open to provide overpressure protection for Penetration X-8. V2-74A and associated piping are configured as an equalizing line across V2-74. V2-74A will open when pressure on the penetration side of V2-74 is greater than reactor side of V2-74. V2-74A also has a safety function to close for primary containment isolation of penetration X-8.

Quarterly Test Requirements
Stroke Open (SO)
Stroke Closed (SC)

Refueling Outage Test Justification
It is not practical to full or part-stroke exercise these valves on a quarterly basis or during cold shutdowns. These valves are located inside the drywell and are not accessible during power operation.

Quarterly Partial Stroke Testing
These valves are inaccessible during power operation. Therefore, partial stroke testing at power is impracticable.

Cold Shutdown Testing
Cold shutdown testing is impracticable, because the drywell must be inerted, and NRC Staff has determined that the requirement to de-inert the Primary Containment for testing is sufficient justification to defer testing to Refueling Outages (NUREG-1482, para. 3.1.1.3)

Refueling Outage Testing
These valves will be exercised closed each refueling outage during leakage rate testing performed in accordance with ISTC-3620 and exercised open each refueling outage in accordance with ISTC-5221.

REFUELING OUTAGE JUSTIFICATION

ROJ-V18

System Reactor Core Isolation Cooling (RCIC) and High Pressure Coolant Injection (HPCI)
Valves V13-820; V13-821; V23-845; V23-846
Category A/C
Class 2
Function
These nozzle check valves are the RCIC/HPCI turbine exhaust line vacuum breakers to prevent water hammer. The vacuum breakers are designed to admit air into the exhaust piping when the exhaust piping pressure decreases below the suction side pressure of the vacuum breaker. The air prevents a significant vacuum from developing and thus eliminates the conditions required to initiate a water hammer event.

Quarterly Test Requirements
Stroke Open (SO)
Stroke Closed (SC)

Refueling Outage Test Justification
Open Position – Per calculation VYC-1790, accident air-flow through the vacuum breaker line is 3909 SCFH for RCIC and 18,817 SCFH for HPCI. Verifying the maximum accident condition required flow through these valves is not possible due to the large gas volume required and extremely high flow velocities through the ¾" test connections. A reduced flow air test can demonstrate that the disk exercised to the full open position at less than accident flow as detected by non-intrusive acoustic technology. It is impractical to full or part stroke exercise these valves on a quarterly basis or during cold shutdown, due to the need to gain access and to set-up non-intrusive test equipment during full stroke exercising.

Closed Position – During normal plant operation, these check valves are maintained in the closed position by an internal spring. Additional closing force is provided by steam when the applicable turbine is in operation. A seat leakage limit has been established such that the torus environment will not be adversely affected during turbine operation. It is impractical to verify these valves in the closed position on a quarterly basis or during cold shutdown due to the need to gain component access and install test equipment. Additionally, the applicable system must be removed from service to accomplish this testing.

Quarterly Partial Stroke Testing
Partial stroke testing requires the same access to components and test equipment setup as full stroke testing, and is impracticable during power operation.

Cold Shutdown Testing
NUREG-1482, subsection 4.1.4, states, "The NRC has determined that the need to setup test equipment is adequate justification to defer backflow testing of a check valve until a refueling outage".

Refueling Outage Testing

RCIC Turbine Steam Discharge Line Series Vacuum Breakers V13-820/821 and HPCI Turbine Steam Discharge Line Series Vacuum Breakers V23-845/846 shall be stroked open and stroked closed during refueling outages, in accordance with ISTC-5221.

REFUELING OUTAGE JUSTIFICATION

ROJ-V19

System	Core Spray			
Valves	V14-10A;	V14-10B;	V14-13A;	V14-13B
Category	C	C	A/C	A/C
Class	2	2	1	1

Function
Valves V14-10A and V14-10B are the Core Spray pump discharge check valves. They have a safety function in the open position to allow flow to the reactor vessel. They have a safety function in the closed position in system standby to prevent backflow to maintain the discharge water leg to prevent water hammer.

Valves V14-13A and V14-13B are the Core Spray injection check valves. They have a safety function in the open position to pass core spray injection flow to the reactor, and in the closed position for primary containment isolation and RCS pressure isolation (PIV).

Quarterly Test Requirements
Stroke Open (SO)
Stroke Closed (SC)

Refueling Outage Test Justification
The maximum required accident condition flow is 4,000 gpm. It is not practical to establish a flow rate of 4000 gpm on a quarterly or cold shutdown basis. The Core Spray system has one full-flow test line per loop capable of a maximum flow rate of <4000 gpm, based on the sizing of restricting orifices to preclude pump runout. These test lines are used to establish the required accident flow rate (3000 gpm per Technical Specification) from each pump with a 120-psid difference between the vessel and the drywell.

The V14-10A and V14-10B check valves have been verified to be in their full open position during a surveillance test using non-intrusive testing (Acoustical and Ultrasonic trace analysis). The check valves were observed to be full open prior to achieving the maximum test flow of approximately 3,100 gpm. However, it is impracticable to verify these valves in the open position on a quarterly basis or during cold shutdown due to equipment setup, and personnel exposure, and equipment access considerations.

The V14-13A and V14-13B valves cannot be exercised open during power operation, since the core spray pump discharge pressure cannot overcome reactor pressure. Manual exercising has been attempted in the past during cold shutdown conditions, yielding inconsistent test results and incurring significant testing difficulty. Empirical data has identified that packing drag is too variable to permit establishing a meaningful break-away torque for these valves.

Quarterly Partial Stroke Testing
Valves V14-10A and V14-10B are part-stroke exercised open quarterly during the Core Spray pump tests at a flow of ~3100 gpm. Valves V14-13A and V14-13B are verified closed (not stroked closed) on a quarterly basis during plant operation.

Cold Shutdown Testing
Cold shutdown testing is impracticable due to the extraordinary system lineups and test equipment required. NUREG-1482, subsection 4.1.4, states, "The NRC has determined that the need to setup test equipment is adequate justification to defer backflow testing of a check valve until a refueling outage".

Refueling Outage Testing
Valves V14-10A, V14-10B, V14-13A and V14-13B are full-stroke exercised open each Refueling Outage during reactor cavity flood-up in accordance with ISTC-5221. Achievement of >4100 gpm satisfies full stroke open for these check valves. V14-13A and V14-13B are CIVs and PIVs and are leak tested in accordance with Appendix J and at nominal reactor operating pressure every 2 years, in accordance with ISTC-3620 and ISTC-3630. The PIV test, performed each refueling outage after the open test, also satisfies the stroke-close requirement for these valves at a Refueling Outage frequency.

REFUELING OUTAGE JUSTIFICATION

ROJ-V20

System Residual Heat Removal
Valves V10-19A; V10-19B; V10-19C; V10-19D
Category C
Class 2
Function
These valves are the RHR pump minimum flow check valves. They have a safety function in the open position to pass RHR flow to the suppression pool for pump protection. They have a safety function in the closed position to prevent backflow through an idle RHR pump.

Quarterly Test Requirements
Stroke Open (SO)
Stroke Closed (SC)

Refueling Outage Test Justification
These valves are stroked open and closed quarterly during the RHR pump surveillance, in accordance with ISTC-5221. The minimum flow check valves are verified open by audible flow noise in the minimum flow line. They are verified closed by acceptable pump flow and ΔP.

In addition to the quarterly test, these valves are also tested by non-intrusive testing, using Acoustical and Ultrasonic trace analysis. This method has been baselined successfully on these valves, and has been demonstrated to indicate both opening and closure reliably. This non-intrusive test (NIT) was performed (baselined) during RFO-21 and reverified during RFO-22. The valves proved to full open at pump start with the pump discharge closed. The valves proved to stroke closed when the pump discharge opens. This NIT is performed as an enhancement to the Code-compliant quarterly test. One RHR minimum flow check valve will be tested by NIT each refueling outage.

Quarterly Partial Stroke Testing
These valves are stroked open and closed during routine surveillance testing.

Cold Shutdown Testing
These valves are stroked open and closed during routine surveillance testing.

Refueling Outage Testing
The following table shows the NIT sample plan that will be used to enhance the Code-compliant quarterly testing.

Sample testing using (NIT) and the flow testing (FT) procedure

VY RFO	V10-19A	V10-19B	V10-19C	V10-19D
21~22	FT/NIT	FT/NIT	FT/NIT	FT/NIT
23	FT/NIT	FT	FT	FT
24	FT	FT/NIT	FT	FT
25	FT	FT	FT/NIT	FT
26	FT	FT	FT	FT/NIT

REFUELING OUTAGE JUSTIFICATION

ROJ-V21

System Reactor Water Cleanup
Valves V12-28A; V12-28B
Category C
Class 3
Function
These valves are the RWCU pump discharge check valves. They have a safety function in the closed position to prevent reverse flow in the event of a line break (HELB) to prevent the environment in the pump cubicle from degrading beyond that previously analyzed in the EQ Program.

Quarterly Test Requirements
Partial Stroke Open (PSO)
Stroke Closed (SC)

Refueling Outage Test Justification
Closed Position – These valves cannot be verified to close on a quarterly or cold shutdown basis due to operating restrictions and the lack of adequate instrumentation required to verify full stroke by system parameters. Quarterly testing requires swapping pumps to check for reverse flow. Because of high pressure and temperature differentials during normal reactor operations, swapping pumps causes pump seal failures. Pump seal replacements are time consuming, expensive, and dose intensive. Since component disassembly in this high dose area is burdensome, alternate means of inspection were reviewed. Non-intrusive testing was determined to be impracticable based on valve materials (stainless steel) and operating restrictions (slowly opening and closing pump discharge valves to minimize check valve slam and flow perturbations). The manner in which RWCU pumps are placed into operation or removed from service will not provide a consistent acoustic signature that is required for proper analysis. Flexible valve lineups and the relaxation of pump swap restrictions are possible during refueling outages, based on the absence of high thermal gradients affecting pump seal life. The check valves can be verified to close during refueling outage tests using observation of the idle pump's shaft during pump swaps in accordance with ISTC-5221(a), observation by positive means (system parameters).

Quarterly Partial Stroke Testing
These valves are partially stroked open whenever their respective RWCU pump is in operation. However, it is not practicable to swap RWCU pumps for the sole purpose of opening the discharge check valve. Therefore, partial opening credit will be taken during the closure test, in accordance with ISTC-3522.

Cold Shutdown Testing
Testing during cold shutdowns is not practical. Depending on the length of the shutdown such testing could delay startup or damage the pumps. The NRC has indicated in Section 3.1.1.4 of NUREG-1482 that licensees need not stop and restart reactor coolant pumps at each cold shutdown solely to allow for the testing of certain valves. Although the RWCU pumps are not the pumps specified by this reference, the intent of ISTC-3522, which allows the test interval to be extended to refueling outages when the tests cannot be practically performed during power operation or cold shutdown outages, is the same.

Refueling Outage Testing
These valves will be exercised open and closed each refuel outage in accordance with ISTC-5221.

REFUELING OUTAGE JUSTIFICATION

ROJ-V22

System Instrument Air; Nuclear Boiler

Valves	V72-125	V72-102	V72-33	V72-109	V2-37A	V2-37B	V2-37C	V2-37D
Category	C	A/C	A/C	A/C	A/C	A/C	A/C	A/C
Class	3	2	2	3	2	2	2	2
Safety Position	O	O/C	O/C	C	O/C	O/C	O/C	O/C

Function
V72-125, V72-102, V72-33, and V2-37A-D have a safety function to open to provide a safety class backup N_2 supply from a bottle system to the ADS accumulators to ensure a 72-hour capability of secondary RPV pressure control during a seismic event (SQUG).

V2-37A-D have a safety function to close and remain leak-tight to maintain pressure in their respective accumulators. V72-109 provides a closed safety function to limit leakage from the backup N_2 supply with a postulated failure of the Containment Air System or its associated NNS piping. V72-102 and V72-33 are the ADS N_2 Supply Containment Isolation Valves. These valves have a safety function to close and remain leak-tight for containment isolation and are included in the Appendix J Program for leak rate testing. Only V72-125 does not have a close function and seat leakage criterion.

Quarterly Test Requirements
Stroke Open (SO) {V72-125, V72-102, V72-33, and V2-37A-D}
Partial Stroke Open (PSO) {V72-109}
Stroke Closed (SC)

Refueling Outage Test Justification
Testing V72-125, V72-102, V72-33, and V2-37A-D in the forward direction is accomplished by recording the time required to increase pressure in each ADS accumulator (individually tested) utilizing N2 from the backup N2 supply. This test requires access to the drywell and disables the secondary RPV pressure control function of all 4 Main Steam Safety Relief Valves (RV-271A-D) during its conduct. It is not practical to full or part-stroke exercise these valves on a quarterly basis or during cold shutdowns when the drywell is inerted and not accessible.

It is not practical to full-stroke exercise V72-102, V72-109, V72-33, and V2-37A-D to their closed positions on a quarterly basis or during cold shutdowns. V72-102, V72-109, V72-33, and V2-37A-D can only be stroke close tested using a leak test, which disables the secondary RPV pressure control function of all 4 Main Steam Safety Relief Valves (RV-2-71A-D) during its conduct.

Quarterly Partial Stroke Testing
Quarterly partial stroke testing is not practicable, because these valves are not accessible during operation.

Cold Shutdown Testing
Cold shutdown testing is impracticable, because the drywell must be inerted, and NRC Staff has determined that the requirement to de-inert the Primary Containment for testing is sufficient justification to defer testing to Refueling Outages (NUREG-1482, para. 3.1.1.3)

Refueling Outage Testing
V72-125, V72-102, V72-33, and V2-37A-D will be exercised open and closed each Refueling Outage in accordance with ISTC-3620, ISTC-3630, and ISTC-5221.

V72-109 will be at least partial-stroked open and exercised closed each refueling outage during leakage rate testing performed in accordance with ISTC-3630 and ISTC-5221.

REFUELING OUTAGE JUSTIFICATION

ROJ-V23

System Reactor Water Clean-up (RWCU)
Valves V12-15; V12-18
Category A
Class 1
Function
These valves are the Reactor Water Cleanup (RWCU) Containment Isolation Valves. They have a safety function in the closed position to isolate primary containment and to close with the initiation of SLC to prevent loss or dilution of boron.

Quarterly Test Requirements
Stroke Time Close (STC)

Refueling Outage Test Justification
It is not practicable to exercise these valves quarterly during normal operation. The reactor water cleanup system is designed to operate continuously. Closure of V12-15 or V12-18 isolation valves during power operation or cold shutdown causes undue system perturbation. The V12-15 and V12-18 valves are interlocked with the Reactor Water Cleanup Pumps to trip the pumps when the valves go closed. These pumps have an industry-wide history of seal failure. The cause of these failures is, in part, attributed to the thermal cycling of the seals during startup and the introduction of microscopic particles from the system itself being trapped on the seal face during the start-up evolution. Startup of an idle pump also requires a seal fill and vent operation, which requires entry into a locked High Radiation cubicle. Subsequent repairs of a failed pump seal expose workers to excessive dose. Thus, unnecessary stopping and starting of the pumps results in a higher personal exposure rate and a higher probability of seal failure. Historical IST data for V12-15 and V12-18 reveals no adverse trends or failures that would warrant a need for testing more frequent than at a refueling outage interval. Testing during refueling outages produces the smallest temperature transients to the pump seal, thereby minimizing the adverse effects of valve testing.

Quarterly Partial Stroke Testing
Partial stroke testing produces the same system upsets as full stroke testing, since partial closure of the valves results in a RWCU pump trip.

Cold Shutdown Testing
Testing at cold shutdown could also cause perturbations to the maintenance of reactor water chemistry.

Refueling Outage Testing
These valves will be stroke timed close during Refueling Outages in accordance with ISTC-5120.

REFUELING OUTAGE JUSTIFICATION

ROJ-V24

System HPCI (High Pressure Coolant Injection); RCIC (Reactor Core Isolation Cooling)
Valves SSC-23-13; V23-56; SSC-13-10; V13-38
Category C
Class 2
Function
These valves are in the HPCI Turbine Exhaust Drain Line and the RCIC Barometric Condenser Vacuum Pump Discharge Line, respectively. They are similar in that both are 2-inch lines penetrating the torus below the minimum torus water level, making them both water-sealed lines and exempt from Appendix J Type C testing. They are required to open to pass drain flow. The inboard globe stop check valves, SSC-23-13 and SSC-13-10, are primary containment isolation valves and are required to close, but not to be leak-tight, to help maintain the torus water seal. The inboard swing check valves are required only to open to pass drain flow.

Quarterly Test Requirements
Stroke Open (SO)
Stroke Close (SC)

Refueling Outage Test Justification
These valves are tested in the open direction quarterly during the HPCI and RCIC surveillance tests. However, testing the valves in the reverse direction requires extensive test setup that cannot be performed during power operation due to containment integrity and equipment unavailability considerations. The most practicable test method for verifying closure of these check valves is a leakage test. Testing these valves closed would require declaring the RCIC and HPCI systems inoperable for the duration of the test, and would require opening a test connection on the drain line to the torus, thereby, compromising primary containment integrity.

Quarterly Partial Stroke Testing
These valves are stroked open during quarterly surveillance testing. Partial stroke closure requires the same test setup and system unavailability as full stroke closure testing.

Cold Shutdown Testing
Cold shutdown testing is impracticable due to the system lineups and test equipment required. NUREG-1482, subsection 4.1.4, states, "The NRC has determined that the need to setup test equipment is adequate justification to defer backflow testing of a check valve until a refueling outage".

Refueling Outage Testing
Therefore, valves SSC-23-13, V23-56, SSC-13-10, and V13-38 will be tested for closure each refueling outage.

REFUELING OUTAGE JUSTIFICATION

ROJ-V25

System	FO	HPCI	HPCI	RCIC	RCIC	RHRSW	RHRSW	RWCU	RWCU
Valves	V78-2	V23-61	V23-62	V13-29	V13-40	V70-43A	V70-43B	V12-62	V12-62A
Category	C	C	C	C	C	C	C	C	C
Class	3	2	2	2	2	3	3	2	3

Function

V78-2: Fuel Oil Storage Tank Fill Line Check Valve
V23-61 HPCI Torus Suction Check Valve
V23-62 HPCI Pump Minimum Recirc Check Valve
V13-29: RCIC Pump Discharge Minimum Flow Check Valve
V13-40: Suppression Pool Supply to RCIC Pump Suction Check Valve.
V70-43A, B: SW Discharge Loop Header Check Valves
V12-62, 62A RWCU Flow to Feedwater System Isolation Check Valves

Quarterly Test Requirements

Stroke Open (SO)
Stroke Close (SC)

Refueling Outage Test Justification

These valves can only be determined to be capable of closing and fully opening by disassembly and examination. The Code specifies that check valves that are disassembled and examined shall be disassembled and examined during refueling outages.

Quarterly Partial Stroke Testing

Some of these valves can be verified to be partially open during plant operation. However, it is not practical to perform partial exercising on a quarterly basis. The HPCI and RCIC torus suction valves cannot be partially stroked at power, since this would introduce torus water into the HPCI and RCIC systems. None of these valves can be verified closed during plant operation.

Cold Shutdown Testing

Cold shutdown does not provide an opportunity to perform partial exercising or closure verification, since the consequences are the same as partial exercising at power.

Refueling Outage Testing

These check valves shall be grouped according to the following table. At least one valve from each group shall be disassembled and examined during each refueling outage. Since the groups are small, the Code requirement that each valve be disassembled and examined at least once every 8 years will be met. The groups are established based on the following: valve manufacturer, design, service, size, materials of construction, and orientation. The following bases were used to establish the groups:

Group 1: The only check valve in Fuel Oil service. There are no others in similar service.
Group 2: HPCI and RCIC Check valves. Although they vary in size, they are the same Manufacturer and Model. They have the same service, materials, orientation, and design.
Group 3 The only lift check. There are no other similar valves.
Group 4: Service Water Header Check valves. These have the same manufacturer, model, design, service, size, materials, and orientation.

Group 5: These RWCU check valves have the same service, size, materials, and orientation. They are of different manufacturer, and although they are both swing checks, one is a bolted bonnet, while the other is a pressure seal bonnet. This difference is not a significant factor in monitoring for degradation.

	Manuf.	Design	Service	Size	Material	Orientation	**Group**
V78-2	Walworth	Swing	Fuel Oil	4.00	Carbon Steel	Horizontal	**1**
V23-61	Walworth	Swing	Reactor Coolant Grade Water	16.00	Carbon Steel	Horizontal	**2**
V23-62	Walworth	Swing	Reactor Coolant Grade Water	4.00	Carbon Steel	Horizontal	**2**
V13-29	Dresser	Lift	Reactor Coolant Grade Water	2.00	Steel Body; SS Disk	Horizontal	**3**
V13-40	Walworth	Swing	Reactor Coolant Grade Water	6.00	Carbon Steel	Horizontal	**2**
V70-43A, B	Walworth	Swing	Service Water	8.00	Carbon Steel	Horizontal	**4**
V12-62	Walworth	Swing	Reactor Coolant Grade Water	4.00	Carbon Steel	Horizontal	**5**
V12-62A	Atwood Morrill	Press. Seal Swing Check	Reactor Coolant Grade Water	4.00	Steel Body; SS Disk	Horizontal	**5**

IV. VALVE 10CFR50.55a REQUESTS

Fourth Interval Program 10CFR50.55a Request Number	Third Interval 10CFR50.55a Request Number
1	13, 14, & 15
2	19

10 CFR 50.55a Request Number
RR-V01

Information to Support NRC Re-Approval of a 10 CFR 50.55a Request for Use During a New 10-Year Interval Inservice Testing Program

1. Previous 10 CFR 50.55a Request Approved by NRC
Components:

Valve Number	System	ISTC-1300 Category	Safety Class
V14-22A	CS	C	2
V14-22B	CS	C	2
V14-23A	CS	C	2
V14-23B	CS	C	2
V14-33A	CS	C	2
V14-33B	CS	C	2
V23-20B	HPCI	C	2
V23-32	HPCI	C	2
V13-19	RCIC	C	2
V13-20B	RCIC	C	2
V10-36A	RHR	C	2
V-10-36B	RHR	C	2

Valves V14-22A(B) and V14-23A(B) are the Condensate transfer system to Core Spray flushing line check valves. These valves have a safety function to close to isolate the high pressure Safety Class 2 CS piping from the lower pressure non-safety grade Condensate Transfer System piping in the event of a CS system actuation.

The remaining valves are the Residual Heat Removal, Core Spray, High Pressure Coolant Injection and Reactor Core Isolation Cooling system keep-fill check valves. These valves have a safety function to close to isolate Safety Class 2 CS, RHR, RCIC or HPCI piping from the lower pressure non-safety grade Condensate Transfer System piping in the event of a system actuation.

This alternative was requested for the 3rd Ten-Year Interval Vermont Yankee IST program (reference BVY 96-163, dated December 19, 1996) and approved by NRC (reference TAC No. M97544, dated January 15, 1998) for 3rd Interval Alternatives (Relief Requests) RR-V13 and RR-V14. The components, Code requirements, plant conditions, and proposed alternatives are unchanged from those previously approved.

2. Changes to the Applicable ASME Code Section
Applicable Code Requirement: ISTC-3522(c), "Category C Check Valves"

> "If exercising is not practicable during operation at power and cold shutdown, it shall be performed during refueling outages."

This Code requirement is unchanged from OM-10, para. 4.3.2.2(e), Exercising Requirements for Check Valves, "If exercising is not practicable during plant operation or cold shutdowns, it may be limited to full-stroke during refueling outages."

3. Component Aging Factors

Component aging is not a factor in this proposed alternative. This request proposes an alternative to the referenced Code requirement on the basis that complying with the Code requirement results in unusual hardship or difficulty and that the proposed alternative provides an equivalent level of safety and quality.

Testing the subject valves quarterly or during cold shutdown is not practicable, based on the degree of difficulty and hardship. These valves have been successfully tested by radiography since this alternative was first authorized by NRC, and they have shown no degradation or other signs of aging. Component aging does not affect the effectiveness or the degree of difficulty of testing these components.

4. Changes in Technology for Testing the Affected ASME Code Component(s)
Vermont Yankee has investigated several alternate test methods with the following results:

Performing testing with flow as described in ISTC-5221(a)(3): It was determined that this testing method is not applicable for these valves since the safety function of these valves is to close on cessation or reversal of flow, and system configuration prevents an unambiguous observation that the valve closes on cessation or reversal of flow.

Use of other non-intrusive testing (NIT) methods (ultrasonic, magnetic or acoustic): Due to valve size, valve type, valve materials, and low flow rates, these methods would not provide conclusive indication of valve closure. Vermont Yankee uses ultrasonic and acoustic NIT on several check valves and continues to monitor industry developments for technology that would permit NIT of these check valves.

Disassembly and Inspection of each valve on a refuel outage basis in accordance with ISTC-5221(c): NRC guidance identified in Appendix A of NUREG-1482 (question group 15) discouraged the use of the disassembly and inspection method on the basis that disassembly is not a true substitute for operability testing using flow. It is Vermont Yankee's position that disassembly and inspection will be used if no other test method is practicable.

5. Confirmation of Renewed Applicability
This request proposes an alternative to the referenced Code requirement on the basis that complying with the Code requirement results in unusual hardship or difficulty and that the proposed alternative provides an equivalent level of safety and quality. ISTC-5221 specifies the testing requirements for obturator movement of check valves that are within the scope of the IST program. ISTC-5221 states in part, "Observations shall be made by observing a direct indicator...or by other positive means...."

The subject check valves are tested by radiography to verify obturator movement to the closed position upon cessation or reversal of flow. Radiography during a refueling outage subjects an unnecessary number of personnel to radiation exposure and results in access restrictions to several areas of the plant that are normally accessible during refueling outages. This ALARA challenge represents an unusual hardship and difficulty in managing personnel access at a time when an unusual number of workers are onsite to support the outage.

This request proposes to test these valves within 60 days prior to each refueling outage, rather than during each refueling outage, as required by ISTC-3522. This alternative provides an acceptable level of quality and safety, since the testing occurs at the same frequency (every 18 months) as prescribed by the Code. However, testing prior to the outage reduces the ALARA concerns associated with radiography, since fewer people will be onsite, and access will be easier to manage.

In accordance with ISTC-5221, each subject check valve will be tested for obturator movement by opening with flow and observing that the obturator has traveled at least to the partially open position. By radiography, it will be verified that the obturator of each subject check valve has traveled to the seat on cessation or reversal of flow.

This radiography on each subject check valve shall be performed within 60 days prior to each refueling outage, as an alternative to the ISTC-3522(c) requirement that this testing be performed during refueling outages.

6. Duration of Re-Approved 10 CFR 50.55a Request

This proposed alternative is requested for the duration of the 4th Ten-Year Interval Vermont Yankee IST program (September 1, 2003 through August 31, 2013).

10 CFR 50.55a Request Number
RR-V02

Information to Support NRC Re-Approval of a 10 CFR 50.55a Request for Use During a New 10-Year Interval Inservice Testing Program

1. Previous 10 CFR 50.55a Request Approved by NRC

ASME Code Component(s) Affected:

Valve Number	System	OM Cat.	Safety Class
SL-13-55A	RCIC	C	2
SL-13-55B	RCIC	C	2
SL-13-55C	RCIC	C	2
SL-13-55D	RCIC	C	2
SL-14-31A	CS	C	2
SL-14-31B	CS	C	2
SL-2-62A	NB	C	2
SL-2-62B	NB	C	2
SL-2-62C	NB	C	2
SL-2-62D	NB	C	2
SL-2-64A	NB	C	2
SL-2-64B	NB	C	2
SL-2-64C	NB	C	2
SL-2-64D	NB	C	2
SL-2-73A	NB	C	2
SL-2-73B	NB	C	2
SL-2-73C	NB	C	2
SL-2-73D	NB	C	2
SL-2-73E	NB	C	2
SL-2-73F	NB	C	2
SL-2-73G	NB	C	2
SL-2-73H	NB	C	2
SL-2-2-7A	NB	C	2
SL-2-2-7B	NB	C	2
SL-2-2-8A	NB	C	2
SL-2-2-8B	NB	C	2
SL-2-3-11	NB	C	2
SL-2-3-13A	NB	C	2
SL-2-3-13B	NB	C	2
SL-2-3-15A	NB	C	2
SL-2-3-15B	NB	C	2
SL-2-3-17A	NB	C	2
SL-2-3-17B	NB	C	2
SL-2-3-19A	NB	C	2
SL-2-3-19B	NB	C	2
SL-2-3-21A	NB	C	1
SL-2-3-21B	NB	C	1

Valve Number	System	OM Cat.	Safety Class
SL-2-3-21C	NB	C	1
SL-2-3-21D	NB	C	1
SL-2-3-23A	NB	C	1
SL-2-3-23B	NB	C	1
SL-2-3-23C	NB	C	1
SL-2-3-23D	NB	C	1
SL-2-3-25	NB	C	2
SL-2-3-27	NB	C	2
SL-2-3-31A	NB	C	1
SL-2-3-31B	NB	C	1
SL-2-3-31C	NB	C	1
SL-2-3-31D	NB	C	1
SL-2-3-31E	NB	C	1
SL-2-3-31F	NB	C	1
SL-2-3-31G	NB	C	1
SL-2-3-31H	NB	C	1
SL-2-3-31I	NB	C	1
SL-2-3-31J	NB	C	1
SL-2-3-31K	NB	C	1
SL-2-3-31L	NB	C	1
SL-2-3-31M	NB	C	1
SL-2-3-31N	NB	C	1
SL-2-3-31P	NB	C	1
SL-2-3-31Q	NB	C	1
SL-2-3-33	NB	C	2
SL-2-3-35	NB	C	2
SL-2-305A	NB	C	2
SL-2-305B	NB	C	2
SL-23-37A	HPCI	C	2
SL-23-37B	HPCI	C	2
SL-23-37C	HPCI	C	2
SL-23-37D	HPCI	C	2

These valves are instrumentation line excess flow check valves (EFCVs) provided in each instrument line process line that penetrates primary containment. The EFCVs are designed to close upon rupture of the instrument line downstream of the EFCV and otherwise remain open. A flow-restricting orifice is installed just inside the drywell on all but the jet pump instrument lines. Because the jet pump instrument lines are small diameter, orifices are not needed. In the unlikely event that an EFCV fails to function properly concurrent with a postulated line break outside containment, orificing and small tube diameters limit flow rates, thus ensuring that the integrity and functional performance of secondary containment is maintained. The coolant loss under such a scenario is well within the makeup capability of reactor coolant supply systems, and the potential off-site radiological consequences have been evaluated to be substantially below the limits of 10CFR100.

This alternative was requested by Vermont Yankee (reference BVY 00-99, dated October 31, 2000; and BVY 01-03, dated January 25, 2001) and approved for the 3rd Ten-Year Interval Vermont Yankee IST program (reference TAC No. MB0415, dated April 2, 2001) as Request for Alternative Testing (Relief Request) RR-V19. The components, Code requirements, plant conditions, and proposed alternatives are unchanged from those previously approved.

2. Changes to the Applicable ASME Code Section

Applicable Code Requirement: ISTC-3522(c), "Category C Check Valves"

> "If exercising is not practicable during operation at power and cold shutdown, it shall be performed during refueling outages."

This requirement is unchanged from the OM-10, para. 4.3.2.2(e), "If exercising is not practicable during plant operation or cold shutdowns, it may be limited to full-stroke during refueling outages."

3. Component Aging Factors

Component aging is not a factor in this proposed alternative. This request proposes an alternative to the referenced Code requirement on the basis that the proposed alternative provides an equivalent level of safety and quality.

Testing the subject valves quarterly or during cold shutdown is not practicable, based on plant conditions. These valves have been successfully tested throughout the life of the Vermont Yankee plant, and they have shown no degradation or other signs of aging. Component aging does not affect the effectiveness or the degree of difficulty of testing these components.

4. Changes in Technology for Testing the Affected ASME Code Component(s)

The technology for testing these valves is simple and has been demonstrated effectively during the operating history of Vermont Yankee. The basis for this alternative is that testing a sample of EFCVs each refueling outage provides a level of safety and quality equivalent to that of the Code-required testing.

5. Confirmation of Renewed Applicability

Excess flow check valves are required to be tested in accordance with ISTC-3522, which requires exercising check valves nominally every three months to the positions required to perform their safety functions. ISTC-3522(c) permits deferral of this requirement to every reactor refueling outage.

The EFCVs are classified as ASME Code Category C and are also containment isolation valves. However, these valves are excluded from 10 CFR 50 Appendix J Type C leak rate testing, due to the size of the instrument lines and upstream orificing. Therefore, they have no safety-related seat leakage criterion.

These valves cannot be exercised during normal power operation, since closing these valves would isolate instrumentation required for power operation. These valves can only be verified to close by leak testing performed during the primary system inservice pressure test performed each refueling outage. This test cannot be performed during cold shutdown since reactor vessel pressurization is required to test the valves.

EFCVs are simple devices, the major active components being a poppet and spring. The spring holds the poppet open under static conditions. The valve will close upon sufficient differential pressure across the poppet. Functional testing of the valve is accomplished by venting the instrument side of the line. The resultant increase in flow imposes a differential pressure across the poppet, which compresses the spring and decreases flow through the valve. The design back-flow through the Vermont Yankee EFCVs is 1.0 gpm, which is the test acceptance criterion.

EFCVs have been extremely reliable throughout the industry[1]. In the first 27 years of operation at VY, only one excess flow check valve has failed. VY has evaluated the consequences of a postulated instrument line break without crediting EFCV function, and the calculated off-site radiological consequences are sufficiently low and acceptable considering the probability of an instrument line break coincident with the functional failure of the associated EFCV. Any increase in risk due to the relaxed frequency of EFCV testing is insignificant. Therefore, the alternative testing of a representative sample, rather than each EFCV during every refueling outage, provides an acceptable level of quality and safety.

Rather than test each EFCV every refueling outage, Vermont Yankee proposes to test a representative sample of EFCVs each refueling outage, such that all EFCVs are tested within a 10-year interval.

Any failures will be evaluated in accordance with the requirements of the VY Corrective Action Program. This evaluation will include analysis to determine:

- corrective actions
- common mode failure
- potential expanded sample size
- performance reliability

Performance reliability may require increased test frequency for failed components until two consecutive acceptable tests are achieved. Testing of that component would then be returned to the 10 year frequency.

Therefore, based on the information provided in the previous 10 CFR 50.55a request, information contained within the NRC approval documents, and information above, the circumstances and basis continues to be applicable to the proposed request.

6. Duration of Re-Approved 10 CFR 50.55a Request

This proposed alternative is requested for the duration of the 4th Ten-Year Interval Vermont Yankee IST program (September 1, 2003 through August 31, 2013).

[1] NEDO-32977-A, "Excess Flow Check Valve Testing Relaxation" (June 2000)