NRC INSPECTION MANUAL

INSPECTION PROCEDURE 75001 ATTACHMENT 75001.QUAL

EQUIPMENT QUALIFICATION

Effective Date: July 21, 2026

PROGRAM APPLICABILITY: 2573

75001.QUAL-01 INSPECTION OBJECTIVES

01.01 To verify that the licensee is using the appropriate design parameters for qualification and that the design basis is appropriately translated into structures, systems, and components (SSCs) qualification tests or analyses.

01.02 To verify that required qualifications of SSCs are completed in accordance with regulatory requirements, design specifications, and approved procedures.

01.03 To verify that licensee records establish an adequate basis for acceptance of licensing commitments with qualification criteria attributes.

01.04 To verify that SSCs are installed in a manner consistent with the design and qualification testing.

01.05 To verify that pre-service testing (PST) is performed in accordance with applicable codes, the PST program, and the Safety Analysis Report (SAR).

75001.QUAL-02 INSPECTION REQUIREMENTS

This IP does not contain specific inspection requirements. The inspection requirements are contained in the technical inspection procedures for the inspection area.

75001.QUAL-03 INSPECTION GUIDANCE

03.01 General Guidance

a. Specific inspection guidance is provided for the following qualification areas:

- Qualification Programs for Mechanical and Electrical Equipment (Section 03.02)
- Seismic Qualification (Section 03.03)
- Environmental Qualification (EQ) (Section 03.04)
- Electrical Isolation and electromagnetic interference (EMI) (Section 03.05)
- Digital Instrumentation and Control (I&C) Systems (Section 03.06)

- MOV Functional Qualification (Section 03.07)

- Pre-Service Testing (PST) of Pumps, Valves, and Dynamic Restraints (Section 03.08)

- Digital Instrumentation and Control (DI&C) System/Software Development Lifecycle (Section 03.09)

b. Generical considerations for qualification inspections.

1. The qualification of the SSC is in accordance with appropriate design specifications and meets acceptance criteria. The qualification report states the qualified life of the SSC.

2. Depending on the type of qualification, the qualification may consist of a test, an analysis, or a combination of test and analysis. In addition, NRC-approved data based on industry experience may be used for seismic qualification.

3. Qualification reports conclude that the SSC can withstand the conditions that would exist before, during, and following a design-based accident without loss of safety function for the time required to perform the safety function.

4. Equipment is installed in a manner consistent with the assumptions in the qualification analysis. EQ equipment should be installed in a configuration bounded by the tested configuration.

5. Equipment surrounding the qualified SSC does not interfere with the qualified SSC such that the equipment prevents the qualified SSC from performing its safety function.

6. Potential sources of localized effects that could worsen the general EQ zone environmental conditions (e.g., temperature, humidity, radiation type, and exposure rate) are described in the qualification test or analysis.

7. Assumptions of the EQ zone calculations may be invalidated if there are unsealed doors that serve as barriers to mitigate high energy line breaks, unaccounted for normally open dampers, or unsealed penetrations that could make the environmental conditions harsher than calculated.

8. A complete record for each qualified SSC should contain a design specification and a qualification report that concludes that the SSC is properly qualified according to design.

c. Design Basis Parameters

The design basis parameters should be appropriately translated into the SSC qualification test or qualification analysis. The qualification tests and analyses should use the limiting design basis parameters (e.g., minimum or maximum voltage, temperature, and pressure) as inputs for the qualification of the SSC.

03.02 Qualification Programs for Mechanical and Electrical Equipment

For the qualification of mechanical and electrical equipment in nuclear facilities, the NRC accepts, with conditions, the American Society of Mechanical Engineers (ASME) Qualification of Mechanical Equipment (QME)-1 Standard, “Qualification of Active Mechanical Equipment Used in Nuclear Facilities,” in RG 1.100, Revision 4, “Seismic Qualification of Electrical and Active Mechanical Equipment and Functional Qualification of Active Mechanical Equipment for Nuclear Power Plants.” The NRC is preparing Revision 5 to RG 1.100 to accept with applicable regulatory positions the ASME QME-1-2023 Standard for water-cooled reactors and the reformatted QME-1 Standard (when published), which is applicable to both water-cooled and non-water-cooled nuclear facilities.

a. Functional Design and Qualification

The implementation of the licensee’s design and qualification methodology should be consistent with the provisions in the plant SAR, such as the ASME QME-1 Standard, “Qualification of Active Mechanical and Used in Nuclear Facilities,” as accepted in Regulatory Guide (RG) 1.100, “Seismic Qualification of Electrical and Active Mechanical Equipment and Functional Qualification of Active Mechanical Equipment for Nuclear Power Plants.”

When evaluating the design and qualification of mechanical and electrical equipment, the inspector should consider the following items, as applicable to the facility:

1. Qualification Plan

(a) Has a Qualification Plan been prepared that satisfies ASME QME-1 as accepted in RG 1.100 with provisions for functional, seismic, and environmental qualification?

(b) Does the plan specify the objectives of the qualification testing and the planned extrapolation of the qualification to other components, and range of performance conditions?

(c) Does the plan implement ASME QME-1 in accordance with RG 1.100?

(d) Does the plan address applicable prerequisite qualification testing (such as seismic, temperature aging, and radiation aging) for metallic and nonmetallic parts?

(e) Does the plan encompass the complete range of operating conditions for the test assembly from normal operation to design-basis conditions?

(f) Does the plan specify the requirements for extrapolation of the functional qualification to other equipment or design-basis conditions that satisfy ASME QME-1 as accepted in RG 1.100?

(g) Does the plan specify the equipment orientation for qualification?

(h) Does the plan address the appropriate test fixture consistent with plant installation, or provide justification for differences between the test fixture and plant installation?

(i) Does the plan specify the acceptance criteria to be established for performance of the qualification testing?

(j) Does the plan specify the component initial setup, limits, maintenance or adjustments that are acceptable during performance of the qualification testing?

(k) Does the plan specify the application of a quality assurance (QA) program that satisfies Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," or an acceptable alternative for NSRSS equipment?

(l) Does the plan specify the required qualifications of test personnel?

(m) Does the plan specify the determination of activities to ensure that production components will perform consistently with the qualified component?

(n) Does the plan specify the preparation of a Functional Qualification Report and Applicability Report in accordance with ASME QME-1. Is the report sufficient to support close-out of applicable inspections, tests, analyses, and acceptance criteria (ITAAC) for the qualified components and their production components?

2. Qualification Testing

(a) Does the qualification testing satisfy ASME QME-1 as accepted in RG 1.100?

(b) Does the test setup satisfy the requirements and assumptions in the Qualification Plan?

(c) Does the test setup provide for testing over the full range of operating conditions from normal operation to design-basis conditions for the test component including justification documented for any differences?

(d) Does the component orientation satisfy the plan requirements?

(e) Have the component internals been inspected to satisfy qualification assumptions and to perform the qualification calculations and extrapolation methodology?

(f) Does the instrumentation appropriately provide sufficient information to demonstrate acceptable component performance?

(g) Is the instrumentation calibrated and benchmarked to provide accurate measurements with specific uncertainty values?

(h) Are lubricant types and applications for the component documented?

(i) Are post-testing inspections conducted of the component to evaluate qualification acceptance criteria for performance and capability?

(j) Are deficiencies in the test instrumentation, component performance, or component parts appropriately documented and evaluated through a corrective action program?

3. Evaluation of test data

   (a) Does the test data evaluation satisfy ASME QME-1 as accepted in RG 1.100?

   (b) Does the test data evaluation apply an accepted industry-wide methodology?

   (c) Are all applicable uncertainties included in the calculations?

   (d) Are deficiencies in the test data or the results of the evaluation identified and addressed through a corrective action program?

   (e) Are the results of the qualification testing specified for applicable components with applicable ranges and uncertainties?

   (f) Are limitations of the qualification results regarding the scope of the qualified components and their applications adequately addressed and documented?

4. Extrapolation of test data to other components and applications

   (a) Does the extrapolation of the test data satisfy ASME QME-1 as accepted in RG 1.100?

   (b) Does the extrapolation apply an accepted industry-wide methodology?

   (c) Are the specific components and their applications within the scope of qualification extrapolation identified in the report?

   (d) Are the requirements for demonstrating the extrapolation of qualification to other components and their applications consistent with ASME QME-1 specified in the report?

5. Post-qualification and post-installation requirements

   (a) Have applicable post-qualification requirements determined by the qualification testing been identified and documented in the qualification report?

   (b) Have post-installation testing requirements been established to demonstrate that production components perform consistently with the qualified component in accordance with ASME QME-1 as accepted in RG 1.100?

6. Documentation

   (a) Does the Functional Qualification Report satisfy ASME QME-1 as accepted in RG 1.100?

   (b) Does the Functional Qualification Report describe the Qualification Plan, test performance, data evaluation, qualification scope, extrapolation, post-qualification and post-installation testing requirements, and corrective actions?

(c) Is the scope of the qualification specified in the report?

(d) Has the Functional Qualification Report been certified to be correct and complete in accordance with ASME QME-1?

(e) Does the Functional Qualification Report specify the preparation of an Applicability Report to demonstrate the suitability of any qualified component and associated production components to meet the requirements of a specific application in accordance with ASME QME-1?

(f) Where applicable, are the Functional Qualification Report and the Applicability Report sufficient to support close-out of any ITAAC for the test component and components qualified by extrapolation, and their production components and applications?

b. Verification and Validation of Engineering Software

If the licensee has not procured the engineering software for mechanical or electrical components as safety-related in accordance with 10 CFR Part 50, Appendix B, the licensee's procedures verify and validate the engineering software for its specific application.

These controls & documentation for the dedication of commercially procured engineering software should include:

- Identification of appropriate acceptance methods and critical characteristics
- Manufacturer and version of the engineering software for verification in the commercial grade dedication instruction
- Acceptance criteria or methods to ensure an appropriate selection of an example problem with similar geometrical properties and boundary conditions to validate the use of the software for a specific safety-related application
- Guidance, where applicable, to ensure that finite element modeling results demonstrate convergence, such as using more precise mesh size to arrive at a unique solution
- Assurance that the licensee collects and evaluates notices or errors issued by the software supplier and captures them in a nonconformance process to determine if they have an adverse effect on the versions of the software used in safety-related applications

The licensee's procedures should include:

- Acceptance criteria for comparing software results to target results
- Discussion of the basis for determining the acceptability of the software relative to acceptance criteria
- Specification of bias and uncertainty values to be included in engineering calculations based on software validation

The licensee's process, including oversight of its contractors, for verifying and validating the adequacy of computer software used in engineering applications should conform to the requirements in 10 CFR Part 50, Appendix B, for safety-related mechanical and electrical equipment, or an acceptable process for NSRSS mechanical and electrical equipment.

c. Changes to the Design for Active Mechanical and Electrical Equipment

Licensee procedures should specify requirements for changes to the design of plant components and address resolution of errors identified in licensing documents. The design change process should provide assurance that components receive adequate design and qualification where design changes are made to those components. The licensee's design change process should involve personnel across multiple disciplines to address cross-cutting issues for design changes. The engineering design change process should satisfy the requirements in 10 CFR Part 50, Appendix B, for safety-related mechanical and electrical equipment or an acceptable process for NSRSS mechanical and electrical equipment.

03.03 Seismic Qualification

The design specifications document the seismic analyses and/or tests required to demonstrate that Seismic Category I SSCs will be able to perform their safety functions during and after a seismic event. The design specification should specify design response spectra or design time histories for qualification by analysis and required response spectra (RRS) for qualification by testing, with appropriate damping values and acceptance criteria. The design specification should also specify the number and magnitude of earthquake cycles for Seismic Category I SSCs sensitive to fatigue. The design specification should specify equipment mounting details and interface connections. Reference can be made to the plant's regulatory requirements and licensing commitments for seismic design basis requirements for SSCs.

Refer to Regulatory Guide 1.100, "Seismic Qualification of Electric and Mechanical Equipment for Nuclear Power Plants," and its referenced standard IEEE, Std 344, "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations," Section 11, Documentation for a complete list of information that should be included in the design specification.

Appendix S to 10 CFR Part 50 states that the SSCs required to withstand the effects of the safe-shutdown earthquake (SSE) ground motion or surface deformation are those necessary for:

- Ensuring the integrity of the reactor coolant pressure boundary
- Providing the capability to shut down the reactor and maintain it in a safe-shutdown condition
- Maintaining the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to the guideline exposures of 10 CFR 50.34(a)(1)

Designers may use different terminology and graded approaches for the seismic requirements associated with their reactor plant design. The terminology, graded approach, and specific seismic requirements for the SR and NSRSS mechanical and electrical components should be described in the design specification, design report, and SAR.

Inspection activities for seismic qualification may include:

- Verifying that Seismic Category I SSCs are protected from unacceptable structural interaction with Seismic Category II and non-seismic structures during and after an SSE.
- Verifying that Seismic Category I components are installed in a Seismic Category I structure. If the structure is not Seismic Category I, then adequate action is taken to assure structural integrity of the equipment.
- Verifying that equipment qualification records indicate that licensees followed the seismic qualification methodology specified in the license.
- Reviewing seismic qualification reports then walking down equipment to verify that assumptions made in the seismic qualification reports are reflected in the as-installed equipment configurations (e.g., equipment orientation, and locations and types of anchorages). Verify that deviations from the qualified configuration are adequately justified.
- For tests, verifying that the appropriate response spectra were used for the location of the equipment and that the results are acceptable.

03.04 Environmental Qualification (EQ)

a. EQ for electrical SSCs

See NRC regulatory requirements in 10 CFR 50.49, “Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants.” For example, the EQ qualification should account for the following design basis parameters: temperature, pressure, humidity, chemical effects, radiation, aging, submergence, and synergistic effects, and should apply appropriate margins to account for unquantified uncertainty.

The design specification should include equipment installation and mounting details, interface connections, age conditioning procedure, service conditions and margins, and acceptance criteria. See NUREG 0588, “Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment,” and its referenced standard IEEE Std 323, “IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations,” Section 6 for a complete list of information that should be included in the design specification and IEEE 323, Section 7 for a complete list of information that should be included in the qualification report.

See NRC Standard Review Plan Section 3.11, “Environmental Qualification of Mechanical and Electrical Equipment,” for additional guidance. IP 51080, “Part 52 Environmental Qualification (EQ) under 10CFR 50.49” provides additional inspection guidance.

b. EQ for mechanical SSCs

Mechanical equipment and materials that are sensitive to environmental effects include seals, gaskets, lubricants, hydraulic fluids, and diaphragms. Mechanical equipment may experience the same environmental conditions as those defined in 10CFR 50.49 (e) for electrical equipment. These conditions should be used in reviewing the environmental qualification of mechanical equipment.

03.05 Electrical Isolation and Electromagnetic Interference (EMI)

Design of the nuclear power generating station's safety equipment should consider the electromagnetic environment to include electrostatic discharge (ESD) as well as the four coupling mechanisms: conductive, radiative, inductive, and capacitive. The design techniques to provide protection against ESD, EMI, radio frequency interference (RFI), and surge withstand capability (SWC) are shielding, grounding wire selection, wire routing, suppression, filtering, data quality checking, and software handling (software band pass filtering).

Proper electrical isolation prevents faults in a non-safety system from propagating into a safety system. Electrical isolation can be achieved using qualified isolation devices, shielding and wiring techniques, or separation distance. See Regulatory Guide 1.75, "Criteria for Independence of Electrical Safety Systems," and its referenced standards IEEE Std 384, "IEEE Standard Criteria for Independence of Class 1E Equipment and Circuits," and IEEE Std 603, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations," Annex B for more information.

The design specification should include equipment mounting details, interface requirements including connections, power, and control signal inputs and outputs, age conditioning procedure, service conditions and margins, and acceptance criteria. See NUREG 0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment," and its referenced standard IEEE Std 323, "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations," Section 6 for a complete list of information that should be included in the design specification and Section 7 for a complete list of information that should be included in the qualification report.

Consider observation or review of the results from field surveys or tests of RFI, EMI, and electromagnetic field strengths, and compare the results to the maximum allowed values. Verify that the tests were conducted in accordance with approved procedures.

03.06 Digital Instrumentation and Control (I&C)

Qualification of digital systems should include system hardware configuration, including all external connectivity, software integration testing, software qualification testing, system integration testing, system qualification testing, and system factory acceptance testing. See Regulatory Guide 1.152, "Criteria for Use of Computers in Safety Systems of Nuclear Power Plants," Regulatory Guide 1.168, "Verification, Validation, Reviews, and Audits for Digital Computer Software Used in Safety Systems of Nuclear Power Plants," and its referenced standard, IEEE Std 1012, "IEEE Standard for Software Verification and Validation," for more information.

The design should include barriers that provide adequate confidence that the non-safety functions cannot interfere with the performance of safety functions of the software or firmware. The design should also include the security of computer system software to prevent unauthorized and unsafe intrusions into the safety system. The software should have no undocumented codes. See Regulatory Guide 1.152," Criteria for Use of Computers in Safety Systems of Nuclear Power Plants," and its referenced standard IEEE Std 7-4.3.2, "IEEE Standard Criteria for Digital Computers in Safety Systems of Nuclear Power Generating Stations," for additional information.

The design should ensure that automatic safety functions and Class 1E manual controls have priority over non-Class 1E controls within the software or firmware.

03.07 MOV Functional Qualification

For water-cooled reactors, the NRC regulations in 10 CFR 50.55a, "Codes and standards," incorporate by reference the ASME *Operation and Maintenance of Nuclear Power Plants*, Division 1, OM Code: Section IST (OM Code) for implementation of PST and IST programs for pumps, valves, and dynamic restraints used in nuclear power plants. For non-water-cooled reactors, the NRC is preparing a regulatory guide (RG) DG-1424 to accept with applicable regulatory positions the ASME OM-2-2024 Code, "Component Testing Requirements at Nuclear Facilities."

The qualification of an MOV to be installed by the licensee consists of three parts:

1. Qualification of a valve assembly (e.g., valve and motor operator). The vendor or contractor will qualify an MOV by performing an internal inspection of the valve, actuator, and stem nut for condition and critical internal dimensions, and dynamic diagnostic testing under applicable temperature, pressure, and flow conditions. This will most likely be at or near design basis conditions.

2. Qualification of a similar MOV. A similar MOV, for example, one that differs only in size or material, will be qualified by a comparison of the MOV's physical attributes to the qualified MOV and diagnostic test data or comparison of physical attributes and a test- based analytical method. Specifically, an internal inspection of the MOV will be conducted to establish applicability to the qualified MOV. A static diagnostic test will be performed to verify proper MOV assembly. A dynamic diagnostic test will be performed under applicable temperature, pressure, and flow conditions and compared to the qualified MOV. The testing will be at less than design basis conditions. A test-based analytical method that has been demonstrated to reliably predict MOV performance may be used to minimize the amount of dynamic testing required to verify the capability of the valve to stroke under design basis conditions.

3. Demonstration of the functional capability of the MOV to be installed by the licensee. This will be accomplished by verification of the physical attributes, application, and diagnostic data of the MOV to be installed to the MOV qualified in bullet 2 above. The MOV to be installed will have an internal inspection to verify applicability to the qualified similar MOV. A static diagnostic test will be performed to verify proper MOV assembly. The valve will then be cycled under fluid conditions to verify functional capability. The fluid conditions may be less than those in 2 above. A test-based analytical method may be used to minimize the testing under flow conditions.

The construction inspector should verify that MOV qualification uses one of the 3 parts listed above. However, if the licensee elects to perform the MOV functional capability testing (bullet 3 above) following final MOV installation, that portion of the qualification may occur during preoperational or startup testing. See ASME QME-1, Section QV, for additional information.

Furthermore, the MOV qualification should also account for other design basis conditions not typically tested, such as degraded voltage and elevated ambient temperature conditions, uncertainty (test equipment inaccuracy, torque switch repeatability), and age-related degradation (stem lubrication degradation, spring pack relaxation, rate of loading degradation, and valve seat degradation). The Inspectors should validate that licensees have adequate engineering bases for the values selected. For gate valves, the licensee should assess the potential for pressure locking and thermal binding and address any potential issues. Switches should be set to ensure the valve will operate under design basis conditions without valve or actuator damage. Valve stroke time should be within the time assumed in the design bases accident analyses, the technical specifications, or the ASME IST program. Inspectors may reference IP 62708," Motor-Operated Valve Capability," IP 62710, "Power-Operated Gate Valve Pressure Locking and Thermal Binding," and IP 73756, "Functional Design, Qualification, and Inservice Testing Program for Pumps, Valves, and Dynamic Restraints," for additional guidance. See also, Standard Review Plan Section 3.9.6, "Functional Design, Qualification, and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints."

MOVs should be installed consistent with their qualification and switch setup assumptions. If the standard or preferred orientation is not used, the reason should be documented, and an evaluation performed that addresses any negative impact. Standard orientation for gate and globe valves is with a vertical upward stem. A gate valve oriented with the stem horizontal may have greater than expected friction between the valve disk and the guide if the disk guide is not designed to support the disk in the horizontal position. Preferred orientation for butterfly valves is stem axis in the same plane as the plane of an elbow bend when an upstream elbow is present, manufacturer specified flow direction for non-symmetric disc designs, and manufacturer-specified direction of disk rotation. Installation in a non-preferred orientation can cause a significant increase in dynamic torque requirements due to flow acting on different portions of the disk than assumed in the analysis. The increased torque requirements resulting from valve orientation should be incorporated into the MOV calculations and switch settings. Additionally, the reduction in the expected life expectancy of the valve should be considered.

03.08 Pre-Service Testing (PST) of Pumps, Valves, and Dynamic Restraints

a. PST Inspection General Guidance

For water-cooled reactors, the NRC regulations in 10 CFR 50.55a, "Codes and standards," incorporate by reference the ASME *Operation and Maintenance of Nuclear Power Plants*, Division 1, OM Code: Section IST (OM Code) for implementation of PST and IST programs for pumps, valves, and dynamic restraints used in nuclear power plants. For non-water-cooled reactors, the NRC is preparing a regulatory guide (RG), RG 1.220, to accept with applicable regulatory positions the ASME OM-2-2024 Code, "Component Testing Requirements at Nuclear Facilities." The RG is currently in draft, DG-1424, "Acceptability of ASME OM-2 Code, Component Testing Requirements at Non-Water-Cooled Nuclear Facilities." ASME OM-2 may apply to advanced reactor construction projects if approved in the license. Inspectors should use the applicable licensing basis to determine the applicable code requirement.

For nuclear power plants licensed under 10 CFR Part 52, NRC Commission Paper SECY-95-132, “Policy and Technical Issues Associated with the Regulatory Treatment of Non-Safety Systems (RTNSS) in Passive Plant Designs,” as accepted by the Commission in its Staff Requirements Memorandum dated June 28, 1995, specifies the Commission policy regarding the functional design, qualification, and inservice testing of RTNSS pumps and valves for new passive design nuclear power plants. For water-cooled reactors, the NRC regulations in 10 CFR 50.55a(b)(3)(iii)(D) specify that licensees shall assess the operational readiness of pumps, valves, and dynamic restraints within the scope of RTNSS for applicable reactor designs. As applicable, the inspector should verify that the licensee has incorporated the activities to provide reasonable assurance that RTNSS pumps, valves, and dynamic restraints can perform their intended functions into plant programs.

The selection of components should emphasize plant risk associated with potential failures, maintenance, identified programmatic weaknesses, and PST activities scheduled for performance during the inspection. Inspection should focus on components with new designs or high safety significance.

For water-cooled-reactors, PST activities need to satisfy the applicable ASME OM Code provisions as incorporated by reference in the NRC regulations, OM Code Cases as accepted in RG 1.192, or authorized alternatives or granted relief requests. For non-water-cooled reactors, PST activities need to satisfy the ASME OM-2 Code provisions as accepted by the NRC, and any deviations accepted by the NRC. The inspectors may refer to NUREG-1482, “Guidelines for Inservice Testing at Nuclear Power Plants: Inservice Testing of Pumps and Valves and Inservice Examination and Testing of Dynamic Restraints (Snubbers) at Nuclear Power Plants” for more specific guidance on PST/IST.

The inspector should determine if the licensee is implementing vendor recommendations regarding testing, preventive maintenance, and post-maintenance testing of components. Where the licensee is not implementing vendor recommendations, the licensee should provide justification for its approach. See NRC Information Notice (IN) 2012-06, “Ineffective Use of Vendor Technical Recommendations,” April 24, 2012.

Review administrative controls for design modifications or replacement of components to determine whether PST program requirements are reviewed for applicability when changes are made to plant procedures, systems, or components, where appropriate.

The inspector should determine if the PST documents are reviewed by the appropriate supervisor responsible for assessing operational readiness of components. The inspector should review the procedures and available database for trending component performance.

As applicable, the inspector should verify that licensee programs are incorporating the inservice testing of pumps, valves, and dynamic restraints within the scope of regulatory treatment of non-safety systems (RTNSS) consistent with 10 CFR 50.55a(3)(iii)(D) and the Commission policy in SECY-95-132. The provisions in the ASME OM Code as incorporated by reference in 10 CFR 50.55a or accepted ASME OM Code Cases would be acceptable methods of performing inservice testing of RTNSS pumps, valves, and dynamic restraints.

b. PST Activities for Valves

For inspection of PST of valves, the inspector may:

- Observe and evaluate PST activities conducted for valves in the PST program. Evaluate the PST method and acceptance criteria.
- Determine whether the instruments used for the PST activities meet the specified range and calibration accuracies and that the calibration is current.
- Evaluate PST results and corrective actions.
- Determine if completed PST documents require appropriate review and are maintained as quality-controlled records.
- Determine if components with remote position indication, including passive and manual valves, are subject to position indication verification in accordance with regulatory requirements.
- Evaluate leak rate testing of Category A components of the OM Code or OM-2 Code, as applicable.
- Evaluate the implementation of the programs for motor-operated valves (MOVs), air-operated valves (AOVs), and pyrotechnic-actuated (squib) valves. Inspectors may refer to IP 73758 for additional guidance.
- Evaluate the adequacy of Category C component PST activities, including the use of non-intrusive testing techniques, and disassembly and inspection, where applicable.
- Determine whether manual valves in the program are periodically exercised in accordance with regulatory requirements.
- Review the set pressure testing for safety and relief valves.
- Review the adequacy of non-reclosing pressure relief device (rupture disc) testing/replacement.

c. PST Activities for Pumps

For inspection of PST of pumps, the inspector may:

- Observe and evaluate PST activities conducted for pumps in the PST program. Evaluate the PST method and acceptance criteria.
- Determine whether the instruments used for the PST activities meet the specified range and calibration accuracies and that the calibration is current.
- Evaluate PST results and corrective actions.

- Determine whether completed PST documents require appropriate review and are maintained as quality-controlled records.

- Review PST methods, acceptance criteria, and corrective action.

- Review PST for compliance with the ASME OM Code provisions as incorporated by reference in the NRC regulations, or ASME OM-2 Code as accepted by the NRC.

- Determine whether the range and calibration accuracies of PST instruments meet Code requirements.

- Determine whether PST activities are performed at established reference values.

d. PST Activities for Dynamic Restraints

Determine the applicable operation and maintenance (OM) Code and verify that pre-service testing (PST) of SR and NSRSS dynamic restraints conforms to the ASME Code for "Operation and Maintenance of Nuclear Power Plants," (OM Code), Subsection ISTD or ASME OM-2 Code "Component Testing Requirements at Nuclear Facilities," Section DRD as accepted by the NRC, the SAR, and the licensee's PST requirements. Inspectors may refer to IP 73758 for additional guidance.

75001.QUAL-04 REFERENCES

10 CFR 100, Appendix A, "Seismic and Geologic Siting Criteria for Nuclear Power Plants"

10 CFR 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants"

ASME QME-1, "Qualification of Active Mechanical Equipment Used in Nuclear Power Plants"

DG-1424, "Acceptability of ASME OM-2 Code, Component Testing Requirements at Non-Water-Cooled Nuclear Facilities."

Facility Preliminary and Final Safety Analysis Report and Design Control Document

IEEE Std 1012, "IEEE Standard for Software Verification and Validation"

IEEE Std 323, "IEEE Standard for Qualifying Class 1E Electrical Equipment for Nuclear Power Generating Stations"

IEEE Std 344, "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations"

IEEE Std 384, "IEEE Standard Criteria for Independence of Class 1E Equipment and Circuits"

IEEE Std 603, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations

IEEE Std 7-4.3.2, "IEEE Standard for Digital Computers in Safety Systems of Nuclear Power Generating Stations"

IP 51080, “Part 52 Environmental Qualification (EQ) Under 10CFR 50.49”

IP 62708, “Motor-Operated Valve Capability”

IP 62710, “Power-Operated Gate Valve Pressure Locking and Thermal Binding”

IP 73756, “Functional Design, Qualification, and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints”

NRC Letter dated 9/25/2006, Subject: Final Safety Evaluation on Joint Owners Group Program on Motor-Operated Valve Periodic Verification (ML061280315)

NUREG-0588, “Interim Position on Environmental Qualification of Safety-Related Electrical Equipment”

NUREG-1482, “Guidelines for Inservice Testing at Nuclear Power Plants: Inservice Testing of Pumps and Valves and Inservice Examination and Testing of Dynamic Restraints (Snubbers) at Nuclear Power Plants”

Regulatory Guide (RG) 1.12, “Nuclear Power Instrumentation for Earthquakes”

RG 1.100, “Seismic Qualification of Electric and Mechanical Equipment for Nuclear Power Plants”

RG 1.152, “Criteria for Use of Computers in Safety Systems of Nuclear Power Plants”

RG 1.168, “Verification, Validation, Reviews, and Audits for Digital Computer Software Used in Safety Systems of Nuclear Power Plants”

RG 1.29, “Seismic Design Classification”

RG 1.75, “Criteria for Independence of Electrical Safety Systems”

Standard Review Plan Section 17.4, “Reliability Assurance Program”

Standard Review Plan Section 3.11, “Environmental Qualification of Mechanical and Electrical Equipment” (NUREG-0800)

Standard Review Plan Section 3.9.6, “Functional Design, Qualification, and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints” (NUREG-0800)

TR-106563-V1, EPRI, Application Guide for Motor-Operated Valves in Nuclear Power Plants, Volume 1: Gate and Globe Valves, Rev. 1

TR-106563-V2, EPRI Application Guide for Motor-Operated Valves in Nuclear Power Plants, Volume 2: Butterfly Valves, Rev. 0

END

List of Attachments:

1. Revision History for IP 75001.QUAL

Attachment 1: Revision History for IP 75001.QUAL

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment and Feedback Resolution Accession Number (Pre-Decisional, Non-Public Information)
N/A	ML26141A227 07/21/26 CN 26-034	Initial Issuance	None	Issued as Final