MECHANICAL COMPONENTS - WORK OBSERVATION

PROGRAM APPLICABILITY: 2512

50073-01 INSPECTION OBJECTIVES

01.01 By direct observation, and independent evaluation of work performance, work in progress, and completed work, determine whether activities relative to safety-related components (other than the reactor pressure vessel and piping) are being accomplished in accordance with NRC requirements, SAR commitments, and licensee procedures.

01.02 To determine whether inadequacies in completed work, partially completed work, or work activities in progress associated with safety-related components indicate a management control problem or generic weakness.

Inspection Schedule

Inspection	May Be Started	Must Be Started	Must Be Completed
First	After work is 10% complete	Before work is 20% complete	Before work is 30% complete
Second	After work is 50% complete	Before work is 60% complete	Before work is 80% complete

50073-02 INSPECTION REQUIREMENTS

02.01 Review the inspection findings of IP 50071 to ensure continuity of efforts between IP 50071 and this procedure.

02.02 Select 14 representative mechanical components within the reactor coolant pressure boundary and 10 components in safety-related systems outside the reactor coolant pressure boundary. At least two of these components are to be motor-operated valves. Observe work performance, partially completed work, and/or completed work on these components, as appropriate, and determine whether the following activities, for each of the above selected components, meet applicable requirements:

a. Receipt Inspection

1. Adherence to receipt inspection procedures.

2. If appropriate, the identification (tagging) and segregation of nonconforming items and the initiation of corrective actions are being performed in accordance with established procedures.

3. Documentation has been prepared and maintained as required by receipt inspection instructions.

b. Storage, Handling, and Protection

1. Storage environment and protection of components (protective covers, caps, preservatives, desiccants, heaters, inert gas blankets, etc.) are in accordance with manufacturer's instructions and/or established procedures.

2. Implementation of special storage and maintenance requirements such as rotation of motors, pumps, lubrication, insulation testing (electrical),[1] cleanliness, etc.

3. Performance of licensee/contractor surveillance activities and documentation thereof are being accomplished.

c. Installation

1. Installation requirements such as proper location, placement, orientation, alignment, mounting (torquing of bolts and expansion anchors), flow direction, tolerances, and expansion clearance are met.

2. Precautions to prevent damage during placement/mounting are adhered to, where appropriate.

3. Availability and utilization of specially trained personnel and equipment where required to meet manufacturer's instructions.

4. Torque switches, limit switches, and bypass switches on motor-operated valves have been properly installed, adjusted and checked out in accordance with established instructions and procedures (reference IP 50071-02.02e).

5. Appropriate drawings and work procedures are available to installers. Installation requirements, construction drawings, specifications, and work procedures are technically adequate and of the latest approved issue.

6. Hold points are observed, when required.

7. Design changes relevant to the work being observed have been appropriately processed through required review and approval routes.

8. Preparation and maintenance of installation and inspection records are adequate.

d. Protection and Maintenance After Installation

1. Inspection activities including scope and frequency are being performed according to instructions.

[1] This applies to electrical motors that are part of "package type" components not normally inspected under IP 51053.

2. Protection provided as required, including protection against adverse temperature, humidity, flooding, and foreign materials such as dirt, dust, bottles, cans, and general debris.

3. Lubrication, rotation, and electrical resistance checks are being performed, as required.

4. Records are being maintained as to the status of installed components.

5. Appropriate stamps, tags, markings, etc. are in use to prevent oversight of required inspections, completion of tests, acceptance, and the prevention of inadvertent operation.

02.03 Personnel Interviews. Select six persons engaged in work activities associated with installation and inspection of mechanical components and confirm or discuss the following:

a. Qualifications of those engaged in component installation and inspection work appear adequate and commensurate with the work in progress.

b. Ability to perform their assigned duties and assume their assigned responsibilities.

c. There is adequate time allocated to the QC function to study installation specifications and instructions and to perform the required component inspections.

d. An appropriate level of independence exists between QA/QC and construction; i.e., organizational freedom to identify nonconforming conditions and document their existence.

e. Adequate management support for QA/QC functions.

f. Effectiveness of management's control over component installation work as may be evidenced through the performance of audits (or their arrangements to have others conduct audits) including followup of audit findings.

02.04 As part of the second inspection (see "Inspection Schedule" under Section 01.02 above), select 14 as-built/final design system drawings and compare portions of these drawings with the actual installation. Discrepancies observed may be due to in-process changes such as those initiated by the design organization or those initiated in the field. If in-process changes are involved, determine whether the licensee has properly controlled and documented these changes on a current base or engineering review, approval, and subsequent incorporation in final as-built drawings.

02.05 Additional inspections, determined by regional management, may be conducted in the areas covered above when the licensee's performance is classified as Category 3 by the SALP program, or if regional management concludes that recent findings will likely result in a SALP Category 3 rating. In these cases, particular consideration should be given to an expanded sample of items to be inspected under Sections 02.02c, 02.03, and 02.04, above.

50073-03 INSPECTION GUIDANCE

General Guidance

a. Applicable portions of the SAR (3, 5, 6, 9, and 17) should have been reviewed to determine licensee commitments relative to mechanical components before

performing this inspection. The inspector should then utilize these SAR commitments during the review of the licensee's implementing construction specifications, drawings, work procedures, and QA implementing procedures. Some of this review can be completed in the office during inspection preparation, if prior arrangements are made with the licensee to provide selected documents.

b. NRC inspectors are reminded that licensee contracting and installation practices may make it advantageous to perform related inspections, such as IP 49063, Piping - Work Observation, in conjunction with this procedure. In some cases combining inspection efforts may be more efficient and avoid duplication.

c. Particular attention should be given to the traceability of material and equipment to prevent the use of incorrect or defective materials, parts and components. The inspector should review 10 CFR 50, Appendix B, Criterion VIII, Identification and Control of Materials, Parts and Components, and applicable codes and specifications. The inspectors should verify that measures have been established by the licensee for identification and control of materials, parts and components, and for traceability to the approved design basis and to the source. The inspector should ensure that required identification of the item is maintained by heat number, part number, serial number or other appropriate means, either on the item or on records traceable to the item, as required, and that required markings are on the item.

   The inspector should note markings on material and equipment and verify that the markings represent material and equipment as specified by the design drawings and specifications. In the case of fasteners, compliance with the applicable material specification (e.g., ASTM or ASME material and grade) should be verified by required markings on bolts and nuts and certified material test reports or certificates of conformance as required by the applicable procurement drawings and specifications and/or by the applicable codes and specifications. In the case of vendor-supplied equipment assemblies containing fasteners, samples should be inspected to verify compliance with approved vendor drawings and specifications and other information such as materials used for equipment qualification tests and/or analyses. Caution should be exercised to ensure that the required markings on material and equipment, including fasteners, not only exist but that the markings indicate the correct material and grade as specified.

d. As used in this and related procedures, mechanical components pertain to those components important to safety within the reactor coolant pressure boundary (as defined in 10 CFR 50.2(v)) and components in quality groups B and C (as defined in RG 1.26) except the reactor pressure vessel and piping. (See Section 03 of IP 49063 for a listing of systems containing these components.)

e. Findings from this inspection activity should address each element covered during the inspection as being satisfactory, being unresolved and requiring resolution, or being in violation and requiring correction. If significant inadequacies or weaknesses are identified in the implementation of established management control systems, the inspector should so inform cognizant regional supervision. The issue should be promptly addressed and resolved at the appropriate level of licensee management.

f. Because of the importance and extent of safety-related component installation, observation of work activities in this area is scheduled to be conducted at least twice. The intent of this procedure is to accomplish the inspection requirements of Section 02 when component installation activities are about one-third complete and two-thirds complete.

g. The inspector may not be able to observe all facets of all activities identified in Section 02 of this procedure. However, direct observation of important activities should be made on a sampling basis. In some cases it will be necessary to observe a completed activity rather than work in progress. The inspector's judgment in sample selection should consider both the importance of the component to overall plant safety and the opportunity to inspect during the most advantageous part of the installation effort.

h. Prevalent errors and recent concerns are areas in which the inspector should be alert to potential generic issues. Refer to the listing of such areas provided in IP 50071, Section 03, and IP 50075, Sections 03.03a through h.

03.01 Specific Guidance

a. Inspection Requirement 02.02. Component selection should be representative of the type of plant components involved such as pumps, heat exchangers, line valves (and operators), safety/relief valves, pressure vessels, and storage tanks.

b. Inspection Requirement 02.02c. NRC report, AEOD/C203, provides a summary of IE circulars and information notices issued relative to identified problems with motor-operated valves. The inspector(s) should be particularly observing of construction/installation practices that may contribute to or cause the type of problems discussed therein.

c. Inspection Requirement 02.03a. In determining the adequacy of QA/QC staffing, the effectiveness of their activities should be considered. Insufficient or unqualified personnel, or inadequate QA management, indicates inadequate staffing. Effectiveness rather than number of personnel is the criterion to be used.[2]

d. Inspection Requirements 02.03b thru 02.03f. Discussions should focus on determining licensee interest and involvement in maintaining an effective management control system.[2]

50073-04 REFERENCES

Regulatory Guide 1.26, "Quality Group Classifications and Standards"

Regulatory Guide 1.28, "Quality Assurance Program Requirement (Design and Construction)"

Regulatory Guide 1.29, "Seismic Design Classification"

Regulatory Guide 1.38, "Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage and Handling of Items for Water-Cooled Nuclear Power Plants"

Regulatory Guide 1.39, "Housekeeping Requirements for Water-Cooled Nuclear Power Plants"

[2] Personnel interviews should be arranged through the licensee or others so authorized. Interviews must be performed expeditiously so as to minimize the worker's time away from jobs in progress. The NRC inspector should contact only those licensee/contractor employees who agree to be interviewed and appear to have first-hand knowledge of the work involved.

Regulatory Guide 1.58, "Qualification of Nuclear Power Plant Inspection, Examination, and Testing Personnel"

Regulatory Guide 1.88, "Collection, Storage and Maintenance of Nuclear Power Plant Quality Assurance Records"

NRC report, AEOD/C203, "Survey of Valve Operator-Related Events Occurring During 1978, 1979 and 1980," dated May 7, 1982

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