

ATTACHMENT 65001.06

INSPECTION OF ITAAC-RELATED INSTALLATION OF MECHANICAL COMPONENTS

PROGRAM APPLICABILITY: 2503

65001.06-01 INSPECTION OBJECTIVES

01.01 To determine whether mechanical component installation and related licensee quality control activities are being performed in accordance with the **Design Control Document (DCD)**, design specifications, Code requirements, approved procedures, and regulatory requirements.

01.02 To determine whether the **technical requirements in the facility Safety Analysis Report (SAR) associated with** mechanical component test and verification activities **have been adequately translated to the construction specifications, drawings, and work procedures as evidenced by the resulting mechanical component installations, and the related quality assurance activities are being performed** in accordance with design specifications, Code requirements, procedures, **and regulatory requirements**.

01.03 To determine whether mechanical component installation welding is being conducted in accordance with design specifications, Code requirements, and approved procedures.

01.04 To determine, **through independent observation and evaluation, that the general** records, welding records, and the test **and** verification records for mechanical components reflect **that** work was accomplished in accordance with the design specifications, Code requirements, and procedures.

01.05 To evaluate the adequacy of the implementation of the specific quality assurance program requirements related to mechanical component installation activities and verify that problems are entered into the corrective action process.

65001.06-02 INSPECTION REQUIREMENTS AND GUIDANCE

For purposes of this procedure, Mechanical Components include all classes (ASME and non-safety) of various types of equipment (e.g., pumps, heat exchangers, strainers, unique steel support structures for components, fabricated metal tanks, the Pressurizer for PWRs, and the Steam Generators for PWRs). It does not include valves, HVAC equipment, pipe supports, or the reactor vessel.

NUREG-0800, Standard Review Plan, Section 17.5, "Quality Assurance Program Description - Design Certification, Early Site Permit and New License Applications," ASME *Boiler & Pressure Vessel Code* (BPV Code), Section III, and ASME Standard NQA-1 "Quality Assurance Requirements for Nuclear Facility Applications," provide guidance concerning all phases of this procedure. The ASME *Operation and Maintenance of Nuclear Power Plants*, Division 1, "OM Code: Section IST," (OM Code) also includes preservice and inservice testing requirements for pumps and dynamic restraints within the scope of this IP. The NRC regulations in Section 55a of 10 CFR Part 50 incorporate by reference the ASME BPV Code and OM Code with specific limitations and modifications.

The regulatory basis for safety-related mechanical components is found in 10 CFR 50, Appendix B; for example, Criterion III, "Design Control," Criterion IV, "Procurement Document Control," and Criterion XI, "Test Control." In addition, the ASME BPV Code, Section III, Parts NB, NC, and ND, and the ASME OM Code contain requirements for fabrication, installation, testing, and tagging applicable mechanical components.

02.01 General Installation. Select a sufficient number of mechanical components, including all targeted mechanical component ITAACs, covering general installation requirements for review. Through direct inspection, confirm the following attributes, as applicable, have been met:

- a. Installation requirements including: proper location and placement, volume, area dimensions, quantity, material type/shape/size, special features such as coatings and insulation, orientation, alignment, seismic and other mounting requirements (i.e., torquing or tightening of nuts, bolts and expansion anchors), flow direction, lubrication, tolerances, and expansion clearance. Requirements can be located in engineering drawings, engineering specifications and the work packages.
- b. All packaging material is removed from mechanical components at the time of installation in accordance with the installation procedure. Verify that all foreign matter is removed and is excluded from re-entering the mechanical component. Verify that the method of protection and exclusion is in accordance with the manufacturer's guidance.
- c. Adhere to the precautions which can if followed prevent damage during placement and mounting.
- d. Availability and use of specially trained personnel and special tools or equipment which conforms to the manufacturer's instructions.
- e. Correct drawings and work procedures are available to installers. Installation requirements, construction drawings, specifications, and work procedures are the latest revisions.
- f. Hold points are observed and quality inspections are properly conducted, as required.
- g. Lifting and rigging are in accordance with procedures and requirements.

- h. Installation cold setting locations meet requirements.
- i. Preparation of installation and inspection records meets quality program requirements.
- j. Field changes that apply to the work being observed have been correctly processed.
- k. Design installation requirements that affect environmental qualification of mechanical components are satisfied, as applicable.

Guidance: This inspection should be performed as often as significant mechanical component installation activities are taking place, and should be performed as necessary to ensure targeted ITAAC are inspected. If no significant activities or targeted ITAAC activities have taken place during an extended period (approximately six months) during the component installation construction period at a construction site, then consideration should be given to performing an additional inspection using this IP.

For components, the inspector should pay particular attention to the traceability of material and equipment to prevent the use of incorrect or defective materials, parts and components. The inspector should ensure that required identification of the item is maintained by heat number, part number, serial number or other similar means, either on the item or on records traceable to the item, and that required markings are on the item.

In the case of fasteners, compliance with the material specification (e.g., ASTM or ASME material and grade) should be verified by required markings on the bolts and nuts and the certified material test reports or certificates of conformance as required by the procurement drawings and specifications and/or by the 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.

Field observations can include independent measurement/observation or observation of licensee/contractor inspections. While all applicable attributes do not need to be reviewed for each sample, the majority should be reviewed and samples/attributes reviewed should include all facets of installation activities.

Records should document the status of the installed component. They should confirm required inspections have been performed by appropriately qualified personnel. And, they should confirm all critical installation and ITAAC requirements have been met. The records should be properly stored in accordance with quality assurance requirements.

Typical problems which can occur in this area include, but are not limited to:

- Inadequate or unclear guidance for installers and inspectors.
- Use of improper or uncalibrated tools for installation and measurement.
- Weak management coordination which can result in skipped hold points or other errors in installation.
- Record storage and/or retrieval problems.

Generic QA implementation processes, such as receiving inspections and component and records storage, are inspected separately, however, the inspector should remain mindful of any problems that reflect on performance in these areas and report these to the NRC regional inspectors for that task area.

02.02 Component Welding. If welding is required for component installation (other than pipe welding), then select a sufficient sample of welds for review. Confirm the applicable attributes listed in IP 65001.B, “**Inspection of the ITAAC-Related Welding Program**”, have been met.

Guidance: The inspector should determine what specific acceptance criteria are specified in the ITAAC including those associated with the attributes and select those that are best confirmed through observation. Others should be confirmed through record/data review.

The samples should include sufficient variety to assure the different welding processes and material combinations are observed for each subcontractor, group or division performing ITAAC related welding. This scope applies to both observations and record reviews. A variety of nondestructive examination processes should also be included in the inspection sample. **If welding is required for component installation, select one or two welds per component, for a minimum of five welds for review.**

Records should provide traceability to all aspects of the welding activity including weld procedures used, welders, material certifications, inspections performed and their results, inspectors, and qualification record for procedures and personnel. These records, including radiographs, should be retained and stored in accordance with QA requirements.

02.03 Post Installation Activities. Select a sufficient number of mechanical components to enable implementation of the inspection objectives. Ensure targeted ITAAC inspection requirements are satisfied, and if necessary, select additional mechanical components based on their risk-significance or uniqueness of design/installation. The selected components should be from several different systems and, if possible, fabricated/installed by different subcontractors. The selection should emphasize, but must not be limited to, the components previously selected for Section 02.01.

Through direct observation, confirm the following actions are completed for these components.

- a. Licensee surveillance activities are being performed according to instructions.
- b. Protection is provided as required, including protection against such conditions as adverse temperature, humidity, flooding, and foreign materials, such as dirt, dust, soda cans, and general debris.
- c. Lubrication, rotation, and electrical resistance checks are being performed, if required.
- d. Records are being maintained, recording the status of installed components.
- e. Recording methods such as; stamps, tags, markings, etc. are being used to prevent omission of inspections by the licensee: to record the completion of tests; to record acceptances; and preclude inadvertent operation.

- f. Component manufacturer maintenance recommendations are being implemented.

Guidance: Post installation activities should be observed throughout the construction period frequently enough to allow formation of a conclusion that mechanical components, equipment, and supports are properly serviced or maintained, if required, until final turnover.

02.04 Testing and Verification. Select a sufficient number of ITAAC-related mechanical component testing and verification activities to assure testing and verification are conducted in accordance with approved procedures and that acceptance criteria have been met.

Inspection requirements include:

- a. Verify proper test and verification activity and frequency in accordance with post-installation, pre-service, or inservice test program, as applicable.
- b. Verify use of appropriately signed and dated test and verification procedures for component testing and verification. Verify that the procedure steps are executed in the correct sequence. If the sequence of steps is changed for some reason, verify that the change does not invalidate the test results.
- c. Verify calibration of test equipment.
- d. Verify qualification of test and other personnel participating in testing and verification activities.
- e. Confirm industrial safety of personnel and equipment during test and verification activities.
- f. Verify that preconditioning of component performance is not specifically or inadvertently occurring in preparation for the test and verification activity.
- g. Review licensee evaluation of test data and verification results in comparison to acceptance criteria.
- h. Verify that unsatisfactory test results and any conditions adverse to quality are entered into the corrective action program.

Guidance: This inspection should be coordinated with IP 65001.C, "Inspection of the ITAAC-Related Construction Test Program," IP 65001.D, "Inspection of the ITAAC-Related Operational Testing Program," and applicable IMC 2504 guidance, such as pre-service inspection and pre-service testing program inspections. Sample size will be dependent on guidance from these procedures and the targeted ITAAC set.

The inspector should determine the specific acceptance criteria that were established and select for observation those that are best confirmed through observation. Others should be confirmed through record/data review. The inspector should focus on those testing and verification activities related to safety-significant systems.

02.05 Problem Identification and Resolution. The inspector should confirm that problems identified during the inspection were entered into the licensee/constructor corrective action program in accordance with program requirements. In order to check the extent of condition and confirm the effectiveness of the licensee's corrective measures, the inspector should review licensee actions to address similar or related problems that were previously identified.

Guidance: This inspection is to verify that problems are entered into the corrective action process and that corrective actions appropriate to the circumstances are developed and undertaken. The inspector should review the relative priority of the actions to verify **that issues are addressed and prioritized depending on their importance to safety.** Inspections of Quality Assurance Program implementation, **including the corrective action program,** will be performed under the MC 2504 inspection program.

65001.06-03 RESOURCE ESTIMATE

Inspection resources necessary to complete this inspection procedure are estimated to be 1600 hours of direct inspection effort over the course of plant construction.

65001.06-04 REFERENCES

10 CFR 50.55a, "Codes and standards."

10 CFR Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants."

ASME Boiler & Pressure Vessel Code, Section III.

ASME Operation and Maintenance of Nuclear Power Plants, Division 1, "OM Code: Section IST."

NUREG-0800, Standard Review Plan, Section 17.5, "Quality Assurance Program Description - Design Certification, Early Site Permit and New License Applications."

ASME Standard NQA-1, "Quality Assurance Requirements for Nuclear Facility Applications."

Generic Letter 81-07, "Control of Heavy Loads"

NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants"

Regulatory Guide 1.14, Reactor Coolant Pump Flywheel Integrity

Regulatory Guide 1.36, Nonmetallic Thermal Insulation for Austenitic Stainless Steel

Regulatory Guide 1.44, Control of the Use of Sensitized Stainless Steel

Regulatory Guide 1.54, Service Level I, II and III Protective Coatings Applied to Nuclear Power Plants

Regulatory Guide 1.84, Design and Fabrication Code Case Acceptability, ASME Section III, Division 1

Regulatory Guide 1.143, Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants

END

Attachment 1:
Revision History

Attachment 1 - Revision History for 65001.06

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)
N/A	04/18/08 CN 08-012	Researched commitments for 4 years and found none. Initial issuance	N/A	N/A
N/A	ML14204A721 01/27/15 CN 15-001	Periodic Update.	N/A	N/A