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## INSPECTION PROCEDURE 69020 APPENDIX F

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### INSPECTION OF MECHANICAL COMPONENTS AT NON-POWER PRODUCTION AND UTILIZATION FACILITIES

Effective Date: March 25, 2025

PROGRAM APPLICABILITY: IMC 2550

#### 69020.F-01 INSPECTION OBJECTIVES

- 01.01 To determine if work and related activities associated with safety-related mechanical components at non-power production and utilization facilities (NPUF) are being performed in accordance with regulatory requirements, the licensing basis, specifications, drawings, and work procedures.
- 01.02 To determine if the applicant/licensee's system for preparing, reviewing, and maintaining records relative to safety-related mechanical component activities reflect work accomplishment consistent with specifications and procedures.
- 01.03 To verify the as-built condition of safety-related mechanical components meets the specified design requirements, specifications, and drawings.
- 01.04 To determine that the implementation of the quality assurance program (QAP) related to work activities for safety-related mechanical components is effective and to verify that deviations from requirements are appropriately resolved.

#### 69020.E-02 INSPECTION REQUIREMENTS

- 02.01 For the safety-related mechanical components selected for inspection, determine if appropriate and adequate procedures in the following areas are compatible with the QAP and prescribe adequate methods to meet the specifications:
  - a. receipt inspection
  - b. storage, handling, and protection
  - c. installation
  - d. protection and maintenance after installation
- 02.02 Determine if the applicant/licensee has an established audit program (including plans, procedures, and audit schedule) for assessing the adequacy of work control functions and requirements for mechanical component activities, and for ensuring that examination, inspection and test personnel associated with performing tests and inspections of mechanical component activities are qualified and/or certified to perform their assigned work.

- 02.03 Determine if the following safety-related mechanical component activities are being controlled and accomplished in accordance with the requirements of the documents reviewed in Section 02.01, above:
- a. as-built activities
  - b. receipt inspection
  - c. storage, handling, and protection
  - d. installation
  - e. protection and maintenance after installation
  - f. configuration management
- 02.04 Review the documentation generated for the safety-related mechanical component activities. Determine if the applicant/licensee/contractor system for documenting safety-related work is functioning properly. Records should be complete, reviewed by quality control, engineering personnel, or designee, and readily retrievable. Review safety-related records in the following areas:
- a. receipt inspection and material certification (if applicable)
  - b. installation inspection
  - c. nonconformance/deviation record(s)
  - d. training/qualification records of craft, and quality inspection personnel (as required)
  - e. configuration management records

## 69020.E-03 INSPECTION GUIDANCE

### General Guidance

Inspectors should review the facility description in the safety analysis report (SAR) or equivalent and be familiar with the requirements for safety-significant mechanical components being installed at the site. The purpose of these as-built inspections is to verify that the assumptions and critical attributes reviewed during the licensing review process remain valid; the design was appropriately translated to construction specifications; the licensee/applicant constructed the facility in accordance with these specifications; and any changes made to the design described in the SAR comply with the licensee's configuration management program.

Inspectors should also be familiar with the licensee's QAP and use IP 69021, "Inspections of Quality Assurance Program Implementation During Construction of Non-Power Production and Utilization Facilities," to perform "vertical slice" inspections as described in the body of this IP. Inspectors should complete this appendix by inspecting the attributes listed in this appendix for with a focus on safety-related mechanical components.

Inspectors should contact the applicant/licensee prior to the on-site inspection to help determine what mechanical components are to be inspected. Observation during in-progress construction/installation of the mechanical components is desirable but not required. If necessary, inspectors may select completed mechanical components for inspection. Inspectors should not attempt to inspect all mechanical components on the site but may expand if significant concerns with the applicant/licensee's control of mechanical components installation/construction arise. Samples should include components or systems within risk-significant areas of the facility. Samples should include work of different subcontractors and work performed at various times throughout the project.

Inspectors should collect applicant/licensee procedures, mechanical components specifications, and work completion records in advance, if possible. If unable to review these documents in advance of the on-site inspection, then the licensee should be notified that these documents, and any other relevant documents, should be available when the inspector(s) arrives at the site.

Inspectors should choose three or more safety-related mechanical components and review the areas listed in Sections 02.01 through 02.04 to the extent practical and may use their judgment in determining which areas to concentrate on if time is limited. However, inspectors should gain an understanding of the applicant/licensee's program to the extent necessary to determine if the applicant/licensee conforms to regulatory requirements. Not all items in the inspection requirements section will be applicable or required in all situations for all safety-related structures, systems, and components.

### 03.01 Inspection Requirement 02.01

- a. Review construction specifications related to safety-related mechanical components and determine if the specified technical requirements conform to the commitments contained in the licensing basis. Review mechanical components procedures and verify that they specify provisions for adequate on-site engineering direction, are appropriate and adequate related to procurement and use of materials, specify adequate control of hold points, and provide adequate controls for design changes and incorporation of design changes into as-built drawings. Determine if appropriate and adequate procedures in the following areas are compatible with the quality assurance program, and prescribe adequate methods to meet the construction specifications:
  1. receipt inspection
  2. storage, handling, and protection
  3. installation
  4. protection and maintenance after installation
- b. For the procedure review, consider the following attributes:
  1. Procurement documents incorporate the technical and quality requirements in the material requisition. This includes identification of material specifications and performance test requirements.
  2. Receipt inspections are adequate and capable of detecting damage or out-of-specification conditions, including adequacy of performance testing, etc. Also, provisions are in place to prevent nonconforming equipment and materials from being installed and used.
  3. Specifications and installation procedures for motor-operated valves provide detailed information relative to the setting of torque switches, limit switches, and limit-switch bypasses.
  4. Post-inspection cleaning, preservation, and inspection requirements have been established before needed.

### 03.02 Inspection Requirement 02.02

- a. Review applicant/licensee's established audit program (including plans, procedures, and audit schedule) for assessing the adequacy of work control functions and requirements in their licensing basis for safety-related mechanical component construction activities.
- b. Review audit program to verify if examination, inspection, and test personnel associated with performing tests and inspections of mechanical component construction activities are qualified and/or certified to perform their assigned work.
- c. Verify records establish that the required audits were performed and that deficiencies identified during audits were appropriately resolved.

### 03.03 Inspection Requirement 02.03

- a. Select representative safety-related mechanical components to inspect. The sample may contain materials handling, fluid transport, or fluid systems components (including, process vessels, tanks, and enclosures). Observe work performance, partially completed work, and/or completed work on these components, as appropriate. Review the pertinent quality-related records for the components selected, or a similar selection of components if more appropriate.
- b. Determine if the following applicable safety-related mechanical component activities are being controlled and accomplished in accordance with the requirements of the documents reviewed in Section 02.01, above:

#### 1. As-Built Activities.

- a) The inspectors should verify that the licensee has established measures for identification and control of materials, parts, and components, and for traceability, to the approved design basis and to the source.
- b) The inspectors 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 and that required markings are on the item.
- c) The inspectors 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 should be verified by required markings on bolts and nuts and certified material test reports or certificates of conformance and/or by the applicable codes and specifications.
- d) 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.

2. Receipt Inspections. Adherence to receipt inspection procedures, including provisions for ensuring:
  - a) piping supports and restraints materials are in conformance with purchase specifications, including special requirements,
  - b) marking, identification, and storage level classifications,
  - c) as received cleanliness and protection,
  - d) receipt inspection reports are generated as required, and
  - e) disposition of nonconforming items.
3. Storage, Handling, and Protection.
  - a) Material-storage procedures should include the requirements that components be identified; properly segregated by type; provided protection from physical or contamination damage, during handling and storage; and that controls for component withdrawal are provided, to ensure proper issuance.
  - b) 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.
  - c) Implementation of special storage and maintenance requirements such as rotation of motors, pumps, lubrication, insulation testing (electrical), cleanliness, etc.
  - d) Performance of licensee/contractor surveillance activities and documentation thereof are being accomplished at required frequency.
4. Installation.
  - a) Installation requirements such as proper location, placement, orientation, alignment, mounting (torquing of bolts and expansion anchors), flow direction, tolerances, and expansion clearance are met.
  - b) Precautions to prevent damage during placement/mounting are adhered to, where appropriate.
  - c) Availability and usage of specially trained personnel and equipment where required to meet component manufacturer's instructions.
  - d) Torque switches, limit switches, and bypass switches on valves have been properly installed, adjusted and checked out, in accordance with established instructions and procedures. Integrated system checks could be a potential focus of inspection.
  - e) 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.

- f) Hold points are observed, when required.
  - g) Design changes relevant to the work being observed have been appropriately processed through required review and approval routes.
  - h) Preparation and maintenance of installation and inspection records are adequate.
5. Protection and Maintenance after Installation.
- a) Inspection activities, including scope and frequency, are being performed according to instructions.
  - b) Protection provided as required, including protection against adverse temperature, humidity, flooding, and foreign materials, such as dirt, dust, bottles, cans, and general debris.
  - c) Lubrication, rotation, and electrical resistance checks are being performed.
  - d) Records are being maintained on the status of installed components.
  - e) Appropriate stamps, tags, markings, etc., are in use to prevent oversight of required inspections, completion of tests, acceptance, and the prevention of inadvertent operation.
6. Configuration management. For the activities observed during Inspection Requirement 02.03., verify if changes occurred during these construction activities, the applicant/licensee properly controlled and documented these changes for engineering review, approval, and subsequent incorporation into the final as-built drawings. Verify these actions were completed in accordance with their procedures and QAP.

#### 03.04 Inspection Requirement 02.04

Determine if the mechanical component activities, the applicant/licensee/contractor system for documenting safety-related work is functioning properly.

- a. Receipt Inspection and Material Certification (if applicable).
  - 1. Records confirm that required material characteristics, performance tests, nondestructive tests, environmental qualification tests, and other specification requirements are met.
  - 2. Receipt inspection and storage records indicate that defective or incorrect components, parts, and materials are controlled and prevented from installation and possible use.
  - 3. Documentation has been prepared and maintained as required by receipt inspection and documentation storage instructions.
- b. Installation Inspection. Records confirm that specified materials and components were installed as specified and that the required construction inspections were performed, and acceptance criteria are defined.

- c. Nonconformance/Deviation Record. Records include current status of these items. Nonconformance reports include the status of corrective action or resolution, (e.g., determine if adequate corrective action is being taken when moisture density test results are not within tolerance or acceptance criteria.)
- d. Training/Qualification Records of Craft, and Quality Inspection Personnel. Records establish that quality inspection personnel are adequately qualified for their assigned duties and responsibilities and that craft personnel have been trained in their assigned tasks.
- e. Configuration Management Records. Review and evaluate a selected sample of configuration management records, and determine if:
  - 1. Records associated with design and field changes, as well as related work and IP changes, reflect that timely review and evaluation of design and field change documents have been performed by personnel who are qualified.
  - 2. Records of periodic inspections ensure that only the most recent approved documents, including design changes, were used in the field.
  - 3. Design changes are subject to adequate design control, including consideration of the impact of the change on the overall design and on as built records.
  - 4. Records of nonconformance's to design requirements include preparation of a nonconformance report even if the nonconformance is resolved through the design-change process.

#### 03.05 Additional Guidance

Note: Determine if enough adequately qualified quality control inspection personnel are at the construction site, commensurate with the work in progress, and adequately performing their assigned duties through the established organizational structure.

Prevalent Errors and Concerns. Prevalent errors and recent concerns are areas in which the inspector should be alert to potential generic issues. These areas include:

- a. Documentation is not kept current.
- b. Inspection documentation is signed off by persons other than the inspectors actually responsible for the recorded information.
- c. Nonconformance report system is deficient in that reports could be destroyed, filed away, or otherwise signed off, without proper resolution or accountability of action taken.
- d. Weather protection degradation is due to inattention to damage and normal "wear and tear," leading to substandard or unacceptable protection provisions.
- e. There is improper installation and adjustment of motor-operated valve torque switches, limit switches, and bypass switches. Applicable specifications and instructions have not been adequate to ensure proper installation, adjustment, and check-out.
- f. Inspection procedures, instructions, and acceptance criteria lack clarity, and in some cases are difficult to find and use.

- g. Licensee audit reports containing adverse findings and recommendations without appropriate follow-up and resolution.

#### 69020.F-04 RESOURCE ESTIMATE

The appendices, or sections of the appendices, and inspection samples and hours, applicable to a specific facility should be in the range of 40–80 hours. Inspection preparation, including review of licensing basis, safety analysis report (SAR), and applicable codes and standards is not included in this estimate.

#### 69020.F-05 PROCEDURE COMPLETION

This inspection procedure appendix is complete when one inspection sample is complete. Refer to Section 69020-05, “Procedure Completion,” of IP 69020, “Inspection of Safety Related Items (and Services) During Construction of Non-Power Production and Utilization Facilities,” for details on what constitutes a completed inspection sample. Inspectors are not expected to complete every activity in the appendices of this IP. Instead, inspectors should prioritize inspection activities based on 1) importance of the activity to safety, 2) availability of the onsite activity at the time of the inspection, and 3) available inspection resources. An appendix to this IP need not be completed if there are no safety-related items (or services) covered by that appendix at an NPUF.

#### 69020.F-06 REFERENCES

Refer to licensing basis requirements for applicable codes and standards for each fuel facility.

END

List of Attachments:

Revision History for IP 69020 Appendix F



Attachment 1: Revision History for IP 69020 Appendix F

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	ML24264A198 03/25/25 CN 25-005	Procedure was rewritten for conformance with changes to IMC 2550 and is now a standalone appendix to IP 69020.	N/A	N/A