
INSPECTION PROCEDURE 88136

MECHANICAL COMPONENTS

PROGRAM APPLICABILITY: 2630

88136-01 INSPECTION OBJECTIVES

01.01 To determine whether the technical requirements detailed or referenced in the facility Construction Authorization Request (CAR) associated with mechanical components in Seismic Category I (SC-I) and SC-II systems have been adequately addressed in the construction specifications, drawings, and work procedures.

01.02 To determine whether requirements and commitments, in the approved QA Quality Assurance (QA) Plan, have been addressed in QA plans, instructions, and procedures, for mechanical components in SC-I and SC-II systems, and have been established in the facility QA Manual.

01.03 To determine, through direct observation and independent evaluation of work, whether the licensee's work control system is functioning properly and whether the installation of mechanical components in SC-I and SC-II systems comply with U.S. Nuclear Regulatory Commission (NRC) requirements, licensee commitments, and applicable codes.

01.04 To determine whether the licensee is adequately implementing the QA program associated with mechanical components, including: (1) preparing, reviewing, and maintaining a system of quality records; (2) records reflect work accomplishment consistent with NRC requirements, CAR commitments, and the QA Plan; and (3) records indicate any potentially generic problems, management control inadequacies, or other weaknesses that could have safety significance.

88136-02 INSPECTION REQUIREMENTS

02.01 Review construction documentation (specifications, drawings, and work procedures) and QA procedures to determine whether they appropriately and adequately assure that specific activities associated with Quality Level 1 (QL-1) and QL-2 mechanical components are controlled and performed according to NRC requirements, CAR commitments, and the approved QA Plan. In particular, ascertain whether provisions have been established to assure that:

- a. Procurement documents incorporate the technical and quality requirements in the material requisition. This includes identification of material specifications and, if required, performance test requirements.

- b. 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.
- c. Installation, testing, and inspection activities meet applicable specifications and established procedures.
- d. Specially trained personnel are used whenever complex or unusual activities are involved.
- e. Specifications and installation procedures for motor-operated valves provide detailed information relative to the setting of torque switches, limit switches, and limit-switch bypasses.
- f. Post-inspection cleaning, preservation, and inspection requirements have been established before needed.
- g. Record-keeping requirements are established and clearly indicate those responsible for record generation; and provisions exist for their review by appropriate management personnel.
- h. Design changes, including field changes, are properly reviewed and coordinated among affected design and engineering organizations.

02.02 Select representative mechanical components for several QL-1 Items Relied on for Safety (IROFS) and QL-2 Structures Systems and Components (SSCs) (the approximate number of QL-1 and QL-2 items to inspect should be specified in an approved inspection plan). The sample should contain materials handling, fluid transport, and 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 [work and Quality Control (QC) inspection] records relative to the components selected, or a similar selection of components if more appropriate. Determine whether the following activities, for each of the above selected components, meet applicable requirements:

- a. Receipt Inspection.
 - 1. Adherence to receipt inspection procedures. 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, where appropriate, 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. 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), cleanliness, etc.
3. Performance of licensee/contractor surveillance activities and documentation thereof are being accomplished at required frequency.

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 usage of specially trained personnel and equipment where required to meet component manufacturer's instructions.
4. 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.
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.
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 on 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 Select several as-built/final design system drawings and compare portions of these drawings with the actual installation. Discrepancies observed may be caused by 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.

02.04 Select various 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 follow-up of audit findings.

02.05. Determine whether qualified licensee/contractor, engineering, craft, and inspection personnel, associated with the installation of QL-1 and QL-2 component-installation work are being used, by reviewing a sampling (approximately five to 10 records total), covering several different disciplines, of personnel-qualification records, as follows:

- a. Determine whether a system of personnel-qualification records meeting stated requirements exists and is being maintained in current status.
- b. Determine if the records are sufficient to reasonably support qualification in terms of certification, experience, proficiency, training, testing, etc., as applicable.

- c. Review the actions taken by responsible licensee/contractor organizations to independently authenticate the validity of critical qualification statements.

02.06 Review the licensee/contractor system for reporting and dispositioning nonconformances associated with the procurement, installation, and testing of QL-1 and QL-2 mechanical components, to determine whether:

- a. Records adequately document current status of nonconformance and deviations. Review approximately 10 nonconformance/deviation reports, to sample system effectiveness.
- b. The sample of records is legible and complete, and indicates that reports are promptly reviewed by qualified personnel.
- c. Records are routinely being processed through established channels, for resolution of the immediate problem, as well as generic implications.
- d. Corrective actions are appropriate to the circumstances and are appropriately prioritized.
- e. Records are being properly identified and stored, and can be retrieved in a reasonable time.
- f. Nonconformance reports include the status of corrective actions or resolutions and actions to prevent recurrences.

02.07 Determine whether the licensee has an established audit program (including audit plans, procedures, and schedules) covering work and control functions in the area of QL-1 and QL-2 component installation. Sample the audit output for the components, processes, and work being followed in the inspection effort.

88136-03 INSPECTION GUIDANCE

03.01 General Guidance.

- a. Applicable portions of the CAR (and Integrated Safety Analysis (ISA) Summary, if available) should be reviewed, to determine licensee commitments relative to mechanical components (including, process vessels, tanks, and enclosures), before performing this inspection. The inspectors should then use the CAR and Safety Evaluation Report (SER) 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 previous arrangements have been made with the licensee to provide selected documents.
- b. 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 inspectors may review 10 CFR Part 50, Appendix B, Criterion VIII, "Identification

and Control of Materials, Parts, and Components,” and applicable codes and specifications, for additional guidance. 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. 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, as required, and that required markings are on the item.

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 [e.g., (American Society for Testing and Materials) or (American Society for Mechanical Engineers) 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.

- c. 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 inspectors should so inform cognizant Regional supervision. The issue should be promptly addressed and resolved at the appropriate level of licensee management.
- d. The inspectors may not be able to observe all facets of all activities identified in Section 02, of this procedure, during a particular inspection. 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 inspectors’ 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.

03.02 Specific Guidance.

Note: The numbering of the guidance below refers to specific subsections of 02, above.

- 02.01 If any of the inspection requirements pertaining to mechanical components have been previously completed, because the same organization and procedures were recently or are presently used at the site for similar work, the inspection requirements need not be repeated (unless problems were

found in the previous inspection of those requirements).

- 02.02b 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.
- 02.03 Components selected should be representative of the type of plant components involved in materials-handling, fluid transport, and fluid systems, as described in Section 11 of the CAR.
- 02.05 The Mixed-Oxide Project QA Plan addresses specific training of individuals. The licensee's site programs are outlined in the upper-tier documents. Other trade or operations personnel qualifications should be detailed in site's or contractors' procedures.
- 02.06 Review selected nonconformance and deviation reports in detail. Specifically, determine whether the corrective action initiated appears likely to preclude repetition. The reviewer should be particularly watchful for nonconformance reports signed off without adequate explanation, or reports that have been closed before being fully processed in accordance with procedures. Also, if components with reported nonconforming conditions are permitted to be installed, NRC inspectors should confirm that the licensee's control system effectively tracks the condition until resolved.
- 02.07 Inspectors should determine if audits have been planned and carried out in accordance with an announced schedule. Qualification of auditors should be verified to ensure that they are fully qualified for the assigned areas.

03.03 Prevalent Errors/Concerns.

This section is included to provide background for inspectors on past problems of a generic nature.

- a. Documentation not kept current, causing speculation and concern that uncurrent records in an attempt to catch-up may be incorrect or invalid.
- b. Inspection documentation signed off by persons other than the inspectors actually responsible for the recorded information.
- c. Nonconformance report system deficient in that reports could be destroyed, filed away, or otherwise signed off, without proper resolution or accountability of action taken.
- d. Weather protection allowed to degrade because of to inattention to damage, and normal "wear and tear," leading to substandard or unacceptable protection provisions.

- e. 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 were filed away without appropriate follow-up and resolution.

88136-04 RESOURCE ESTIMATE

Because of the importance and extent of IROFS and SSC installation, observation of work activities in this area is scheduled to be conducted in stages. The intent of this procedure is to accomplish the inspection requirements of Section 02.04 when component installation activities are about one-third complete, and with Section 02.05, when activities are about two-thirds complete.

This inspection procedure is expected to take, on the average, 32 to 64 hours for each review of licensee/contractor activities. The procedure should be conducted early in the installation of components relied on for safety, with primary focus on procedures, personnel qualifications, and handling of individual components. Subsequent inspections should be conducted of the components relied on for safety, installed, with the primary focus on inspection of as-built configurations and review of installation records.

88136-05 REFERENCES

Duke, Cogema, Stone and Webster, "Mixed-Oxide Fuel Fabrication Facility Construction Authorization Request," Docket Number 070-03098, latest revision accepted by NRC.

Duke, Cogema, Stone and Webster, "Mixed-Oxide Fuel Fabrication Facility, MOX Project Quality Assurance Plan (MPQAP)," Docket Number 070-03098, under U.S. Department of Energy Contract DE-AC02-99-CH10888, latest revision accepted by NRC.

American Society for Mechanical Engineers, ASME NQA-1-1994 Edition with NQA-1a-1995 Addenda.

U.S. Nuclear Regulatory Commission, Regulatory Guide 1.28, "Quality Assurance Program Requirement (Design and Construction)."

END

ATTACHMENT 1

Revision History for IP 88136

Commitment Tracking Number	Issue Date	Description of Change	Training Needed	Training Completion Date	Comment Resolution Accession Number
N/A	07/25/07 CN 07-023	IP 88136 is a newly issued procedure. Issued for MOX inspection program to improve effectiveness and efficiency by incorporating and consolidating mechanical components inspection requirements.	None	N/A	ML071730462