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## INSPECTION PROCEDURE 88109

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### QUALITY ASSURANCE: INSPECTION, TEST CONTROL, AND CONTROL OF MEASURING AND TEST EQUIPMENT (PRE-LICENSING AND CONSTRUCTION)

PROGRAM APPLICABILITY: 2630

#### 88109-01 INSPECTION OBJECTIVES

01.01 To determine whether inspections and tests verifying conformance of an item or activity to specified requirements are planned and executed in accordance with U.S. Nuclear Regulatory Commission (NRC)-approved Quality Assurance (QA) program requirements.

01.02 To determine whether the applicant's control for tools, gages, instruments, and other measuring and test equipment (M&TE) for quality-affecting activities is in accordance with NRC-approved QA program requirements.

01.03 To verify that the applicant has established a process to identify the status of inspection and test activities to assure that required inspections and tests are performed and to assure that items that have not passed the required inspections and tests are not inadvertently installed, used, or operated.

#### 88109-02 INSPECTION REQUIREMENTS

Verify that selected elements associated with the applicant's program for inspection, test control, and control of M&TE (as identified in an approved inspection plan) are in accordance with the applicant's approved QA Plan. Elements chosen for inspection may include three or more of the following:

02.01 Verify that inspection requirements and acceptance criteria are contained in the applicable design documents approved by the responsible design organization. Verify that inspection activities are documented and controlled by instructions, procedures, drawings, checklists, travelers, or other appropriate means.

02.02 Verify that tests required to verify conformance of an item to specified requirements, and to demonstrate satisfactory performance for service, are planned and executed. Verify that the characteristics to be tested and test methods to be employed are specified. Verify that test results are documented and their conformance with acceptance criteria are evaluated.

02.03 Verify that the applicant has established controls for tools, instruments, gauges,

and other M&TE used for quality-affecting activities. Verify that M&TE is controlled, calibrated (at specified periods), and adjusted to maintain accuracy within necessary limits.

02.04 Verify that the applicant has established the requirements to identify the status of inspection and test activities. Verify that the status is indicated either on the items or in documents traceable to the items, where it is necessary to assure that required inspections and tests are performed, and to assure that items that have not passed the required inspections and tests are not inadvertently installed, used, or operated. Verify that the status is maintained through indicators (i.e., physical location and tags, markings, shop travelers, stamps, inspection records, computerized logs, or other suitable means). Verify that authority for application and removal of tags, markings, labels, and stamps is specified. Verify that status indicators provide for indicating the operating status of systems and components of the facility (i.e., tagging valves and switches) to prevent inadvertent operation.

### 88109-03 INSPECTION GUIDANCE

The inspector should refer to the applicant's approved QA Plan for specific requirements and commitments.

03.01 Verify that the following inspection activities are documented and controlled by instructions, procedures, drawings, checklists, travelers, or other appropriate means:

- a. Inspection Planning. Verify that documented inspection planning includes the following:
  1. Identification of each work operation where inspection is necessary to ensure quality;
  2. Identification of documents that are used to perform the inspections;
  3. Identification of the characteristics for inspection and the identification of when, during the work process, inspections are to be performed for those characteristics;
  4. Identification of inspection or process-monitoring methods employed;
  5. Sufficient information from the final inspection, to provide a conclusion regarding conformance of the item to specified requirements;
  6. Identification of the functional-qualification level (category or class) of personnel performing inspections;
  7. Identification of acceptance criteria;
  8. Identification of sampling requirements;
  9. Methods to record inspection results; and

10. Selection and identification of the M&TE to be used to perform the inspection to ensure that the equipment is calibrated and is of the proper type, range, accuracy, and tolerance to accomplish the intended function.
- b. Selecting Inspection Personnel to Perform Inspections.
    1. Determine that the individual who performs an inspection to verify conformance of an item to specified acceptance criteria is qualified to the requirements specified in the applicant's approved QA Plan.
    2. Verify that inspections are performed by personnel other than those who performed or directly supervised the work being inspected. Verify that inspection personnel do not report directly to the immediate supervisor responsible for the work being inspected.
  - c. Inspection Hold Points.
    1. If mandatory inspection hold points are used to control work, then verify that specific hold points are indicated in documents.
    2. When applicable, verify that consent to waive hold points are documented and approved before to continuing work beyond the designated hold point.
  - d. Statistical Sampling. If statistical sampling is used to verify the acceptability of a group of items, then verify that the statistical sampling method used is based on recognized standard practices.
  - e. In-Process Inspections and Monitoring.
    1. If inspection of processed items is not practicable, then verify that indirect control is provided by the monitoring of processing methods, equipment, and personnel.
    2. Verify that both inspection and process monitoring are conducted, when control is inadequate with only one method.
    3. Verify that controls are established and documented for the coordination and sequencing of the work at established inspection points during successive stages of the process.
  - f. Final Inspection.
    1. Verify that finished items are inspected for completeness, markings, calibration, adjustments, protection from damage, or other characteristics, as required to verify the quality and conformance of the item to specified requirements.
    2. Verify that final inspections include a review of the results and resolution of nonconformances identified by earlier inspections.

3. If modifications, repairs, or replacements of items are performed subsequent to the final inspection, then verify that appropriate re-tests or re-inspections are performed.
- g. Accepting Items. Verify that the acceptance of an item is documented and approved by qualified and authorized personnel.
- h. Inspection Documentation. Verify that inspection documentation includes the following:
  1. The item inspected, date of inspection, the name of the inspector, or the inspector's unique identifier, who documented, evaluated, and determined acceptability;
  2. The name of the data recorder, as applicable, and the type of observation or method of inspection;
  3. The inspection criteria, sampling plan, or reference documents used to determine acceptance;
  4. Results indicating acceptability of characteristics inspected;
  5. M&TE used during the inspection, including the identification number and the most recent calibration date; and
  6. Reference to information on actions taken in connection with nonconformance.

03.02 Verify that the following test control activities are conducted and documented in accordance with the applicant's approved QA Plan:

- a. Test Planning. Verify that test planning includes the following:
  1. Identification of documents to be developed to control and perform tests;
  2. Identification of items to be tested, test requirements, and acceptance limits, including required levels of precision and accuracy;
  3. Identification of test methods to be employed and instructions for performing the test;
  4. Identification of test prerequisites addressing, calibration for instrumentation, adequacy of test equipment and instrumentation, qualifications of personnel, condition of test equipment and the item to be tested, suitably controlled environmental conditions, and provisions for data acquisition;
  5. Identification of mandatory hold points and methods to record data and results; and

6. Selection and identification of the M&TE to be used to perform the test to ensure that the equipment is of the proper type, range, accuracy, and tolerance to accomplish the intended function.
- b. Performing Tests. Verify that tests are performed in accordance with the applicant's QA procedures, and, as applicable, include the following:
1. Provisions for determining when a test is required, describing how tests are performed, and ensuring that testing is conducted by trained and appropriately qualified personnel.
  2. Test objectives and provisions for ensuring that prerequisites for the given test have been met, adequate calibrated instrumentation is available and used, necessary monitoring is performed, and suitable environmental conditions are maintained.
  3. Test requirements and acceptance criteria provided or approved by the organization responsible for the design of the item to be tested, unless otherwise designated.
  4. Test requirements and acceptance criteria based on specified requirements contained in applicable design or other pertinent technical documents.
  5. Potential sources of uncertainty and error.
- c. Use of Other Testing Documents. Other testing documents (e.g., American Society for Testing and Materials specifications, vendor manuals, or other related documents containing acceptance criteria) may be used instead of preparing special test procedures. If the applicant uses other documents, then verify that the information is incorporated directly into the approved test procedure, or incorporated by reference in the approved test procedure.
- d. Tests Results. Verify that test results are documented and their conformance with acceptance criteria evaluated by a qualified individual within the responsible organization, to ensure that the test requirements have been satisfied.
- e. Test Documentation. Verify that test documentation includes the following:
1. Item or work product tested, date of test, names of tester and data recorders, type of observation, and method of testing;
  2. Test criteria or reference documents used to determine acceptance;
  3. Results and acceptability of the test;
  4. Actions taken in connection with any nonconformances noted;
  5. The individual evaluating the test results; and

6. M&TE used during the test, including the identification number and the most recent calibration date.

f. Qualification of Test Personnel. Verify that the individual who directs a test to verify conformance of an item to specified acceptance criteria is qualified in accordance with the applicant's approved QA Plan. Verify that tests are directed by personnel other than those who performed or directly supervised the work being tested. Verify that test directors do not report directly to the immediate supervisor responsible for the work being tested.

03.03 Verify that the program for the control of M&TE is conducted and documented in accordance with the applicant's approved QA Plan. The following elements should be verified:

a. Calibration.

1. Verify that M&TE is calibrated, adjusted, and maintained at prescribed intervals, or before use, against reference calibration standards having traceability to nationally recognized standards. If no nationally recognized standards or physical constants exist, verify that the basis for calibration is documented.

2. Verify that calibration standards have a greater accuracy than the required accuracy of the M&TE being calibrated.

3. Verify that the method and interval of calibration, for each device, are defined, based on the type of equipment, stability characteristics, required accuracy, intended use, and other conditions affecting measurement control. For M&TE used in one-time-only applications, verify the calibration is performed both before and after use, when practicable.

4. Verify that the calibration is performed when the accuracy of calibrated M&TE is suspect.

5. Verify that calibrated M&TE is labeled, tagged, or suitably marked or documented to indicate a due date or interval of the next calibration and uniquely identified to provide traceability to its calibration data.

b. Documenting Use of Measuring and Test Equipment. Verify that the use of M&TE is properly documented and, as appropriate to equipment use and calibration schedule, verify that the documentation identifies the processes monitored, data collected, or items inspected or tested since the last calibration.

c. Out-of-Calibration Measuring and Test Equipment.

1. If the calibration due date or interval has passed without recalibration, or the device produces results known or suspected to be in error, then verify that the applicant has considered the M&TE to be out of calibration and not used until calibrated.

2. Verify that out-of-calibration M&TE is controlled (tagged, segregated, etc.).
  3. If any M&TE is consistently found out of calibration during the recalibration process, then verify that the M&TE is repaired, replaced, or the calibration interval shortened.
- d. Lost or Damaged Measuring and Test Equipment. If M&TE is lost or damaged, then verify it is documented as a nonconforming item in accordance with the applicant's approved QA Plan. Verify that the evaluation of the nonconformance addresses the validity of results obtained using that equipment, since its last valid calibration, to determine acceptability of previously collected data, processes monitored, or items previously inspected or tested.
  - e. Handling and Storage. Verify that M&TE is properly handled and stored to maintain accuracy.
  - f. Commercial Devices. No specific guidance is provided; however, inspectors should recognize that calibration and control are not required for rulers, tape measures, levels, and other normal commercial equipment that provide adequate accuracy.
  - g. Measuring and Test Equipment Documentation. Verify that M&TE calibration documentation includes the following:
    1. Identification of the measuring or test equipment calibrated;
    2. Traceability to the calibration standard used for calibration;
    3. Calibration data, including the results of the calibration and statement of acceptability;
    4. Identification of the date of calibration and the recalibration due date or interval;
    5. Identification of the individual performing the calibration;
    6. Identification of the document and revision number used in performing the calibration; and
    7. Reference to any actions taken in connection with out-of-calibration or nonconforming M&TE including evaluation results.

03.04 Verify that the program for identifying the status of inspection and test activities is conducted and documented in accordance with the applicant's approved QA Plan. The following elements should be verified:

- a. Identifying Items.
  1. Verify that items that have satisfactorily passed the required inspections

have been identified.

2. Verify that identification methods preclude the inadvertent installation, use, or operation of items that have not passed the required inspections and tests.

b. Indicating Status.

1. Verify that the statuses of required inspections and tests of items are indicated, when necessary to preclude inadvertent bypassing of such inspections and tests.
2. Verify that the statuses of inspections and tests are identified either on the items or in documents traceable to the items.
3. Verify that the statuses are maintained through the use of status indicators (e.g., tags, markings, labels, and stamps), or other means (travelers, logs, inspection or test records).
4. Verify that the authority for applying and removing status indicators is specified.
5. Verify that the status indicator is used to provide indications of the tests or operating statuses of items or facilities to prevent inadvertent changes in operating statuses.

#### 88109-04 RESOURCE ESTIMATE

Inspection resources necessary to complete this inspection procedure are estimated to be 24-32 hours of inspection per facility visit. The basics of this inspection procedure should be conducted annually, during the construction phase, or when significant changes occur to the M&TE program.

#### 88109-05 REFERENCES

Code of Federal Regulations, 10 CFR Part 50, Appendix B, "Quality Assurance Requirements for Nuclear Power Plants and Fuel Reprocessing Plants."

Code of Federal Regulations, 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material."

U.S. Nuclear Regulatory Commission, NUREG-1718, "Standard Review Plan for the Review of an Application for a Mixed Oxide Fuel Fabrication Facility," August 2000.

U.S. Nuclear Regulatory Commission, Regulatory Guide 1.28, "Quality Assurance Program Requirements (Design and Construction)," (Rev. 3).



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 (Sections 10, 11, 12, and 14).

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

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

END

ATTACHMENT 1

Revision History for IP 88109

Commitment Tracking Number	Issue Date	Description of Change	Training Needed	Training Completion Date	Comment Resolution Accession Number
N/A	06/20/07 CN 07-020	IP 88109 is a newly issued procedure. Issued for MOX inspection program to improve effectiveness and efficiency by incorporating and consolidating controls for measuring and test equipment inspection requirements.	None	N/A	ML071570221