

ATTACHMENT 65001.A
ITAAC ATTRIBUTES FOR AS-BUILT INSPECTION

PROGRAM APPLICABILITY: 2503

65001.A-01 INSPECTION OBJECTIVES

This procedure provides guidance for inspecting the physical and functional arrangements of the plant facility against the associated Inspection, Test, Analysis, and Acceptance Criteria (ITAAC). Inspection of as-built characteristics generally requires verification of location, alignment, dimensions, and functionality, and may also involve direct measurements and sizing.

This general section has each technical discipline specific IP as appendices addressing as-built inspection. Corresponding technical inspection areas are addressed in the companion IP related to the planned inspection activity.

01.01 To ensure that the as-built ITAAC have been completed in conformance with the design specifications, including authorized changes, the construction details, and any approved modifications.

01.02 To evaluate the condition of structures, systems, and components (SSC) and other equipment related to as-built ITAAC.

01.03 To determine whether the licensee records establish an adequate basis for the acceptance of ITAAC with as-built attributes.

01.04 To verify that the configuration management program meets requisite engineering, as-built verification, and quality assurance and quality control (QA/QC) requirements

65001.A-02 INSPECTION REQUIREMENTS

Inspection items 01 and 02 below need only to be completed once during construction of the facility, unless contractor changes or problems are identified that dictate additional inspections of the related programmatic controls. Inspection items 03 and 04 should be repeated for each ITAAC verification activity conducted in conjunction with the corresponding technical inspection; i.e., utilizing the companion technical IP. Inspection item 05 should be implemented as applicable or as necessary in support of inspection items 03 and 04.

References to common codes used by industry, standards and Regulatory Guides that may be helpful to the inspector are provided as guidance within the appendices, however the inspector must ensure that the licensee is committed to these standards or Regulatory Guides prior to using them for actual inspection.

02.01 Verify that the licensee is maintaining a configuration management program for identifying the as-built status of SSC construction and ITAAC completion. Assess the

adequacy of the procedural controls that have been established to govern the generation of as-built design/construction documents, including consideration of installed modifications. Evaluate how ITAAC progress is tracked to completion.

Guidance. In support of the licensee's configuration program, all contractor procedures should include provisions for maintaining the as-built status of construction items, particularly where the completion and acceptance of ITAAC are related to the construction activity. A system that controls the use of marked-up documents (e.g., drawings) that convey as-built information during the construction process should be established until the final as-built document, incorporating all the as-built changes, is approved and issued.

All design changes and approved modifications should not be considered complete until the affected design, construction, or operations procedures are appropriately revised to incorporate the updated information. Operator training programs, as applicable, should be considered in the design change document control process. For all changes, the control of obsolete documents, to include recall from the field, must be properly effected.

It may be necessary to conduct some of these program reviews offsite; e.g., at the licensee's or design organization's corporate offices. Implementation of such inspections should consider not only the interfaces between offsite and onsite organizations, but also the proper transfer of as-built information, including design details, field changes, and feedback from the site across the established communication channels.

02.02 Review the ITAAC Matrix for the inspected facility to determine the ITAAC residing in Column [A] for "As-Built Inspection" of the ITAAC matrix. Assess the licensee's system of record controls that document the basis for the general acceptance of these ITAAC in Matrix Column [A].

Guidance. While the licensee's record controls for ITAAC completion may be a subset of the overall QA program for quality records, the acceptance of the ITAAC should be documented in a manner that can facilitate audits and provides a paper trail of objective evidence that the ITAAC have been met.

02.03 Review the ITAAC Matrix for the inspected facility to determine which Matrix Rows (i.e., 1 through 19) contain ITAAC in common with Matrix Column [A]. Select specific ITAAC from the applicable "family" for direct inspection and/or review. For this specific sample of ITAAC, conduct the inspection activities in 02.04 below.

Guidance. Inspections should be performed in accordance with the ITAAC Inspection Plan. Through review of the ITAAC Matrix for the particular facility design, the grouping of ITAAC into "families" related to as-built inspection and specific technical disciplines will be identified. With the development of the inspection plan for any given as-built "family", specific ITAAC will be selected for direct inspection and/or review.

02.04 Examine at least three critical attributes associated with each ITAAC selected for inspection. Where appropriate, conduct field inspections and independent measurements of the ITAAC-related SSC to verify the conformance to the acceptance criteria and the correctness of the as-built records. Where field inspection is not applicable or is

insufficient to validate the ITAAC acceptance, review the licensee records to determine the adequacy of the documentation in providing objective evidence that the ITAAC has been met.

Guidance. The critical attributes may be associated with the specific ITAAC details delineated in the ITAAC “inspections, tests, analyses” or in the “acceptance criteria”. Where the acceptance criteria specify a verifiable attribute (e.g., dimensions, distances, locations, sizing), it should be selected for inspection. However, it is recognized that certain critical attributes may not be so clearly specified, but more generally related to code compliance.

The ITAAC provide sufficient details to the inspector for guidance in selecting critical attributes and in establishing what needs to be inspected to verify adequate licensee completion, compliance, and acceptance.

02.05 See Appendices 01 through 05 for additional as-built inspection details and guidance related to the referenced technical disciplines.

Additionally, a review of all 10 CFR Parts 21 and 50.55(e) reports issued to the inspected facility would minimize the potential for the as-built ITAAC being adversely affected by the identified defect. Additionally, the inspector should confirm corrective actions, as necessary, for satisfactory ITAAC completion.

65001.A-02-03 RESOURCE ESTIMATE

Resource estimates are currently under development for this inspection procedure. This document will be revised to add this information as it becomes available.

65001.A-02-04 REFERENCES

Facility Final Safety Analysis Report (FSAR) and Design Control Document (DCD)

Inspection Procedure 35100, Implementation of Quality Assurance (QA) Program Described in Final Safety Analysis Report (FSAR)

Inspection Procedure 36100, Inspection of 10 CFR Parts 21 and 50.55(e) Programs for Reporting Defects and Noncompliance

Inspection Procedure 37051, Verification of As-Built

Inspection Procedure 37700, Design, Design Changes, and Modifications

Inspection Procedure 71152, Identification and Resolution of Problems

65001.A-05 APPENDICES

The following Appendices provide further discussion of the as-built ITAAC inspection areas, as related to the nineteen technical disciplines listed in the ITAAC Matrix Rows. Each matrix row category (01) through (19) is covered in one of the five appendices.

Appendix 1, As-Built Inspection for Civil/Structural ITAAC

- (01) Foundations & Buildings
- (02) Structural Concrete

Appendix 2, As-Built Inspection for Piping ITAAC

- (03) Piping
- (04) Pipe Supports & Restraints
- (05) Reactor Pressure Vessel & Internals

Appendix 3, As-Built Inspection for Mechanical ITAAC

- (06) Mechanical Components
- (07) Valves
- (11) Containment Integrity & Penetrations
- (12) Heating, Ventilating & Air Conditioning
- (13) Fuel Handling Equipment & Racks

Appendix 4, As-Built Inspection for Electrical/I&C ITAAC

- (08) Electrical Components & Systems
- (09) Electrical Cable
- (10) Instrumentation & Control Components & Systems

Appendix 5, As-Built Inspection for Miscellaneous Program ITAAC

- (14) Complex Systems with Multiple Components
- (15) Fire Protection
- (16) Engineering
- (17) Security
- (18) Emergency Preparedness
- (19) Radiation Protection

END

Appendix 1
As-Built Inspection
for
Civil/Structural ITAAC

(01) Foundations & Buildings

- a. Verify that all contractors have approved procedures that describe administrative controls, work processes, and inspection requirements to ensure that foundation and structural design requirements are met.

Guidance.

- 1. Verify that the procedures prescribe adequate methods of QC inspection to ensure that the as-built condition of the foundations and structural steel meets specified engineering requirements and drawings.
 - 2. Verify that procedures adequately address the requirements of American Nuclear Society (ANS)/American Institute for Steel Construction (AISC) Standard N690-94, "Specification for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities."
 - 3. Ensure that reviewed documents include appropriate quantitative and qualitative acceptance criteria for determining that the prescribed activities have been accomplished satisfactorily.
- b. Observe work activities to verify that foundation construction work and structural steel installation is being accomplished under controlled conditions and in conformance with design requirements.

Guidance.

- 1. Interview a sample of craft and QC personnel performing the observed activities to assess whether job and procedure knowledge is satisfactory.
- 2. Verify that the dimensions of the excavation conform to design drawings.
- 3. Verify that QC inspections were performed to verify subsurface acceptance criteria.
- 4. Determine if the placement of backfill conforms to lift thickness criteria and is compacted with the proper equipment, the required number of passes and the proper speed of travel.
- 5. Observe in-process testing activities and determine if they conform to standards and codes listed in the design specifications and drawings.

6. Ensure that the equipment used for process monitoring is calibrated and maintained in accordance with the procedure requirements.
 7. Ensure that the craft and QC inspection personnel are qualified to perform their assigned work.
- c. Verify the adequacy of the system of records utilized to support the licensee's ITAAC conclusion.

Guidance.

1. Select a sample of records that were generated during the conduct of excavation, backfill, compaction, forming, concrete placement, structural steel installation, and testing activities, and the records of craft and QC personnel.
2. Verify that the records reviewed were properly approved, and that they adequately demonstrate that the as-built condition satisfies design requirements.

(02) Structural Concrete

- a. Verify that the contractor has approved implementing procedures that describe administrative controls, work processes, and inspection requirements to ensure that as-built design requirements for as-built conditions are met for the manufacture and placement of structural concrete.

Guidance.

1. Verify that procedures adequately address the requirements of applicable American Concrete Institute Standards.
2. Verify that the procedures prescribe adequate methods of QC inspection to ensure that the as-built condition of structural concrete meets specified engineering requirements and drawings.
3. Verify that the appropriate quantitative and qualitative acceptance criteria are incorporated into documents to ensure that prescribed activities have been satisfactorily accomplished.
4. Ensure that the procedures accomplish batch plant qualification and testing as required by the design specification.
5. Verify the adequacy of the design procedures that govern concrete mixing and placement.

- b. Verify that structural concrete construction is being accomplished under controlled conditions and in conformance with design requirements.

Guidance.

1. Observe in-process structural concrete work activities.
2. Verify that reinforcing steel installation satisfies minimum bend diameter, limits on spacing between bars and between the forms and the bars, and splicing requirements.
3. Ensure that concrete form installation is in accordance with drawings and satisfies minimum cover requirements.
4. Assess the level of worker job and procedure knowledge by interviewing a sample of craft and QC personnel performing observed activities.
5. Verify that structural dimensions conform to design drawings.
6. Verify that QC inspections were performed to verify correct placement of reinforcing steel and concrete.
7. Observe in-process testing activities and determine if they conform to standards and codes listed in the design specifications and drawings.
8. Ensure that the equipment used for process monitoring is calibrated and maintained as part of the procedure requirements.
9. Ensure that the craft and QC inspection personnel are qualified to perform their assigned work.
10. Inspect in-progress steel structures and verify the following:
 1. Fit-up tolerances have not been exceeded (ANS/AISC Standard N690-94, Section Q1.23.11);
 2. Clearances are not exceeded (ANS/AISC Standard N690-94, Sections Q1.25.5);
 3. Column bases have the required finish (ANS/AISC Standard N690-94, Section Q1.21.3);
 4. Thermal cut edges have the required finish (ANS/AISC Standard N690-94, Section Q1.23.3.1);
 5. Maximum and minimum edge distance for slotted, oversize, and standard bolt holes is not exceeded (ANS/AISC Standard N690-94, Sections Q1.16.5.1, Q1.16.5.2, or Q1.16.5.3, as applicable, and Tables Q1.16.5.1 and Q1.16.5.3);

6. Bolt hole size for standard, oversize, short-slotted, and long slotted holes for bolted connections is not exceeded (ANS/AISC Standard N690-94, Section Q1.23.7);
 7. Minimum bolt hole spacing requirements are not exceeded (ANS/AISC Standard N690-94, Section Q1.16.4);
 8. High-strength bolts are ASTM Standard A325 or A490 and are tensioned with calibrated torque wrenches or by turn-of-the-nut method and meet minimum thread engagement (ANS/AISC Standard N690-94, Section Q1.23.8).
11. For welded steel connections, verify the following:
 1. A symbol to identify the welder;
 2. The welder is qualified;
 3. The weld procedure used was qualified according to AWS Standard D1.1-96, Section 4;
 4. Welding material is controlled according to AWS Standard D1.1-96, Sections 5.3.1.4 and 5.3.2.
 12. Verify that recommencement of work, particularly during concrete pours, is performed in accordance with design specifications and accepted procedure requirements.
 13. Verify that dimensional QC inspections were performed.
 14. Observe in-process welding testing activities and determine if they conform to standards and codes listed in the design specifications and drawings.
 15. Verify that the equipment used for process monitoring or data collection is calibrated and maintained as part of the procedure requirements (calibration is not required for rulers, tape measures, levels, and other such coarse measurement devices that provide adequate accuracy as received from the manufacturer).
 16. Verify that craft and QC inspection personnel are qualified to perform their assigned work.
- c. Verify the adequacy of the system of records utilized to support the licensee's ITAAC conclusion.

Guidance.

1. Select a sample of records that were generated during the concrete batching, placement and testing activities, and the records of craft and QC personnel.
2. Verify that the records reviewed were properly approved, and that they adequately demonstrate that the as-built condition satisfies design requirements.
3. Verify that the records conform to applicable procedures and to applicable ACI and ASTM standard requirements.

Appendix 2
As-Built Inspection
for
Piping ITAAC

(03) Piping

- a. Verify that all contractors have approved procedures that describe administrative controls, work processes, and inspection requirements to ensure that as-built design requirements are met for piping activities.

Guidance.

- 1. Verify that the procedures prescribe adequate methods of QC inspection to ensure that the as-built condition of the piping meets specified engineering requirements and drawings.
 - 2. Verify that procedures adequately address the requirements for pipe, such as the American Society of Mechanical Engineers (ASME) codes.
 - 3. Ensure that reviewed documents include appropriate quantitative and qualitative acceptance criteria for determining that the prescribed activities have been accomplished satisfactorily.
- b. Observe work activities to verify that the piping installation work is being accomplished under controlled conditions and in conformance with design requirements.

Guidance.

- 1. Interview a sample of craft and QC personnel performing the observed activities to assess whether job and procedure knowledge is satisfactory.
- 2. Verify that the dimensions of the sections and schedules conform to design drawings.
- 3. Verify that QC inspections were performed.
- 4. Observe in-process testing activities and determine if they conform to standards and codes listed in the design specifications and drawings.
- 5. Ensure that the equipment used for process monitoring is calibrated and maintained in accordance with the procedure requirements.
- 6. Ensure that the craft and QC inspection personnel are qualified to perform their assigned work.

- c. Verify the adequacy of the system of records utilized to support the licensee's ITAAC conclusion.

Guidance.

1. Select a sample of records that were generated during the conduct of installation, fitting, and testing activities, and the records of craft and QC personnel.
2. Verify that the records reviewed were properly approved, and that they adequately demonstrate that the as-built condition satisfies design requirements.

(04) Pipe Supports & Restraints

- a. Verify that the contractor has approved implementing procedures that describe administrative controls, work processes, and inspection requirements to ensure that as-built design requirements are met for the installation of piping systems.

Guidance.

1. Verify that procedures adequately address the following requirements:
 1. For pipe welding - the American Society of Mechanical Engineers (ASME) Boiler & Pressure Vessel Code (B&PV), Section IX
 2. For supports not attached by weld to pipe - the American Nuclear Society (ANS)/American Institute for Steel Construction (AISC) Standard N690-94, "Specification for the Design, Fabrication, and Erection of Steel Safety-Related Structures for Nuclear Facilities"
 2. Verify methods prescribed in the procedures for QC inspection are adequate to ensure that the as-built condition of piping systems meets specified engineering requirements and drawings.
 3. Ensure that reviewed documents include appropriate quantitative and qualitative acceptance criteria for determining that the prescribed activities have been accomplished satisfactorily.
- b. Verify by observation of work activities that piping system construction is being accomplished under controlled conditions and in conformance with design requirements.

Guidance.

1. Inspect in-progress piping system construction and verify the following are satisfied:

1. Fit-up tolerances for length, depth, and straightness of structural members and anchor base plate holes (ANS/AISC Standard N690-94, Section Q1.23.11);
 2. Limits for spacing between pipe and supports (design drawings); support base plate elevation and degree of levelness (ANS/AISC Standard N690-94, Section Q1.25.5);
 3. Pipe and component sizes, thicknesses, elevations and slopes in accordance with design requirements (design drawings);
 4. Pipe supports are sized and located as required by design requirements (design drawings).
2. Verify that dimensional QC inspections were performed.
 3. Observe in-process testing activities and determine if they conform to standards and codes listed in the design specifications and drawings.
 4. Verify that the equipment used for process monitoring or data collection is calibrated and maintained as part of the procedure requirements (calibration is not required for rulers, tape measures, levels, and other such coarse measurement devices that provide adequate accuracy as received from the manufacturer).
 5. Verify that craft and QC inspection personnel are qualified to perform their assigned work.
- c. Verify the adequacy of the system of records utilized to support the licensee's ITAAC conclusion.

Guidance.

1. Select a sample of records that were generated during piping system installation and testing activities, and the records of craft and QC personnel.
2. Verify that the records reviewed were properly approved, and that they adequately demonstrate that the as-built condition satisfies design requirements.
3. Verify that the records conform to applicable procedures and standard requirements set forth in the design documents.

(05) Reactor Pressure Vessel & Internals

- a. Verify that all contractors have approved procedures that describe administrative controls, work processes, and inspection requirements to ensure that as-built

design requirements are met for RPV and internal component installation activities.

Guidance.

1. Verify that the procedures prescribe adequate methods of QC inspection to ensure that the as-built condition of the RPV meets specified engineering requirements and drawings.
 2. Ensure that reviewed documents include appropriate quantitative and qualitative acceptance criteria for determining that the prescribed activities have been accomplished satisfactorily.
- b. Observe work activities to verify that RPV installation work is being accomplished under controlled conditions and in conformance with design requirements.

Guidance.

1. Interview a sample of craft and QC personnel performing the observed activities to assess whether job and procedure knowledge is satisfactory.
 2. Verify that the dimensions of the internal components and spacings conform to design drawings.
 3. Verify that QC inspections were performed to verify internal design acceptance criteria.
 4. Observe in-process testing activities and determine if they conform to standards and codes listed in the design specifications and drawings.
 5. Ensure that the equipment used for process monitoring is calibrated and maintained in accordance with the procedure requirements.
 6. Ensure that the craft and QC inspection personnel are qualified to perform their assigned work.
- c. Verify the adequacy of the system of records utilized to support the licensee's ITAAC conclusion.

Guidance.

1. Select a sample of records that were generated during the conduct of installation, fitting, piping, welding, and testing activities, and the records of craft and QC personnel.
2. Verify that the records reviewed were properly approved, and that they adequately demonstrate that the as-built condition satisfies design requirements.

Appendix 3
As-Built Inspection
for
Mechanical ITAAC

(06) Mechanical Components

- a. Verify that all contractors have approved procedures that describe administrative controls, work processes, and inspection requirements to ensure that as-built design requirements are met for component installation activities.

Guidance.

- 1. Verify that the procedures prescribe adequate methods of QC inspection to ensure that the as-built condition of the components and installations meets specified engineering requirements and drawings.
 - 2. Ensure that reviewed documents include appropriate quantitative and qualitative acceptance criteria for determining that the prescribed activities have been accomplished satisfactorily.
- b. Observe work activities to verify that installation work is being accomplished under controlled conditions and in conformance with design requirements.

Guidance.

- 1. Interview a sample of craft and QC personnel performing the observed activities to assess whether job and procedure knowledge is satisfactory.
 - 2. Verify that the dimensions of the component placements conform to design drawings.
 - 3. Verify that QC inspections were performed to verify acceptance criteria.
 - 4. Observe in-process testing activities and determine if they conform to standards and codes listed in the design specifications and drawings.
 - 5. Ensure that the equipment used for process monitoring is calibrated and maintained in accordance with the procedure requirements.
 - 6. Ensure that the craft and QC inspection personnel are qualified to perform their assigned work.
- c. Verify the adequacy of the system of records utilized to support the licensee's ITAAC conclusion.

Guidance.

1. Select a sample of records that were generated during the conduct of installation and testing activities, and the records of craft and QC personnel.
2. Verify that the records reviewed were properly approved, and that they adequately demonstrate that the as-built condition satisfies design requirements.

(07) Valves

- a. Verify that all contractors have approved procedures that describe administrative controls, work processes, and inspection requirements to ensure that as-built design requirements are met for installation activities.

Guidance.

1. Verify that the procedures prescribe adequate methods of QC inspection to ensure that the as-built condition of the valve installations meets specified engineering requirements and drawings.
 2. Ensure that reviewed documents include appropriate quantitative and qualitative acceptance criteria for determining that the prescribed activities have been accomplished satisfactorily.
- b. Observe work activities to verify that installation work is being accomplished under controlled conditions and in conformance with design requirements.

Guidance.

1. Interview a sample of craft and QC personnel performing the observed activities to assess whether job and procedure knowledge is satisfactory.
2. Verify that the dimensions of the valve installations conform to design drawings.
3. Verify that QC inspections were performed to verify acceptance criteria.
4. Observe in-process testing activities and determine if they conform to standards and codes listed in the design specifications and drawings.
5. Ensure that the equipment used for process monitoring is calibrated and maintained in accordance with the procedure requirements.
6. Ensure that the craft and QC inspection personnel are qualified to perform their assigned work.

- c. Verify the adequacy of the system of records utilized to support the licensee's ITAAC conclusion.

Guidance.

1. Select a sample of records that were generated during the conduct of installation and testing activities, and the records of craft and QC personnel.
2. Verify that the records reviewed were properly approved, and that they adequately demonstrate that the as-built condition satisfies design requirements.

(11) Containment Integrity & Penetrations

- a. Verify that all contractors have approved procedures that describe administrative controls, work processes, and inspection requirements to ensure that as-built design requirements are met.

Guidance.

1. Verify that the procedures prescribe adequate methods of QC inspection to ensure that the as-built conditions meets specified engineering requirements and drawings.
 2. Ensure that reviewed documents include appropriate quantitative and qualitative acceptance criteria for determining that the prescribed activities have been accomplished satisfactorily.
- b. Observe work activities to verify that the installation work is being accomplished under controlled conditions and in conformance with design requirements.

Guidance.

1. Interview a sample of craft and QC personnel performing the observed activities to assess whether job and procedure knowledge is satisfactory.
2. Verify that the dimensions of the installations conform to design drawings.
3. Verify that QC inspections were performed to verify acceptance criteria.
4. Observe in-process testing activities and determine if they conform to standards and codes listed in the design specifications and drawings.
5. Ensure that the equipment used for process monitoring is calibrated and maintained in accordance with the procedure requirements.

6. Ensure that the craft and QC inspection personnel are qualified to perform their assigned work.
- c. Verify the adequacy of the system of records utilized to support the licensee's ITAAC conclusion.

Guidance.

1. Select a sample of records that were generated during the conduct of installation and testing activities, and the records of craft and QC personnel.
2. Verify that the records reviewed were properly approved, and that they adequately demonstrate that the as-built condition satisfies design requirements.

(12) Heating, Ventilating & Air Conditioning

- a. Verify that the contractor has approved implementing procedures that describe administrative controls, work processes, and inspection requirements to ensure that the as-built design requirements are met for the placement of HVAC.

Guidance.

1. Verify that procedures adequately address the following requirements:
 1. ASME N-509-1989, "Nuclear Power Plant Air Cleaning Units and Components," Sections 4, 5, 6, and 7;
 2. ASME/ANSI Standard AG-1, "Code on Nuclear Air and Gas Treatment," 1997 edition;
 3. American Conference of Governmental Industrial Hygienists (ACGIH) Standard, "Industrial Ventilation, A Manual of Recommended Practice," 20th Edition, Section 8.
2. Ensure that AWS Structural Welding Code, AWS D1.1, governs welding of steel supports and any material greater than or equal to 0.125 inches thick.
3. Ensure that ACI Standard 349, Appendix B, "Steel Embedments" governs anchor bolting of supports to walls.
- b. Verify by observation of work activities that HVAC construction is being accomplished under controlled conditions and in conformance with design requirements.

Guidance.

1. Inspect on-going HVAC system installation and verify the following:

1. Length, elevation, material thickness, joint and seam joining, and span for ducting and supports meet acceptable dimensions and tolerances;
 2. The taper of duct transitions meets design requirements;
 3. Flange seating surfaces are clean and have an acceptable surface finish;
 4. Gaskets conform with specified dimensional tolerances and are free from tears, breaks, or other defects;
 5. Bolted connections conform to procedure or drawing established tolerances for mutual parallelism and axial alignment.
2. Verify that bolted connections are adequately torqued and inspected.
 3. Verify that welding conforms to applicable standards.
- c. Verify the adequacy of the system of records utilized to support the licensee's ITAAC conclusion.

Guidance.

1. Select a sample of records that were generated during the installation and testing of HVAC components, and the records of craft and QC personnel.
2. Verify that the records reviewed were properly approved, and that they adequately demonstrate that the as-built condition satisfies design requirements.
3. Verify that the records conform to applicable procedures and to applicable standard requirements.

(13) Fuel Handling Equipment & Racks

- a. Verify that the contractor has approved implementing procedures that describe administrative controls, work processes, and inspection requirements to ensure that as-built design requirements are met for the placement of mechanical equipment.

Guidance.

1. Review the equipment manufacturers' technical manuals, the design drawings covering the installation of special or large mechanical equipment, and the procedures for accomplishing the installation activities. Examples of these equipment types are pumps; heating, ventilation, and air conditioning (HVAC) fans, filters and housings; and backup power supplies.

2. Ensure that the design and manufacturer's requirements related to the equipment installation are accomplished through the implementation of approved procedures.
 3. Ensure that the installation procedures include inspections and tests to verify that the installed condition of the selected equipment conforms to design drawing requirements and the equipment manufacturer's technical manuals. Procedures should contain appropriate acceptance criteria.
 4. Verify that programmatic controls are in place to ensure that selected equipment is properly aligned and that the licensee has identified and resolved any physical alignment problems. Components that are improperly aligned introduce stresses that can impact the functional capability of plant equipment.
- b. Verify by observation of work activities that mechanical equipment installation is being accomplished under controlled conditions and in conformance with design requirements.

Guidance.

1. Verify that all mechanical equipment inspected is identified with a unique component identifier.
 2. Ensure that the selected equipment is located, installed, assembled, and connected to conform to the latest approved drawing, installation specification, technical manual requirements, and procedures.
 3. Verify the following:
 1. Leveling, alignment, clearances, and tolerances conform to drawing requirements;
 2. Location, routing, and support of cables and sensing lines conform to drawing requirements;
 3. Thread engagement and tightness of threaded connections and fastenings conform to technical manual requirements;
 4. Equipment is suitably protected from contamination or damage from construction debris;
 5. Installation of mountings and supports is according to procedures;
 6. Bolt torque conforms to engineering requirements.
- c. Verify the adequacy of the system of records utilized to support the licensee's ITAAC conclusion.

Guidance.

1. Select a sample of records that were generated during the installation and testing of mechanical equipment, and the records of craft and QC personnel.
2. Verify that the records reviewed were properly approved, and that they adequately demonstrate that the as-built condition satisfies design requirements.
3. Verify that the records conform to applicable procedures and to applicable standard requirements.

Appendix 4
As-Built Inspection
for
Electrical/I&C ITAAC

(08) Electrical Components & Systems

- a. Verify that all contractors have approved procedures that describe administrative controls, work processes, and inspection requirements to ensure that as-built design requirements are met for electrical installation activities.

Guidance.

1. Verify that the procedures prescribe adequate methods of QC inspection to ensure that the as-built condition of the electrical installation meets specified engineering requirements and drawings.
 2. Ensure that reviewed documents include appropriate quantitative and qualitative acceptance criteria for determining that the prescribed activities have been accomplished satisfactorily.
- b. Observe work activities to verify that electrical installation work is being accomplished under controlled conditions and in conformance with design requirements.

Guidance.

1. Interview a sample of craft and QC personnel performing the observed activities to assess whether job and procedure knowledge is satisfactory.
2. Verify that the dimensions of installation work conform to design drawings.
3. Verify that QC inspections were performed to verify acceptance criteria.
4. Observe in-process testing activities and determine if they conform to the latest revisions of IEEE standards 308, 379, 384, 603, 628, and 741 endorsed by the NRC and committed to by the licensee.
5. Ensure that the installations conform with the following IEEE Standards endorsed by the following Regulatory Guides:

IEEE Standards	Related Regulatory Guides
308	1.32, 1.81, 1.93, 1.6
379	1.53
384	1.75
603	1.153

6. Ensure that the equipment used for process monitoring is calibrated and maintained in accordance with the procedure requirements.
7. Ensure that the craft and QC inspection personnel are qualified to perform their assigned work.
8. Applicable IEEE Standards with Regulatory Guides include:
 1. IEEE Std. 336 (Power, Instrumentation, Control Equipment) - RG 1.30
 2. IEEE Std. 338 (Safety Systems) - RGs 1.22, 1.47, and 1.62
 3. IEEE Std. 381 (Class 1E Modules) - no RG available
 4. IEEE Std. 387 (Diesel Generators) - RG 1.9
 5. IEEE Std. 415 (Preoperational Testing Program- Class 1E systems) - RG 1.41
 6. IEEE Std. 484 (Batteries) - RG 1.128
 7. IEEE Std. 690 (Cable Systems) - no RG available.
 8. IEEE Std. 317 (Containment Penetration Assemblies) - RG 1.63
- c. Verify the adequacy of the system of records utilized to support the licensee's ITAAC conclusion.

Guidance.

1. Select a sample of records that were generated during the conduct of installation and testing activities, and the records of craft and QC personnel.
2. Verify that the records reviewed were properly approved, and that they adequately demonstrate that the as-built condition satisfies design requirements.

(09) Electrical Cable

- a. Verify that the contractor has approved implementing procedures that describe administrative controls, work processes, and inspection requirements to ensure that the as-built design requirements are met for the installation of electrical cable and equipment.

Guidance.

1. Verify that procedures adequately address the requirements of the latest revision of IEEE Standards 308, 379, 384, 603, 628, 741 endorsed by the NRC and committed to by the licensee.
2. Ensure that requirements important to the operation of the equipment and cable in the manufacturers' technical manuals are included in the installation procedures.
3. Ensure that the following attributes are addressed in the installation procedures:
 1. Temperature limits for handling and pulling electrical cables during low temperatures;
 2. Cable pulling lubricants are specified and are compatible with the cable outer surface, are not hardening, and are not combustible;
 3. Use of tension measuring devices during cable pulling;
 4. Maximum pulling tensions, maximum side wall pressure;
 5. Minimum bending radius;
 6. Maximum number of bends in conduit;
 7. Size of bends, boxes, and fittings for raceways;
 8. Types of acceptable pulling devices;
 9. Cable support for vertical runs.
- b. Verify that all temporary modifications, lifted leads, and jumpers are properly reviewed, approved, and controlled.

Guidance.

1. A formal record should be maintained of the status of lifted leads and jumpers.
 2. The controls should include independent verification of the installation and removal of lifted leads and jumpers and should also require functional testing of equipment following removal of temporary modifications.
- c. Verify by observation of work activities that electrical cable and equipment installation is being accomplished under controlled conditions and in conformance with design requirements.

Guidance.

1. Inspect on-going electrical cable installation and verify the following:
 1. The pulling tension measuring device is calibrated and maintained;
 2. A permanent marker identifies the ends of cables in accordance with design documents;
 3. Ends of cables are sealed against the entrance of moisture;
 4. Temperature limits are met; correct cable lubricants are used;
 5. Cable pulling is done in a steady continuous pull utilizing a swivel attached between the pulling eye and the pulling cable;
 6. Cables are pulled only into clean raceways;
 7. Cable reels are supported so the cable can be unreeled and fed into a raceway or conduit without being subject to a reverse bend
 8. A suitable feeder device is used to protect and guide the cable and ensure that the minimum bending radius of the cable is not violated;
 9. Conduits are not overfilled (see ANSI/NFPA 70, latest);
 10. The recommended maximum pulling tension is not exceeded;
 11. Vertical cable is secured to the cable tray at least every five feet;
 12. The weight of vertical cable is supported by holding devices.
2. Inspect on-going electrical equipment installation and verify the following:
 1. Clearances, tolerances, leveling, and alignment conform to drawing requirements
 2. Location, routing, and support of electrical cables conform to drawing requirements;
 3. Electrical connections are in accordance with manufacturer's requirements;
 4. Thread engagement and tightness of fasteners for mounting and installation of equipment conform to engineering drawings and technical manuals.

- d. Verify the adequacy of the system of records utilized to support the licensee's ITAAC conclusion.

Guidance.

1. Select a sample of records that were generated during the installation and testing of electrical cable and equipment, and the records of craft and QC personnel.
2. Verify that the records reviewed were properly approved, and that they adequately demonstrate that the as-built condition satisfies design requirements
3. Verify that the records conform to applicable procedures and to applicable standard requirements.

(10) Instrumentation & Control Components & Systems

- a. Verify that the contractor has approved implementing procedures that describe administrative controls, work processes, and inspection requirements to ensure that the as-built design requirements are met for the installation of instrumentation and controls.

Guidance.

1. Verify that procedures adequately address the requirements of IEEE Standards for the installation of instrumentation & controls.
 2. Ensure that requirements important to the operation of the instrumentation and controls in the manufacturers' technical manuals are included in the installation procedures.
- b. Verify that all process measurement, process control, and equipment interlock devices that are required to operate, maintain, and control the piping system equipment are shown on the selected system P&ID.

Guidance.

Review the Piping and Instrumentation Diagrams (P&IDs) to identify the devices that are required for the system. The primary purpose of a P&ID is to bring together system information from various engineering disciplines (mechanical, electrical, instrumentation & controls) and present it in one drawing to illustrate how a system works as a whole. Review the FSAR and the system description to identify the required devices.

- c. Verify by observation of work activities that the installation of instrumentation and controls is being accomplished under controlled conditions and in conformance with design requirements.

Guidance.

1. Verify that the physical location of instrument taps and device elevations are consistent with design drawing requirements.
2. Inspect on-going instrumentation & controls installation and verify the following:
 1. Instrument sensing lines do not come in contact with structural steel and concrete surfaces;
 2. Spacing around sensing lines is sufficient to allow each tube to expand independently at all turns without striking adjacent tubes or other equipment;
 3. Sensing lines routed through penetrations are labeled with a permanent tag on each side of the barrier; sensing lines have a continuous slope to promote being kept either full or free of fluid; bends, rather than tube or pipe fittings, are used to change direction of sensing lines;
 4. A minimum bend radius of at least two and one quarter times the tubing outside diameter is employed for bends in stainless and copper tubing;
 5. Support intervals for sensing lines do not exceed procedural requirements
 6. For threaded connections of stainless to stainless, lubrication is applied to prevent seizing or galling; lubricants have no chloride content and consideration to potential reaction with either the service fluid or the piping material has been given;
 7. Lines are blown clear of foreign material with clean, oil free, dry air or nitrogen prior to placing the system in operation.
3. The mounting of instruments to support structures is in accordance with design engineering drawings, and manufacturer's instruction.
4. Deviations from plan location and elevation are within design tolerances.
5. Process connected level transmitters and indicators are mounted within design tolerances.
6. Liquid actuated level switches are mounted within design tolerances.
- d. Verify the adequacy of the system of records utilized to support the licensee's ITAAC conclusion.

Guidance.

1. Select a sample of records that were generated during the installation and testing of instrumentation and controls components, and the records of craft and QC personnel.
2. Verify that the records reviewed were properly approved, and that they adequately demonstrate that the as-built condition satisfies design requirements.
3. Verify that the records conform to applicable procedures and to applicable standard requirements.
4. Verify that safety-related I&C systems (RTS, ESFAS etc.) have the detailed documentation demonstrate the Equipment Qualification on digital computer system.
5. Verify that safety-related I&C systems (RTS, ESFAS etc.) have detailed documentation demonstrate the design process (per certified design Tier 1 commitments).
6. Verify that safety-related I&C systems (RTS, ESFAS etc.) have the detailed documentation demonstrating the separation and independency of divisions.
7. Verify that safety-related I&C systems (RTS, ESFAS etc.) have the detailed documentation demonstrate the design compliance with IEEE standard 603-1991 requirements (per 10 CFR 50.55a(h)).

Appendix 5

As-Built Inspection for

Miscellaneous Program ITAAC

(14) Complex Systems with Multiple Components

- a. Verify that all contractors have approved procedures that describe administrative controls, work processes, and inspection requirements to ensure that as-built design requirements are met.

Guidance.

1. Verify that the procedures prescribe adequate methods of QC inspection to ensure that the as-built conditions meets specified engineering requirements and drawings.
 2. Ensure that reviewed documents include appropriate quantitative and qualitative acceptance criteria for determining that the prescribed activities have been accomplished satisfactorily.
- b. Observe work activities to verify that the construction and installation work is being accomplished under controlled conditions and in conformance with design requirements.

Guidance.

1. Interview a sample of craft and QC personnel performing the observed activities to assess whether job and procedure knowledge is satisfactory.
 2. Verify that the dimensions of the installations conform to design drawings.
 3. Verify that QC inspections were performed to verify acceptance criteria.
 4. Observe in-process testing activities and determine if they conform to standards and codes listed in the design specifications and drawings.
 5. Ensure that the equipment used for process monitoring is calibrated and maintained in accordance with the procedure requirements.
 6. Ensure that the craft and QC inspection personnel are qualified to perform their assigned work.
- c. Verify the adequacy of the system of records utilized to support the licensee's ITAAC conclusion.

Guidance.

1. Select a sample of records that were generated during the conduct of installation and testing activities, and the records of craft and QC personnel.
2. Verify that the records reviewed were properly approved, and that they adequately demonstrate that the as-built condition satisfies design requirements.

(15) Fire Protection

- a. Verify that the licensee has provided approved implementing procedures that describe administrative controls, work processes, and inspection requirements to ensure that fire protection systems, including fire barrier systems and other fire protection features, are installed in accordance with design and construction drawings and other documentation. Also verify that the licensee has provided approved implementing procedures to ensure that the required separation of redundant divisions by fire barriers or other means has been provided by the final as-built configuration of SSCs, including circuits, important to safety.

Guidance.

1. Review the equipment manufacturers' technical manuals, certification documents, design/erection drawings and installation procedures for fire barriers (including penetration seals), fire pumps, firewater storage tanks, fire detection/alarm systems, fixed suppression systems, seismic Category I standpipe systems, and other important fire protection features.
 2. Ensure that the installation procedures include inspections and tests to verify that the installed condition of the selected systems and equipment conforms to design/erection drawing requirements and the equipment manufacturers' requirements. Procedures should contain required functional checks and appropriate acceptance criteria.
 3. Verify that installation drawings and procedures for fire barrier penetration seals are in accordance with the tested and certified configurations.
 4. Verify that programmatic controls are in place to ensure that fire pumps and drivers are properly aligned and that the licensee has identified and resolved any physical alignment problems.
 5. Verify that the procedures and documentation required for installation, inspection, and functional checks have been provided to the installer.
- b. Verify that the descriptions of physical plant and combustible loading provided in the most recent, approved fire hazards analysis and post-fire safe-shutdown circuit

analysis are in accordance with the as-built plant for each fire area containing SSCs important to safety.

Guidance.

1. Using a sampling approach, compare the information in the fire hazards analysis with the as-built plant conditions with respect to ignition sources, combustible loading (type, quantity and location), safety-related divisional equipment and circuits, and fire protection systems, including fire barriers.
 2. Using a sampling approach, verify that redundant divisions of circuits and components are separated in accordance with design documents and the current, approved post-fire safe-shutdown circuit analysis and fire hazards analysis.
 3. Excluding the Main Control Room, for areas of the plant containing SSCs important to safety and where separation of redundant divisions is not provided by 3-hour rated fire barriers, verify that it is not feasible to provide 3-hour barrier separation and verify that the bases for the alternative design as documented in the DCD or COL are reflected in the as-built plant (e.g., adequate separation distance, low combustible loading, cable in metal conduit). Three-hour fire barrier separation is not required inside containment, however, fire protection for redundant shutdown systems in the reactor containment building must ensure, to the extent practicable, that at least one post-fire shutdown success path will be free of fire damage. See Regulatory Position 6.1.1 of RG 1.189 for additional guidance.
 4. Verify by inspection that discharge of a single fixed automatic suppression system cannot adversely impact the safe-shutdown function of more than one redundant division (system discharge is not required). Equipment important to safety that does not itself require protection by water-based suppression systems, but is subject to unacceptable damage if wetted by suppression system discharge, should be appropriately protected (e.g., water shields or baffles). The same equipment important to safety should not be affected by, or should be appropriately protected from, ventilation shutdown provisions due to fire suppression systems.
 5. Verify by inspection that the spill control features for combustible liquids and drainage capabilities required by the design documents have been provided, taking into account discharge of fixed suppression systems and/or manual hose streams. See Section 8.5 of NFPA 804, "Fire Protection for Advanced Light Water Reactor Electric Generating Plants," for additional guidance.
- c. Verify by observation of work activities and acceptance functional tests, where applicable, and by inspection of completed work and certifications that fire protection system installation is being performed in accordance with the approved

implementing procedures and that the completed installation is in conformance with design/erection requirements.

Guidance.

1. Ensure that the selected equipment is located, installed, assembled, and connected, and has passed any required functional tests, to conform to the latest approved drawing, installation specification, technical manual requirements, and procedures.
2. Using a sampling approach, verify that fire barriers and penetration seals are installed in accordance with the tested and certified design configuration. Verify that only noncombustible materials qualified per ASTM E-119, "Standard Test Methods for Fire Tests of Building Construction and Materials," are used for construction of fire barriers. Where penetration seal configurations deviate from the tested and certified configuration, verify that the deviation has been appropriately evaluated and approved. See NUREG-1552, "Fire Barrier Penetration Seals in Nuclear Power Plants," and Regulatory Position 4.2 of RG 1.189, "Fire Protection for Nuclear Power Plants," for additional guidance.
3. Verify that the as-built fire water supply sources meet the design volumetric requirements.
4. Using a sampling approach, verify that fire detectors are located in accordance with design/erection drawings and that as-built plant conditions will not degrade the performance of the detectors (e.g., HVAC air flow directed at smoke detectors; large obstructions, such as HVAC ductwork, between ceiling mounted detector and floor). See NFPA 72, "National Fire Alarm Code," for additional guidance.
5. Verify that suppression system discharge nozzles are not obstructed by permanent plant.
6. Using a sampling approach, verify that interior manual hose installations are able to reach any location that contains, or could present a fire exposure hazard to, equipment important to safety with at least one effective hose stream, taking into account the length of hose provided, the access paths between hose stations and the locations protected, and postulated fires that prevent access to the hose station nearest the fire. Verify that pressuring-regulating devices are installed at hose stations, where required, in accordance with design/erection documents. See NFPA 14, "Standard for the Installation of Standpipe and Hose Systems," for additional guidance.
7. Verify that fire extinguishers are provided in areas that contain or could present a fire exposure hazard to equipment important to safety. Extinguishers should be installed with due consideration given to possible adverse effects on equipment important to safety installed in the area. NFPA 10,

“Standard for Portable Fire Extinguishers,” provides guidance on the installation (including location and spacing) of portable extinguishers.

8. Verify that emergency lighting and fixed communication systems have been installed and function in accordance with design/erection documents.
 9. Verify that for plants with oil-lubricated reactor coolant pumps located outside the reactor vessel and in a non-inerted containment, the oil collection system is installed in accordance with design/erection documentation. See Regulatory Position 7.1 of RG 1.189 for additional guidance.
 10. Using a sampling approach, verify that fire dampers are installed and function in accordance with their listing and in accordance with NFPA 90A, “Standard for Installation of Air-Conditioning and Ventilating Systems.”
- d. Verify the adequacy of the system of records utilized to support and document the licensee’s ITAAC conclusion.

Guidance.

1. Select a sample of records that were generated during the installation, inspection and testing of fire protection systems components, including the records of craft and QC personnel.
2. Verify that the records reviewed were properly completed and approved, and that they adequately demonstrate that the as-built condition satisfies design requirements.
3. Verify that the records conform to applicable procedures and to applicable standard requirements.
4. Verify that where as-built conditions meet design requirements but differ from design/erection documents, the deviations have been properly reviewed and approved by the design organization and are properly annotated on the set of documents that reflect as-built conditions.
5. Verify that the appropriate NFPA forms have been completed. NFPA standards for each type of fire protection system include requirements for design acceptance. For example, NFPA 13, “Installation of Sprinkler Systems,” includes a “Contractor’s Material and Test Certificate for Aboveground Piping,” that requires the installing contractor to verify that the system has been installed according to accepted plans; that the system and components function properly; that the equipment used is approved; and that the installation has been accepted by the approving authorities (the NRC is the Authority Having Jurisdiction for nuclear power plant fire protection systems).

(16) Engineering

- a. Verify that all contractors have approved procedures that describe administrative controls, work processes, and inspection requirements to ensure that as-built design requirements for design changes are met.

Guidance.

1. Verify that the procedures prescribe adequate methods of QC inspection to ensure that the as-built conditions of design changes meet specified engineering requirements and that drawings are updated to reflect the changes.
 2. Ensure that reviewed documents include appropriate quantitative and qualitative acceptance criteria for determining that the change activities have been accomplished satisfactorily.
- b. Observe the change work activities to verify that the installation of change work is being accomplished under controlled conditions and in conformance with the design change requirements.

Guidance.

1. Interview a sample of craft and QC personnel performing the observed activities to assess whether job and procedure knowledge is satisfactory.
 2. Verify that the dimensions of the components and installations conform to updated and revised design drawings.
 3. Verify that QC inspections were performed to verify acceptance criteria.
 4. Observe in-process testing activities and determine if they conform to standards and codes listed in the updated design specifications and revised drawings.
 5. Ensure that the equipment used for process monitoring is calibrated and maintained in accordance with the procedure requirements.
 6. Ensure that the craft and QC inspection personnel are qualified to perform their assigned work.
- c. Verify the adequacy of the system of records utilized to support the licensee's ITAAC conclusion adequately supports the design changes.

Guidance.

1. Select a sample of records that were generated during the conduct of installation and testing activities for the design changes, as well as the records of craft and QC personnel.
2. Verify that the records reviewed were properly approved, and that they adequately demonstrate that the as-built condition satisfies design changes.

(17) Security

- a. Verify that all contractors have approved procedures that describe administrative controls, work processes, and inspection requirements to ensure that as-built design requirements are met.

Guidance.

1. Verify that the procedures prescribe adequate methods of QC inspection to ensure that the as-built conditions of the security measures meet specified engineering requirements and drawings.
 2. Ensure that reviewed documents include appropriate quantitative and qualitative acceptance criteria for determining that the prescribed activities have been accomplished satisfactorily.
- b. Observe work activities to verify that the installation work is being accomplished under controlled conditions and in conformance with design requirements.

Guidance.

1. Interview a sample of craft and QC personnel performing the observed activities to assess whether job and procedure knowledge is satisfactory.
2. Verify that the dimensions of the components and installations conform to design drawings.
3. Verify that QC inspections were performed to verify acceptance criteria.
4. Observe in-process testing activities and determine if they conform to standards and codes listed in the design specifications and drawings.
5. Ensure that the equipment used for process monitoring is calibrated and maintained in accordance with the procedure requirements.
6. Ensure that the craft and QC inspection personnel are qualified to perform their assigned work.

- c. Verify the adequacy of the system of records utilized to support the licensee's ITAAC conclusion.

Guidance.

1. Select a sample of records that were generated during the conduct of installation and testing activities, and the records of craft and QC personnel.
2. Verify that the records reviewed were properly approved, and that they adequately demonstrate that the as-built condition satisfies design requirements.

(18) Emergency Preparedness

- a. Verify that the licensee/applicant has approved implementing procedures that describe administrative controls, work processes, and inspection requirements to ensure that the as-built design requirements are met for the installation/placement of Emergency Preparedness (EP) related components/systems and facilities.

Guidance.

1. Review the equipment manufacturers' technical manuals, the design drawings covering the installation/construction of EP related components/systems and facilities, and the procedures for accomplishing the installation/construction activities.
2. Communications equipment is installed per the design requirements, specifications, and design drawings.
3. Ensure that the design and manufacturer's requirements related to the installation of EP related components/systems are accomplished through the implementation of approved procedures.
4. Ensure that the installation/construction procedures include inspections and tests to verify that the installed/constructed condition of the selected components/systems and facilities conforms to design drawing requirements and the manufacturer's technical manuals. Procedures should contain appropriate acceptance criteria.
5. Verify that programmatic controls are in place to ensure that EP related components/systems are properly installed and that the licensee has identified and resolved any installation problems. EP related components/systems that are improperly installed can impact the functional capability of that plant equipment, and thereby could impact the public's health and safety.

- b. Observe work activities to verify that installation of and/or construction projects associated EP related components/systems and facilities are being accomplished under controlled conditions and in conformance with design requirements.

Guidance.

1. Review the licensee's/applicant's planned, ongoing, and completed work on EP related components/systems and facilities.
 2. Interview a representative sampling of craft and QC personnel performing the observed activities to assess whether job and procedure knowledge is satisfactory.
 3. Verify that craft and QC inspection personnel are qualified to perform their assigned work.
 4. Verify that the dimensions of the EP facilities conform to design drawings.
 5. Ensure that the EP related components/systems and facilities are located, installed, assembled, and connected to conform to the latest approved drawing, installation specification, technical manual requirements, and procedures.
 6. Verify that all EP related components/systems equipment are inspected and identified with a unique component identifier.
 7. Verify that the EP related components/systems used for process monitoring or data collection are capable of being calibrated and maintained as part of the procedure requirements.
 8. Review plans for in-process testing activities (and observe these activities, if possible) and ascertain whether they conform to applicable standards.
 9. Verify that QC inspections were performed to verify EP related components/systems and facilities acceptance criteria.
- c. Verify the adequacy of the system of records utilized to support the licensee's ITAAC conclusion.

Guidance.

1. Review the licensee's/applicant's completed work packages and records for the construction of EP related components/systems and facilities. Select a representative sample of records that were generated during the construction and/or installation of these components, systems, and facilities, as well as the records of craft and QC personnel.

2. Verify that the records reviewed were properly approved (using appropriate industry standards), and that they adequately demonstrate that the as-built condition satisfies design requirements
3. Verify that the records conform to applicable procedures and to the appropriate industry standards requirements.

(19) Radiation Protection

- a. Verify that all contractors have approved procedures that describe administrative controls, work processes, and inspection requirements to ensure that as-built design requirements for radiation protection systems and components are met.

Guidance.

1. Verify that the procedures prescribe adequate methods of QC inspection to ensure that the as-built conditions of the radiation protection measures meet specified engineering requirements and drawings.
 2. Ensure that reviewed documents include appropriate quantitative and qualitative acceptance criteria for determining that the prescribed activities have been accomplished satisfactorily.
- b. Observe work activities to verify that the installation work is being accomplished under controlled conditions and in conformance with design requirements.

Guidance.

1. Interview a sample of craft and QC personnel performing the observed activities to assess whether job and procedure knowledge is satisfactory.
2. Verify that the dimensions of the components and installations conform to design drawings.
3. Verify that QC inspections were performed to verify acceptance criteria.
4. Observe in-process testing activities and determine if they conform to standards and codes listed in the design specifications and drawings.
5. Ensure that the equipment used for process monitoring is calibrated and maintained in accordance with the procedure requirements.
6. Ensure that the craft and QC inspection personnel are qualified to perform their assigned work.

- c. Verify the adequacy of the system of records utilized to support the licensee's ITAAC conclusion.

Guidance.

1. Select a sample of records that were generated during the conduct of installation and testing activities, and the records of craft and QC personnel.
2. Verify that the records reviewed were properly approved, and that they adequately demonstrate that the as-built condition satisfies design requirements.

END

Exhibit 1: Revision History for IP 65001.A

Exhibit A

Revision History For 65001.A

Commitment Tracking Number	Issue Date	Description of Change	Training Needed	Training Completion Date	Comment Resolution Accession Number
	10/03/07 CN 07-030	Researched commitments for 4 years and found none. Initial issuance	N/A	N/A	N/A