

Activity: As-Built Verification

1.0 Purpose: This guideline provides a basis for the performance of quality surveillances of the as-built design, construction and modification drawings and specifications to assure that they reflect the as-built condition of the plant.

2.0 Scope: This guideline has been developed for the review and evaluation of the following areas.

- E Final design drawings, and specifications reflecting as-built conditions.
- E Design and field changes properly reviewed, approved, processed, and implemented.
- E Design verification.
- E Walkdown inspection.
- E Document control.

3.0 References:

- 3.1 ANSI N45.2.11, "Quality Assurance Requirements for the Design of Nuclear Power Plants"
- 3.2 IE Bulletins 79-14 and 79-04
- 3.3 Reg. Guide 1.75, "Physical Independence of Electrical Systems"

4.0 Guidelines:

4.1 In preparation for and during the conduct of this surveillance:

- E Obtain and review implementing procedures, instructions and drawings governing this activity.
- E Prepare a guide or checklist using the selected items from this guideline.
- E Review past surveys, audits, surveillances and other evaluations or assessments.
- E Ensure that checklists include, where applicable, actual observation of performance, general plant conditions, radiological work practices, housekeeping, work document controls and use, and safety practices.

4.2 Identify a safety system that has already been inspected for verification of as-builts.

4.3 Select a random sample of final design documents including detail design drawings and construction specifications.

4.4 For each system selected, example a representative sample using the following guidelines:

- A. Piping systems – Review inspection packages and isometric drawings for each system selected. Review a representative sample of
 1. Hangers (size, type, travel limits, load setting, drawing number(s), location, etc.)
 2. Floor and wall penetrations (pipe clearance through all penetrations).
 3. Supports (type, location, installed per design drawing(s)).
 4. Valves (type, size, weight, orientation, and location).
 5. Piping (size, wall thickness, weight, and location).

6. Pipe welds (locations and identification).
 7. Drawing confirmation control (piping system configuration, including support location and embedments matching drawing).
- B. Electrical Cable Trays - Review electrical drawings and specifications for Class IE conduit and Class IE cable tray runs for the following:
- 1) Location/routing
 - 2) Supports
 - 3) Separation/isolation
 - 4) Loading (cables, physical and thermal)
 - 5) Identification (conduit and tray)
- C. Electrical Cables/Wires - Review design and construction records such as drawings, pull cards, etc., which represent as-built cable routing and:
- 1) Compare design with actual installation relative to routing identification, protection/isolation, and separation from redundant cable/wires.
 - 2) Compare design document and as-built identification for each conductor at one termination point.
- D. Structures - Structural steel assemblies are to be seismic category I structures. Each assembly selected should contain at least three welded and/or three bolted joints. Review to determine:
- 1) Whether the structural assembly configuration conforms to final design.
 - 2) Joint locations/orientation, dimensions, and configuration conform to final

design.

- 4.5 Select a random sample of plant changes not yet incorporated into as-built drawings and review to determine the status of review, approval, and revision of these identified changes from the "original" design.
- 4.6 Select a random sample of as-built changes on design/construction drawings which correctly reflect the as-built condition and review to verify the changes were properly reviewed and approved by appropriate personnel.
- 4.7 Select a random sample from the drawings used for verifications of as-builts and review changes that had been incorporated in safety-related systems to determine whether the as-built condition of the plant was used as the input to the seismic analysis of the system or that the as-built condition conforms to the original seismic criteria as applicable.
- 4.8 Determine if provisions are being or will be taken to ensure that final as-built design documents such as drawings, specifications, and calculations will be readily available to site operations personnel.
- 4.9 Determine if records which correctly identify the as-built conditions of items in the nuclear facility are being maintained and stored for the life of the particular item while it is installed in the nuclear facility.
- 4.10 For design modifications, verify that required design verifications have been performed including evaluations of the effects of those changes on the overall design.
- 4.11 Review to determine that design and field changes are adequately controlled so that the as-built process will result in proper and timely updating of the original/master drawings and

specifications to incorporate such changes.

4.12 Surveillance of the walkdown verification process includes:

- A. By personal interview, determine if the inspector has familiarized himself with the requirements of the system(s) before performing the walkdown inspection.
- B. Observe inspectors performing walkdown inspections.
- C. Inspection objectives for verification of as-builts are to determine whether:
 - 1) As-built design and construction drawings/specifications correctly reflect the as-built condition of the plant.
 - 2) Changes from the original design were properly reviewed, processed, approved, and implemented in accordance to procedural controls.
 - 3) Plant seismic and other stress calculations are based on as-built conditions.
 - 4) Determine the adequacy of:
 - a. Procedures governing generation and completion of as-built design documents such as drawings, specifications, and incomplete calculations.
 - b. Status of schedule for completion of as-built design documents.

5.0 Other Guidelines for Consideration:

5.1 A.1, "General Quality Surveillance Guidance"

5.2 F.2, "Environmental Qualification"