

### CONSTRUCTION REFURBISHMENT PROCESS - WATTS BAR UNIT 2

PROGRAM APPLICABILITY: 2512

#### 37002-01 INSPECTION OBJECTIVES

01.01 To determine whether the licensee's process for construction refurbishment includes the appropriate scope of structures, systems, and components (SSCs) including associated passive commodities to be refurbished, replaced, or evaluated to assure design requirements are met.

01.02 To determine whether the licensee's process for construction refurbishment includes appropriate refurbishment activities, inspections, and tests; commensurate with the applicable preservice degradation mechanism; to assure SSCs are confirmed to meet design requirements.

01.03 To evaluate the licensee's implementation of the construction refurbishment process by independently evaluating samples of refurbishment activities.

#### 37002-02 INSPECTION REQUIREMENTS AND GUIDANCE

02.01 Scoping inspection. [Reviews under this inspection procedure (IP) will apply to both the licensee, the Tennessee Valley Authority (TVA) and its contractors that implement their own QA programs. Where the term "licensee" is used, it may be read as the "licensee or the licensee's contractor."] This inspection should consist of a multi-disciplined inspection primarily to accomplish objectives 01.01 and 01.02.

- a. Review scoping documents associated with the major refurbishment program activities to confirm that the licensee's process for construction refurbishment includes the appropriate scope of structures, systems, and components (SSCs) including associated passive commodities to be refurbished, replaced, or evaluated to assure design requirements are met. Confirm that the licensee's process is sufficiently thorough to include appropriate refurbishment activities, inspections, and tests commensurate with the applicable preservice degradation mechanism in order to confirm that SSCs requiring refurbishment meet their design requirements.

Guidance. In order to address the decrease in the number of preservation and layup activities at Watts Bar Unit 2 since the early 2000's, the licensee established a refurbishment program to identify the scope of equipment in the program, and perform appropriate activities to assure design standards are met. The licensee's general program procedure for refurbishment, 25402-000-GPP-0000-TI216, Watts Bar Unit 2 Completion Project Refurbishment Program, was submitted to NRC on July 8, 2009 and reviewed by the Office of Nuclear Reactor Regulation (NRR). The results of this review should be factored into the planning process for this inspection. The scoping documents should be reviewed to verify that these assure that all SSCs and associated commodities are covered subject to degradation mechanisms as described in the refurbishment program.

The licensee's refurbishment process covering activities such as inspections, evaluations, component refurbishment and testing should be reviewed to verify that it includes clear acceptance criteria commensurate with the applicable preservice degradation mechanisms. The refurbishment process (as described in the TVA refurbishment program reviewed by NRR) should confirm that SSCs meet their design requirements. This includes meeting Codes, standards, quality assurance, and vendor requirements. 'Accept as is' dispositions in particular, should be justified regardless if inspections were performed or not. If sample inspections are performed by the licensee, the process should ensure all SSCs, including associated passive commodities 'accepted as is', are bounded by the samples credited, i.e. samples should be a sufficient number to cover the various environmental conditions and should be located in areas most susceptible to degradation. For example, carbon steel piping should consider the most susceptible corrosion locations, wetted and non-wetted environments, indoor and outdoor environments, and low points where water may accumulate. Multiple samples should be included to accommodate unknown variables. Where the process credits Corrective Action Programs (CAPs) or Special Programs (SPs), inspectors should ensure the CAP or SP clearly covers required refurbishment activities. Inspection of CAPs and SPs is performed separately from this IP. The process should also provide for implementation of corrective actions appropriate to the circumstances including extent of condition where appropriate.

- b. The inspectors shall select two to three safety related systems for review. A variety of quality related or safety related samples shall be selected from each system via review of plant drawings, equipment lists, or other available information. These samples should include mechanical components, electrical components, instrumentation components, civil components, and passive commodities. Inspectors should confirm via this sampling that the process ensures all components and commodities will be addressed by the refurbishment program. If any problems are identified in the scoping process, assure that appropriate corrective actions are initiated.

Guidance. This inspection can be performed in conjunction with 02.01.a. Select systems/components based on risk significance and potential exposure to degradation mechanisms. Inspectors should use licensee's Unit 1 risk model, if available, to provide risk insights into the selection of systems/components. If the licensee's risk model is not available, use NRC's Standardized Plant Analysis Risk (SPAR) model.

- c. Review available refurbishment self-assessment documents such as audits and surveillances of the program and samples of licensee identified problems.

Guidance. Assure appropriate corrective actions are initiated and implemented in a timely manner.

## 02.02 Implementation Inspection.

### a. Vendor Refurbishment or Replacement

1. Select 8-10 samples covering different types of components. Samples should include electrical, mechanical and instrumentation components being refurbished by vendors and confirm requirements have been met.
2. Select 8-10 samples covering different types of components. Samples should include electrical, mechanical and instrumentation components being replaced and confirm requirements have been met.

Guidance. Utilize guidance of IP 35065; Procurement, Receiving, and Storage. Inspectors should ensure critical component characteristics are covered by the procurement process, including basic design criteria, vendor requirements, quality assurance requirements, 10CFR50 Appendix B, and 10CFR21 requirements. Any changes to these requirements should be fully evaluated and documented and appropriately incorporated into the design process. Applicable attributes of the appropriate IMC 2512 IPs may also be utilized (see references) for inspecting the installation of new or refurbished components. Sample selection should be weighted toward higher risk systems/components (use licensee's Unit 1 risk model, if available; if not, use NRC's SPAR model). In addition, a variety of components should be selected. If problems are identified with a type of component, the potential for multiple components being affected, i.e. common mode failure potential, should be considered. Sample size may be increased at management's discretion if problems are identified.

### b. Active Mechanical System Components; On Site Inspection/Refurbishment

This includes valves, pumps, snubbers, ice condenser doors, chillers, compressors, dampers, pressure regulators, etc. A sample of 20-25 components covering at least five different types of components, shall be selected to confirm the adequacy of the refurbishment process. Confirm that

appropriate refurbishment activities have occurred such as; correct shelf life limited parts/materials have been replaced (e.g. lubricants, gaskets, packing, elastomers), appropriate inspections are conducted with clear acceptance criteria, associated corrective actions have been performed, and testing has been performed or included in an established test program.

Guidance. Applicable attributes of the appropriate inspection procedure which are listed in section 37002-04, REFERENCES, of this refurbishment inspection procedure may be used for conducting inspection of active mechanical components. Inspections should also include a review of records generated. Field observations should be performed for the most susceptible material/environmental combinations. See applicable ASME design specifications, vendor information, and FSAR requirements such as those in FSAR section 3.9.3.2 for pumps and valves. The inspectors may also use the guidance in GL 89-04 or the current U1 IST program. See sample selection guidance of 02.02.a. Sample size may be increased at management's discretion if problems are identified.

c. Active Electrical and Instrumentation Components; On Site Inspection/Refurbishment

The area includes blocking diodes, disconnects, hand switches, heaters, relays, solenoids, switchgear, terminal blocks, transformers, indicators, and temperature elements. Planned activities include qualified life calculations, chemical swipes, visual inspections, dielectric tests, bridge tests, oil testing, calibration, leak tests, contact tests, micro ohm tests, implementation of original equipment manufacturer recommendations, and EQ requirements. The inspector shall select at least one sample from 8-10 types of equipment. Multiple samples should be selected for large population categories. For each sample, review the applicable refurbishment procedures including acceptance criteria, and confirm, via field observation and/or record reviews that required inspections were performed. Review evaluations of inspection results for each sample to confirm appropriateness of 'accept as is' or repair/replacement actions.

Guidance. Applicable attributes of the appropriate inspection procedure which are listed in section 37002-04, REFERENCES, of this refurbishment inspection procedure may be used for conducting inspection of active electrical and instrumentation components. Inspections should also include a review of records generated. See sample selection guidance of 02.02.a. Sample size may be increased at management's discretion if problems are identified.

d. Passive Commodities

This includes piping, tanks, tubing, structures, supports, penetrations, cables, conduits, cable trays, ducting, ice condenser equipment, heat exchangers,

doors, coatings, etc. The primary planned licensee activities for this area include performing engineering evaluations, visual inspections, testing such as hardness tests, chemical swipes, leak tests, flushing, and NDE. Inspectors shall select samples to include 12-15 passive categories and various types of inspection activities. For the large population commodities such as piping, multiple samples shall be selected to cover each material type and environment. Review engineering evaluations, inspection and test results for each sample, as applicable, to confirm appropriateness of 'accept as is' or repair/replacement actions.

Guidance. Applicable attributes of the appropriate inspection procedure which are listed in section 37002-04, REFERENCES, of this refurbishment inspection procedure may be used for conducting inspections of passive commodities. Samples of passive commodities selected for inspection should take into account higher risk systems/components (use licensee's Unit 1 risk model, if available; if not, use NRC's SPAR model). Additionally, the number of samples should take into consideration the engineering evaluation results and should be included in the associated inspection plan. Sample size may be increased based on problems encountered. For each sample confirm, via field observation and/or record reviews, that required inspections were performed. At least 10 field observations should be performed. These observations should include the most susceptible material/environmental combinations. Confirm inspection sample points are sufficient to bound all categories and material types being accepted (e.g., are a sufficient number of inspection points covered and are these located in worse case locations if used as bounding samples). Sample size may be increased at management's discretion if problems are identified. Confirm any generic implications of results are considered.

e. Record Review

Select a variety of 15-20 completed records generated by the program and confirm these records meet the program and quality assurance requirements.

Guidance. Records should be legible, retrievable, meet the licensee's records management requirements, and reflect completed work.

f. Problem Identification and Resolution

Select 10-15 Problem Evaluation Reports (PERs) and confirm problems are thoroughly evaluated commensurate with significance including cause(s), appropriated corrective actions, and extent of condition, as applicable.

Guidance. It is an expectation that inspectors review applicant corrective actions for any problems identified in any of the above inspection areas. In addition, inspectors should select additional PERs to confirm implementation of an

effective corrective action process in this area. See IP 35007, Appendix 16 for additional guidance for inspection attributes.

### 37002-03 RESOURCE ESTIMATE

This IP supports the review of the construction refurbishment process for Watts Bar Unit 2. This IP should remain open during the entire construction period. The resource estimate for this IP is approximately 250 hours of direct inspection effort.

### 37002-04 REFERENCES

TVA letter dated December 9, 2009, "Watts Bar Nuclear Plant – Unit 2 – Licensing Basis Preservation and Construction Refurbishment Program for Structures, Systems, and Components (SSCs) (TAC NO. MD6311)"

NRC letter dated April 28, 2009, "Watts Bar Nuclear Plant, Unit 2 – Request for Additional Information on Programs for Licensing Basis Preservation and Construction Refurbishment (TAC NO. MD6581)"

TVA letter dated July 8, 2009, "Watts Bar Nuclear Plant (WBN) Unit 2 – Response to Request for Additional Information on Program for Construction Refurbishment (TAC NO. MD6581)"

NRC letter dated August 31, 2009, "Summary of August 6, 2009, Meeting with Tennessee Valley Authority (TVA) Regarding Watts Bar Unit 2 Construction Refurbishment Program"

TVA letter dated September 22, 2009, "Summary of August 6, 2009, Meeting with Tennessee Valley Authority (TVA) Regarding Watts Bar Unit 2 Construction Refurbishment Program"

IP 35007, Quality Assurance Program Implementation During Construction

IP 35065, Procurement, Receiving, and Storage

IP 43004, Inspection of Commercial-Grade Dedication Programs

IP 46053, Structural Concrete Work Observation

IP 46055, Structural Concrete Record Review

IP 46061, Structural Masonry Construction

IP 46071, Concrete Expansion Anchors

IP 48053, Structural Steel and Supports Work Observation

IP 48055, Structural Steel and Supports Record Review

IP 49001, Inspection of Erosion/Corrosion Monitoring Programs

IP49053, Reactor Coolant Pressure Boundary Piping – Work Observation

IP 49055, Reactor Coolant Pressure Boundary Piping Record Review

IP 49063, Piping – Work Observation

IP 49065, Safety-Related Piping – Records Review

IP 50053, Reactor Vessel and Internals Work Observation

IP 50055, Reactor Vessel and Internals Record Review

IP 50073, Mechanical Components – Work Observation

IP 50075, Safety-Related Components – Records Review

IP 50090, Pipe Support and Restraint Systems

IP 50100; Heating, Ventilating, and Air Conditioning Systems

IP 51053, Electrical Components and Systems – Work Observation

IP 51055, Electrical Components and Systems – Record Review

IP 51063, Electric Cable – Work Observation

IP 51065, Electric Cable – Record Review

IP 52053, Instrument Components and Systems – Work Observation

IP 52055, Instrument Components and Systems – Record Review

IP 53053, Containment Penetration (Mechanical) Work Observation

IP 53055, Containment Penetration (Mechanical) Record Review

IP 57050, Nondestructive Examination Procedure Visual Examination

IP 57060, Nondestructive Examination Procedure Liquid Penetrant Examination

IP 57070, Nondestructive Examination Procedure Magnetic Particle Examination

IP 57080, Nondestructive Examination Procedure Ultrasonic Examination

IP 57090, Nondestructive Examination Procedure Radiographic Examination

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END

Attachment 1-1  
Revision History for IP 37002

Commitment Tracking Number	Issue Date	Description of Change	Training Needed	Training Completion Date	Comment Resolution Accession Number
N/A	02/05/10 CN 10-005	Completed 4 year historical CN search for commitments and found none. New inspection procedure for refurbishment construction inspections at Watts Bar Unit 2.	None	N/A	N/A