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September 22, 2009

U.S. Nuclear Regulatory Commission
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Watts Bar Nuclear Plant, Unit 2
NRC Docket No. 50-391

Subject: **SUMMARY OF AUGUST 6, 2009, MEETING WITH TENNESSEE VALLEY AUTHORITY (TVA) REGARDING WATTS BAR UNIT 2 CONSTRUCTION REFURBISHMENT PROGRAM**

Reference: 1. 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"

The purpose of this letter is to provide TVA responses to the questions and comments on the Watts Bar Unit 2 Refurbishment Program that were discussed at a public meeting on August 6, 2009, and are summarized in Reference 1. As part of the construction completion of WBN Unit 2, TVA is replacing or refurbishing equipment. The Refurbishment Program covers the safety-related and quality-related structures, systems and components (SSCs) that will be inspected/evaluated for preservice degradation to ensure that the SSCs are capable of meeting their original design specification.

Enclosure 1 provides the NRC questions and TVA's responses. Enclosure 2 provides a list of open actions required for licensing identified in Enclosure 1.

If you have any questions, please contact me at (423) 365-2351.

Sincerely,

M. Bajestani

Masoud Bajestani
Watts Bar Unit 2 Vice President

Enclosures: Enclosure 1 - Summary of Questions and Comments
Enclosure 2 - List of Open Actions for Licensing

cc: See page 2

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cc (Enclosures):

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Enclosure 1

QUESTIONS AND COMMENTS
AUGUST 6, 2009, MEETING WITH TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT, UNIT 2
CONSTRUCTION REFURBISHMENT PROGRAM

During the August 6 presentation by Tennessee Valley Authority (TVA), the Nuclear Regulatory Commission (NC) staff asked a number of questions to obtain further clarification of the overall refurbishment program plan and the method of implementation. In addition, the NRC staff had certain comments regarding some of the details presented. The following provides the NRC questions and comments with TVA responses. The NRC questions are shown in italics.

1. *NRC Question: Describe how TVA will be establishing the qualified life for each type of component in its plan.*

TVA Response: Active mechanical safety-related and quality-related commodities are to be refurbished to their original design specification under Construction Completion Project Procedure (CCPP) 25402-000-GPP-0000-TI216, *Watts Bar Unit 2 Completion Project Refurbishment Program,* and CCPP 25402-000-GPP-0000-N1302, *Component Refurbishment Evaluation.* Vendor Technical Manuals and TVA work documents will be used for each specific class or type of active commodity. Upon completion of the refurbishment, the qualified life will be established.

For the Mechanical Environmental Qualification (MEQ) equipment, the service life for non-metallic safety-related active mechanical equipment subcomponents is specified in the Qualification Maintenance Data Sheet (QMDS) in the applicable section of the MEQ binder (WBN-MEQ-001).

In accordance with 10 CFR 50.49, for active and passive electrical and instrumentation EQ equipment, the qualified life is specified in the QMDS Section of the applicable EQ binder for the components/subcomponents that have a qualified life that is less than the 40-year plant life.

Most of the Unit 2 cables have never been energized and have remained in an ambient environment. As part of the EQ program, the impact on life due to ambient temperature will be calculated.

See also related question and answer No. 6.

2. *NRC Question: For Watts Bar Nuclear (WBN) Unit 2, what is the edition (year) used for the code of record of the American Concrete Institute (ACI) Code and American Institute of Steel Construction (AISC) Code?*

TVA Response: The following provides a list of ACI and AISC codes. For ACI codes, the two digits after the ACI code number provide the edition (year).

ACI

ACI 214-77	Recommended Practices for Evaluation of Strength Test Results of Concrete

ACI 315-74	Manual of Standard Practice for Detailing Reinforced Concrete Structures
ACI 359	Standard Code for Concrete Reactor Vessels and Containments (Proposed ACI-ASME Code ACI-359 (Article CC-3300) as issued for trial use April 1973
ACI 318-63	Building Code Requirements for Reinforced Concrete
ACI 318-71	Building Code Requirements for Reinforced Concrete
ACI 318-77	Building Code Requirements for Reinforced Concrete
ACI 347-68	Recommended Practice for Concrete Formwork
ACI 305-72	Recommended Practice for Hot Weather Concreting
ACI 211.1-70	Recommended Practice for Selecting Proportions for Normal Weight Concrete
ACI 304-73	Recommended Practice for Measuring Mixing, Transporting, and Placing Concrete
ACI 349-76	Code Requirements for Nuclear Safety-Related Concrete Structures
ACI 307-69	Specification for Design and Construction of Reinforced Concrete Chimneys

AISC

Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings, adopted February 12, 1969, Seventh Edition, as amended through June 12, 1974.

Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings, adopted November 1, 1978, Eighth Edition

3. *NRC Question: TVA's Master Equipment List (MEL) does not include all components. Describe the process to update the MEL and reconcile the final MEL prior to system turnover for startup testing. In addition, how will subcomponents inside panels or other devices be addressed?*

TVA Response: The Unit 2 MEL is governed under CCPPs 25402-3DP-G04G-00503, *Master Equipment List,* and 25402-3DP-G04G-00028, *Q-List and UNID Control.* The Unit 1 MEL was used as the initial basis for the Unit 2 MEL. Unit 1 designations were converted to Unit 2 designations and identified as unverified data in the Unit 2 MEL.

The Unit 2 unique identifiers (UNIDs) and associated equipment information are then verified by construction package closure documentation, walkdowns, drawing reviews, vendor manual reviews, and other design documentation. UNIDs which do not have a direct correlation from Unit 1 to Unit 2 are added to the Unit 2 MEL based on reviews of construction package closure documentation, drawings, and field walkdowns.

Subcomponent refurbishments are addressed as part of the activity for the parent component.

4. *NRC Question: Spring-can type pipe supports have been considered as passive components. What will the program require for refurbishment of them to ensure that the springs have not been damaged (spring constant changed) due to being in a loaded configuration for a number of years? For example, spring cans locked or pinned since construction.*

TVA Response: The spring hangers are installed for the life of plant. If the spring is locked in place, it sees no load as the load passes through the can body. If the spring can is not locked, the spring will not be damaged as long as it is set within its design capacity. Spring hangers are visually inspected under 79/14 program and prior to and during the plant heatup. The parameters inspected include corrosion, deformation, misalignment, improper clearances, improper spring settings, and missing, detached, or loose support items. Repairs or replacement of the springs will be made as required.

5. *NRC Question: Describe how masonry-block walls will be addressed in the program.*

TVA Response: The majority of masonry walls are in common buildings (part of the Unit 1 operating envelope) such as the Control, Auxiliary, and Diesel Generator Buildings. Each Reactor Building contains only three block walls. Walls in the common buildings and Unit 1 Reactor Building were covered in the Unit 1 masonry wall program. In addition, a calculation was prepared to qualify the masonry walls on the Unit 2 side of the common buildings and Unit 2 Reactor Building. This calculation will be updated as described below and will be used to resolve the NRC concerns in NRC Bulletin 80-11.

The following work activities are required to complete the Unit 2 masonry wall program.

1. Perform a walkthrough to identify which walls need to be constructed and which walls need to be enhanced with restraints and signage.
2. Revise applicable calculations which determined the worst case masonry wall configuration to make them applicable to Unit 2.
3. Document remaining construction work in applicable calculations.
4. Prepare design output to complete remaining work.
5. Complete remaining field work.
6. Revise applicable calculations which document acceptance of the Unit 2 walls.
7. Close applicable corrective action documents.

Activities 1 through 4 have been completed.

Civil/Structural inspections will be performed prior to startup as part of area turnover walkdowns to ensure that no physical damage or degradation has occurred to the block walls during Unit 2 completion. After startup, observations are made as part of the maintenance rule and normal plant activities.

6. *NRC Question: For each component commodity or attribute listed in Attachment 3 to the program plan, discuss how the specific acceptance criteria will be provided to the inspection personnel. Describe the specific acceptance criteria that will be used for the evaluations.*

TVA Response: As shown in the first column of the TI216 Inspection Matrix (Attachment 3), there are three different tracking processes for the inspections: Corrective Action Programs (CAP), Engineering Reports, or Refurbishment. For example for valves, applicable code standards shall be determined using issued Valve Data Sheets along with the ASME Certified Design Specifications. The original Manufacturer's Code Data Report will be used to establish/verify the applicable Edition and Addenda for use in inspections and refurbishments.

Active safety-related and quality-related commodities are to be refurbished to their original design specification using CCPP 25402-000-GPP-0000-N1302, *Component Refurbishment Evaluation.* Vendor Technical Manuals and TVA work documents will be used for each specific class or type of active commodity.

Both the active and passive commodities that have a CAP associated with them, such as Supports, will be handled under the program; and the acceptance criteria will be issued as part of the CAP.

The active and passive commodities that will be handled by an Engineering Evaluation will be dispositioned using additional procedures. This process will use WBN Unit 2 procedures, along with direction from vendors on specific commodities, to provide the acceptance criteria. As an example, for piping, Bechtel Procedure 25402-000-GPP-0000-N3505, *Piping System Cleanliness,* directs inspections and provides acceptance criteria for piping prior to performing work on piping. This procedure directs implementation of TVA Technical Instruction (TI) 27 Part III, *Cleaning and Cleanliness of Fluid Systems and Components,* for establishing the requirements of internal and external surface cleaning and cleanliness.

Once inspected, Startup will issue procedures to flush and sample piping using N3M-938, *Cleaning and Cleanness of Fluid Systems and Components,* to ensure the final cleanliness and fluid quality.

7. *NRC Question: For instrumentation subcomponents that will not be replaced (e.g., resistance temperature detectors, thermocouple probes, etc.), describe how TVA plans to verify their acceptability. During its review of the program plan, the staff may need to review selected TVA procedures for instrumentation.*

TVA Response: Safety-related resistance temperature detectors are being replaced. Thermocouples will be inspected (resistance and continuity checks), functionally checked, and replaced, if necessary. Subcomponents, in general, will be addressed as part of the refurbishment/testing of the parent components.

8. *NRC Question: Discuss the qualification requirements for Engineering or other field personnel who would be performing the inspections and/or evaluations.*

TVA Response: Inspectors will be trained in accordance with ANSI N45.2-1971. Maintenance personnel will be qualified for the task. This will be documented and tracked using the existing training and qualification programs.

9. *NRC Question: Were any of the safety-related structures at WBN Unit 2 supported by steel piles? If so, how are these piles being inspected or evaluated? Similarly, confirm the methods for inspecting subsurface foundations for structures.*

TVA Response: Category I safety-related structures are identified in Table 3.2-1 of the Final Safety Analysis Report (FSAR). Table 3.7-3 of the FSAR identifies the supporting media (rock supported, soil supported, and pile supported) for the Category I structures. The Condensate Demineralizer Waste Evaporator Building and the Additional Diesel Generator Building are the only Category I structures identified as pile supported. Since these are not Unit 2 specific buildings, there is no Category I structure at WBN Unit 2 supported by steel piles.

Condition of subsurface foundations is monitored by observation of the interior slabs and wall surfaces and by noting the presence of groundwater in-leakage. Prior to startup, these observations are performed as part of the various Civil/Structural inspections and walkdowns, the refurbishment program, and in area turnover walkdowns. After startup, observations are made as part of the maintenance rule and normal plant activities.

10. *NRC Question: Describe the source criteria that will be used during the refurbishment of relief valves.*

TVA Response: Refurbishment of safety-related and quality-related relief valves will be governed by the following source criteria:

- ASME Section III requirements including Design Specifications
- Manufacturer's requirements outlined in drawings and vendor manuals

11. *NRC Question: How will be [sic] disk to valve seat coefficient of friction be assessed for air-operated valves?*

TVA Response: Calculations are used to determine the coefficient of friction for safety-related valves in WBN Unit 2's Air-Operated Valve Program. In the calculations, the disk to seat friction coefficient (μ_s) is calculated using methods discussed in EPRI reports TR-113558, *A Refined Model for Prediction of Balanced Disk Globe Valve Thrust Requirements*; TR-107322, *Air-Operated Valve Evaluation Guide*; and TR-1032244-R2, *EPRI MOV Performance Prediction Program: Performance Prediction Methodology (PPM) Implementation Guide.*

Safety-related valves are tested to verify their ability to meet the calculation requirements (setpoint and leakage).

12. *NRC Question: Is a summary of the test data for the concrete in structures available? Summarize the results of the closure report for the Concrete Issues Corrective Action Program Plan. Describe the monitoring and management of potential corrosion of embedded steel and degradation of concrete. Is the groundwater tested for non-aggressive elements in order to understand how ground-water intrusion impacts concrete and reinforcing steel.*

TVA Response: Concrete strengths for concrete placed in Unit 1 and Unit 2 are recorded in calculations. Low strength concrete, i.e., concrete where the mix did not meet design strength, is shown on the various concrete outline drawings.

Concrete quality issues were resolved and closed for both units by the Concrete Special Program (SP). An NRC inspection (Inspection Report 390/90-26 and 391/90-26 – January 8, 1991) included a walkdown inspection of several structures including the Unit 1 and Unit 2 Reactor Buildings and the Unit 1 and Unit 2 Reactor Containment Shield Structures. The inspection concluded that the concrete quality concern issues were resolved.

Potential corrosion of embedded steel and identification of degraded concrete will be identified thought a series of Civil/Structural inspections and walkdown plans that are in place. In addition, the WBN Unit 2 Refurbishment Program and Area Turnover walkdowns will identify corroded embedded plate steel and/or degraded concrete. In

addition, identification of any observed degraded and/or area in distress is done through the CAP.

The reinforced concrete foundation of the structures (Reactor Building and Auxiliary Building) exposed to ground water infiltration is in excess of 6 feet thick with sealed construction joints. Monitoring of the condition of the structures, prior to Unit 2 turnover, will be accomplished through a series of Civil/Structural inspections and walkdown plans that are in place. In addition, the WBN Unit 2 Refurbishment Program and Area Turnover walkdowns will identify corroded steel and/or degraded concrete. WBN Unit 2 structures that are already in service to support Unit 1 are monitored and maintained under the Unit 1 Maintenance Rule program. The Maintenance Rule provides guidelines necessary to conduct the required inspections every five years, identifies all of the pertinent structures and/or components to be inspected, and provides checklists to be followed during the inspections. Any signs of distress and/or degraded concrete (e.g., cracks of structural concern, evidence of corrosion streaks through wall cracks, etc.) will be identified and corrected as necessary. As a result of prior WBN Unit 1 Maintenance Rule inspections, some questionable conditions (e.g., in-leakage, cracks, spalling, paint peeling, etc.) were identified. These were evaluated and determined to have no adverse effects on the structure and subsequently corrected/repaired as necessary.

13. *NRC Question: For the WBN Unit 2 equipment that is already in service to support Unit 1, discuss the manner in which TVA will determine that the equipment meets the design and licensing conditions related to the qualified life at Unit 2.*

TVA Response: WBN Unit 2 structures, systems, and components that are already in service to support Unit 1 are monitored and maintained under the Unit 1 Maintenance Rule program. Interfaces between Unit 1 and Unit 2 will be inspected to verify that they will meet their intended design function for Unit 2. This will be accomplished through visual inspections, flushing, flow balancing, and flow testing.

14. *NRC Question: Describe the scope of the pre-service inspection of the containment liner and associated containment penetrations, bellows, and coatings.*

TVA Response: TVA's program for WBN Unit 1 inservice inspections in accordance with ASME Section XI, Subsection IWE and IWL, 2001 Edition with the 2003 Addenda, as mandated and modified by 10 CFR 50.55a, is found in TI-100.012, *ASME Section XI Containment Inservice Inspection (CISI) Program.* This procedure describes the inspection program for containment, penetrations, and associated appurtenances including coatings. TVA is planning to issue a similar document for inspections on Unit 2.

SPP- 9.1, *ASME Section XI,* establishes administrative controls and provides requirements, standard methods, guidance, and interfaces for preparation of ASME Section XI, Operations and Maintenance, and augmented inservice inspection and testing programs. This document is generic and applies to both units at WBN.

Containment coatings in the Containment Dome and the liner will be inspected and repaired or dispositioned, as necessary. The inspection will be conducted in accordance with N3A-932, *Special Coating and Color Requirements and Exceptions/Variances for Watts Bar Nuclear Plant,* and G-55, *Technical and Programmatic Requirements for the Protective Coating Program for TVA Nuclear Plants.*

15. *NRC Question: Does TVA have a program to monitor the differential settlement of structures at Unit 2?*

TVA Response: During the construction of WBN Unit 1 and Unit 2, instrumentation for monitoring differential settlement of the main structures (i.e., Reactor Buildings, Auxiliary Building, Control Building, and Diesel Generator Building) was installed and periodic readings were obtained. After several years of monitoring, extensive investigation, and evaluation of the data, it was determined that the differential settlement between the structures was insignificant. Therefore, continued monitoring was not warranted, and on this basis, the differential settlement monitoring was discontinued for both units in 1984.

16. *NRC Question: In reference to the information on page 20 of the plan, state the reasons for not replacing all elastomer or other seals such as ice condenser inlet door seals. What will be done to evaluate these seals?*

TVA Response: The elastomers referred to on page 20 of 25402-000-GPP-0000-TI216, *Watts Bar Unit 2 Completion Project Refurbishment Program*, are the thick divider barrier seals, the door seals, and expansion joints. These seals are of a construction that limits the amount of degradation that will occur if the material is exposed to air or other fluids for a long period of time. Also based on industry experience and other plants that have completed license extensions, it has been noted that the elastomers performed their design function and had little or no degradation and were approved without replacement for additional service. Therefore, TVA has made the decision to perform inspections on these elastomers instead of replacing them.

Acceptance criteria are being prepared and will be issued as part of the implementing instructions. This will include performing a test to ensure that the elastomer performs to the design specification that it was originally purchased to, based on data sheets and design specifications provided by the manufacturer. Along with these tests and inspections, durometer readings, creep and elasticity reviews will be used to verify that the elastomer meets current industry standards.

17. *NRC Question: Describe TVA's plans for oversight and auditing of the implementation of the program and the accomplishment of program objectives.*

TVA Response: TVA has final approval for the Engineering Evaluation packages that are prepared for active and passive commodities. As part of the Construction Completion and turnover process, a complete listing of system UNIDs and work performed on these UNIDs will be prepared in accordance with CCPP 25402-000-GPP-0000-N1302, *Component Refurbishment Evaluation,* and reviewed by TVA Engineering. One functional purpose of this review will be to ensure the required aspects of the WBN Unit 2 refurbishment program have been satisfactorily performed and implemented.

TVA also will be reviewing and approving the procedures for implementation of the refurbishment program. Following development and implementation of the procedures needed to support the refurbishment program, TVA plans to perform an assessment of the refurbishment program.

Quality Control (QC) will inspect engineering and procedural requirements for applicable refurbishment packages. Nuclear Assurance will provide oversight of the program.

18. *NRC Question: If there will be procurement of equipment and parts from suppliers not possessing programs and qualifications under Title 10, Code of Federal Regulations, Part 50, Appendix B, how will the commercial grade dedication be accomplished?*

TVA Response: WBN Unit 2 commercial grade dedications are performed in accordance with TVA Procedure NEDP-8, "Technical Evaluation for Procurement of Materials and Services." NEDP-8 outlines the four methods of performing commercial grade dedications as required by EPRI NP-5652, *Guidelines for the Utilization of Commercial Grade Items in Nuclear Safety Related Applications,* Special Tests and Inspection, Commercial Grade Survey, Source Verification and Acceptable Supplier/Item Performance Record. NEDP-8 and EPRI NP-5652 are required training for Bechtel and TVA Procurement Engineers. In Generic Letter 89-02, the NRC conditionally endorsed EPRI NP-5652 for evaluating commercial grade products for suitability for use in safety-related applications.

19. *NRC Question: What is being done to evaluate the load-carrying requirements for anchor bolts?*

TVA Response: Anchor bolts are visually inspected under various programs (i.e., Bulletin 79/14 program, Equipment Seismic Qualification program, etc.). Damaged/corroded or missing anchors are identified and will be replaced as required. Anchors do not degrade over time unless exposed to physical damage as described above.

Anchor bolt installations for safety-related pipe supports have had QC documentation records retrieved, reviewed, and evaluated to ensure proper installation. For any anchors that do not have this documentation, a pull test will be performed. If the pull test does not show that the anchor has adequate capacity, the anchor will be replaced.

20. *NRC Question: Provide the schedule for completion of procedures for refurbishment, inspection, and engineering evaluations under the program plan. The staff will use the schedule and listing to determine if it will audit selected procedures.*

TVA Response: Engineering implementing instructions for 25402-000-GPP-0000-TI216 are expected to be issued by the end of 2009. These will cover those commodities that will be handled using an Engineering Evaluation or a CAP/SP. The current internal schedule for commodities is as follows:

Piping	10/09/09
Coatings (Protective)	10/23/09
Supports	10/30/09
Structural Steel	10/30/09
Concrete	10/30/09
Seals, Penetrations (Electrical)	11/06/09
Cables	11/13/09
Splices	11/13/09
Condensing Pots	11/20/09
Instrument Air Tubing	11/20/09
Instrument Sense Lines	11/20/09
Ducts	12/04/09

Construction implementation documents are in the process of being scoped and will begin drafting as the above-listed procedures and guidance are issued. Construction implementing documents will be available prior to the refurbishment of components.

Enclosure 2
List of Open Actions for Licensing

1. Active mechanical safety-related and quality-related commodities are to be refurbished to their original design specification under CCPP 25402-000-GPP-0000-TI216, *Watts Bar Unit 2 Completion Project Refurbishment Program,* and CCPP 25402-000-GPP-0000-N1302, *Component Refurbishment Evaluation.* Vendor Technical Manuals and TVA work documents will be used for each specific class or type of active commodity. Upon completion of the refurbishment program and prior to fuel load, the qualified life will be established.

2. Interfaces between Unit 1 and Unit 2 will be inspected to verify that they will meet their intended design function for Unit 2. This will be accomplished through visual inspections, flushing, flow balancing and flow testing, prior to fuel load.

3. Engineering implementing instructions for 25402-000-GPP-0000-TI216 are expected to be issued by the end of 2009.