Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

May 16, 2013

10 CFR 50.54(f)

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Watts Bar Nuclear Plant, Unit 1
Facility Operating License No. DPF-90
NRC Docket No. 50-390

Subject: **Watts Bar Nuclear Plant, Unit 1 - Path Forward for Resolution of Generic Safety Issue (GSI)-191**

References:

1. Nuclear Energy Institute (NEI) letter to NRC, Office of Nuclear Reactor Regulation, Director, Division of Safety Systems, "GSI-191 - Current Status and Recommended Actions for Closure," dated May 4, 2012
2. NEI letter to NRC, Office of Nuclear Reactor Regulation, Director, Division of Safety Systems, "GSI-191 – Revised Schedule for Licensee Submittal of Resolution Path," dated November 15, 2012.
3. SECY-12-0093, "Closure Options for Generic Safety Issue - 191, Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance," dated July 9, 2012.
4. Pressurized Water Reactor Owners Group (PWROG), Topical Report (TR) WCAP-16793-NP, Revision 2, "Evaluation of Long-Term Core Cooling Considering Particulate Fibrous and Chemical Debris in the Recirculating Fluid," dated October 12, 2011.
5. NRC Staff Requirements – SECY-12-0093, "Closure Options for Generic Safety Issue - 191, Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance," dated December 14, 2012.
6. NRC Final Safety Evaluation for Pressurized Water Reactor Owners Group Topical Report WCAP-16793-NP, Revision 2, "Evaluation of Long-Term Cooling Considering Particulate Fibrous and Chemical Debris in the Recirculating Fluid," dated April 8, 2013.

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In a letter dated May 4, 2012 (Reference 1), the Nuclear Energy Institute (NEI) described the status of industry efforts to resolve Generic Safety Issue (GSI)-191, "PWR Sump Performance" and recommended actions to close the issue. NEI's Reference 1 recommendations were based on licensees providing a docketed submittal to NRC by December 31, 2012 that would outline a GSI-191 resolution path.

In a subsequent letter dated November 15, 2012 (Reference 2), NEI recommended to the NRC that licensees delay submittal of GSI-191 resolution path and schedule until January 31, 2013, or 30 days following both the Commission response to SECY 12-0093 (Reference 3) and the final NRC safety evaluation (SE) on WCAP-16793 (Reference 4) being made publicly available. This schedule was requested to allow time for licensees to appropriately address Commission direction contained in the Staff Requirements Memorandum (SRM) on SECY 12-0093 and staff decisions contained in the SE on WCAP-16793.

In its SRM on SECY 12-0093 (Reference 5), the Commission approved the staff's recommendation to allow licensees the flexibility to choose any of the three options discussed in the paper to resolve GSI-191. Subsequently, on April 16, 2013, the SE for WCAP-16793 was made publicly available (Reference 6).

TVA's approach to resolving GSI-191 for Watts Bar Nuclear Plant (WBN), Unit 1 is to use the Option 1 criteria approach described in SECY-12-0093 (i.e.; Compliance with 10 CFR 50.46 Based on Approved Models). Enclosure 1 to this letter includes information regarding TVA's planned approach for WBN, Unit 1, including resolution path forward and schedule for resolution, summary of actions completed for GL 2004-02, and defense-in-depth and mitigation measures which have been established and will be maintained throughout the resolution period.

Enclosure 2 provides a list of commitments made in this submittal.

If you have any questions concerning this submittal, please contact Russell Thompson at (423) 751-2567.

I declare under penalty of perjury that the foregoing is true and accurate. Executed on this 16th day of May 2013.

Respectfully,

J. W. Shea
Vice President, Nuclear Licensing

Enclosures
cc: See Page 2

Enclosures

1. GSI-191 Path Forward, Watts Bar Nuclear Plant, Unit 1
2. List of Commitments

cc (Enclosures):
NRC Regional Administrator – Region II

Enclosure 1

GSI-191 Path Forward

Watts Bar Nuclear Plant, Unit 1

Enclosure 1
GSI-191 Path Forward
Watts Bar Nuclear Plant, Unit 1

Introduction

The purpose of this Enclosure is to describe the Tennessee Valley Authority's (TVA) plans to complete the remaining action associated with the evaluation of the potential for debris entrained in the circulated containment pool, following a loss-of-coolant accident, to block restrictions within the Emergency Core Cooling System (ECCS) recirculation flow path, including blockage within the reactor fuel assemblies, as requested by Generic Letter (GL) 2004-02 for Watts Bar Nuclear Plant (WBN), Unit 1.

To complete the required action, TVA will demonstrate compliance with 10 CFR 50.46 through the use of approved models for analyses, strainer head loss testing, and in-vessel effects. TVA's plan uses Option 1 criteria (Bypass > 15 gram/fuel assembly) for completion of Generic Safety Issue -191 as described in SECY-12- 0093, "Closure Options for Generic Safety Issue - 191, Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance," dated July 9, 2012.

Current Resolution Status

On September 13, 2004, the NRC issued GL 2004-02. GL 2004-02 requested that each plant perform an evaluation of the ECCS and Containment Spray System (CS) recirculation functions in light of the information provided in the GL, and, if appropriate, take additional actions to ensure system function.

TVA submitted its initial response to the GL for WBN, Unit 1, by letter dated March 7, 2005. TVA's latest response for WBN, Unit 1, regarding GL 2004-02 was submitted on August 15, 2011. Additional correspondence for WBN, Unit 1, was submitted on July 21, 2005, September 1, 2005, April 11, 2006, July 3, 2006, March 31, 2008, March 3, 2009 and April 1, 2010.

As discussed in one or more of these submittals, TVA has completed the following Generic Letter 2004-02 actions, analyses and modifications for WBN, Unit 1:

- Latent debris walkdowns and analysis;
  - (Described as completed in letter from TVA to NRC dated March 31, 2008)
- Debris generation analysis;
  - (Described as completed in letter from TVA to NRC dated March 31, 2008)
- Debris transport analysis;
  - (Described as completed in letter from TVA to NRC dated March 31, 2008)
- Hydraulic analysis of the ECCS and CS systems (taking suction from the containment recirculation sump);
  - (Described as completed in letter from TVA to NRC dated March 31, 2008)
- Net positive suction head analysis for CS and Residual Heat Removal (RHR) pumps (taking suction from the containment recirculation sump);
  - (Described as completed in letter from TVA to NRC dated March 31, 2008)

- Head loss testing for containment recirculation sump strainers;
    - (Described in letters from TVA to NRC dated March 31, 2008, March 3, 2009, and August 15, 2011)
- Wear and blockage analysis for components downstream of containment recirculation sump strainer;
    - (Described as completed in letter from TVA to NRC dated March 31, 2008)
- Structural analysis of containment recirculation sump strainers
    - (Described in letters from TVA to NRC dated March 31, 2008)
- Installation of new containment recirculation sump strainers.
    - (Described as completed in letter from TVA to NRC dated March 31, 2008)

Additionally, in the letter from TVA to NRC dated August 15, 2011, TVA committed to modify the sump plenum housing cover plate and to remove the Min-K fibrous insulation from the zone of influence in lower containment. These commitments were completed during the Fall 2012 WBN, Unit 1, refueling outage.

With regard to the evaluation of in-vessel, downstream effects, by letter dated March 3, 2009, TVA committed to complete the WBN, Unit 1, in-vessel downstream effects evaluation following issuance of the final NRC Safety Evaluation Report (SER) for Topical Report No. WCAP-16793-NP, "Evaluation of Long-Term Cooling Considering Particulate, Fibrous, and Chemical Debris in the Recirculating Fluid."

The NRC issued its final Safety Evaluation on WCAP-16793-NP, Revision 2, "Evaluation of Long-Term Cooling Considering Particulate, Fibrous, and Chemical Debris in the Recirculating Fluid" on April 8, 2013. Consequently, to appropriately address downstream in-vessel effects, WBN, Unit 1, plans to use the criteria established by WCAP-16793 Revision 2, including any limitations associated with the use of the WCAP based on the NRC final Safety Evaluation Report. TVA will review the Safety Evaluation Report and document adherence to the Limitations and Conditions contained in Section 4.0 in the appropriate WBN and Corporate calculations and design documents.

As described in TVA's letter dated March 31, 2008, WBN had Reflective Metallic Insulation, 3M M20C (Interam) fire wrap, and Min-K insulation within the polar crane wall. The fibrous debris quantity is documented in the latent debris walkdown and debris generation analyses discussed in the March 31, 2008 letter. As discussed above, the Min-K insulation was removed from the zone of influence during the Fall 2012, Unit 1, refueling outage.

Based on WCAP-16793-NP, Revision 2, in-core fuel fiber affects, the 3M M20C fire wrap material in lower containment, WBN, Unit 1, will not be able to meet the new acceptance criteria of 15 gram/fuel assembly. TVA will continue to participate in industry efforts to resolve the downstream in-vessel effects issue and determine if additional actions are required to ensure that downstream in-vessel effects are addressed.

As discussed in the March 31, 2008 TVA letter, design and administrative controls are in place at WBN to ensure that potential quantities of post-accident debris are maintained

within the bounds of the analyses and design bases that support ECCS and CS recirculation functions. A summary follows:

a. Surveillance Instruction 1-SI-304-2, "18 Month ECCS Containment Sump Inspection - Verifies the integrity and cleanliness of the ECCS containment sump, containment spray piping, RHR suction piping, and floor drains in Accumulator Rooms 3 and 4.

b. Technical Instruction TI-61.003, "Containment Debris Log" - A procedure that describes the steps to record, track, and evaluate any debris in containment and the ice condenser.

c. NPG-SPP-09.17, "Temporary Equipment Control" - These procedures delineate controls for housekeeping, material condition, and temporary equipment at TVA nuclear sites. This encompasses housekeeping responsibilities for all workers to preserve the quality of the work environment and the material condition of the plant.

d. NPG-SPP-09.3, "Plant Modifications and Engineering Change Control" - This procedure establishes a uniform process of administrative controls and regulatory/quality requirements for plant modifications and changes to engineering documents. It includes consideration of materials introduced into the containment that could contribute to sump strainer blockage.

e. NPG-SPP-09.5, "Temporary Modifications" - This procedure provides the requirements for controlling temporary alterations to systems, structures, and components (SSCs) of TVA's 10 CFR 50 and 10 CFR 72 facilities in a manner which ensures operator awareness, conformance with design basis and operability requirements, and preservation of plan safety and reliability.

f. Technical Instruction TI-12.07A, "WBN Containment Access Modes 1-4" - This instruction provides documentation of containment entry/exit and cleanliness (housekeeping) requirement when the plant is in Modes 1 through 4. Performance ensures no loose debris (rags, trash, clothing, failed protective coatings, tools, etc.) is present in containment, specifically debris that could impact RHR, CSS, and ECCS operability due to adverse impact on the containment sump.

g. General Engineering Specification G-55, "Technical and Programmatic Requirement for Protective Coating Program at TVA Nuclear Plant" - This engineering specification provides the technical and programmatic requirements for the protective coating programs at TVA nuclear plants.

h. Modification/Addition Instruction M&AI-5.3, "Application and Repair of Protective Coatings" - This procedure covers the technical and verification requirements to implement a protective coating program at WBN which meets TVA's commitments as defined in Engineering Specification G-55.

i. Technical Instruction TI-279, "Modification Review for Sources and Quantities of Aluminum and Zinc" - This procedure provides the requirements for controlling design changes and modifications to ensure the inventory of light metals (aluminum and zinc) inside containment is maintained within FSAR limits and design bases TVA is committed to USNRC Regulatory Guide 1.7 which states under section C.6, "Materials within the containment that would yield hydrogen gas due to corrosion from the

emergency cooling or containment spray solutions should be Identified and their use should be limited as much as practical."

Collectively, these documents provide the technical and programmatic controls necessary to ensure that design change, maintenance, and modification activities are conducted in a manner that assures operability of the containment sump with defense-in-depth and mitigation measures.

Resolution Schedule

There are no open issues related to the resolution of GSI-191 except for downstream in-vessel effects. TVA will complete the resolution of the downstream in-vessel effects within two refueling outages after May 16, 2013.

The WBN Updated Final Safety Analysis Report will be updated with this information in accordance with 10CFR 50.71(e).

Enclosure 2

List of Commitments

Watts Bar Nuclear Plant, Unit 1

List of Commitments

TVA will complete the resolution of the downstream in-vessel effects within two refueling outages after May 16, 2013.