

**POLICY ISSUE**  
**(Information)**

September 29, 2014

SECY-14-0102

FOR: The Commissioners

FROM: Daniel H. Dorman, Acting Director */RA/*  
Office of Nuclear Reactor Regulation

SUBJECT: CONSTRUCTION AND LICENSING FOR WATTS BAR NUCLEAR  
PLANT, UNIT 2

PURPOSE

The objective of this paper is to inform the Commission of the Nuclear Regulatory Commission's (NRC's) staff licensing and inspection activities in response to the request by the Tennessee Valley Authority (TVA) to issue an operating license (OL) for full power operation of the Watts Bar Nuclear Plant (WBN) Unit 2. This paper does not address any new commitments or resource implications. The NRC staff expects this SECY paper to be its final information paper to the Commission on this matter.

SUMMARY

The licensing of WBN Unit 2 is a project that spans five decades at the NRC with the original construction permit (CP) granted in 1973. The NRC staff developed a regulatory framework and established a licensing approach specifically for the project to ensure that a thorough and high-quality review is complete before rendering a decision regarding issuance of the OL. The NRC staff developed a construction inspection program to address WBN Unit 2's unique history and to provide inspection guidance that reflects current inspection practices. As construction nears completion, inspections are on track to support a licensing decision in 2015. The NRC staff is developing a Reactor Oversight Process (ROP) transition plan to ensure that safety and

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security performance is properly inspected as Unit 2 transitions to commercial operation, should an OL be granted. As the project nears completion, the NRC staff is coordinating the management and resolution of the remaining technical and licensing open items, such as ensuring that the National Environmental Policy Act (NEPA) requirements are met (given the rulemaking on Continued Storage of Spent Nuclear Fuel) and completing the licensing basis hydrology review for WBN Unit 2. The NRC schedule for completing its reviews to support an OL decision currently aligns with TVA's schedule to start commercial operation in December 2015, provided that TVA maintains their construction schedule and submits timely and high-quality submittals to resolve the remaining open items for licensing.

## BACKGROUND

WBN consists of two Westinghouse-designed four-loop pressurized-water reactors within ice-condenser containments. TVA received a CP for both Units 1 and 2 in 1973 under Part 50, "Domestic Licensing of Production and Utilization Facilities," of Title 10, "Energy," of the *Code of Federal Regulations* (10 CFR). Construction on both plants proceeded until 1985, when significant deficiencies in the Quality Assurance Program were identified. At that time the majority of WBN's Unit 1 and 2 structures were built and significant components (such as the reactor pressure vessel and reactor coolant system piping) were installed. In response to these deficiencies, TVA developed a Nuclear Performance Plan for Unit 1, which the NRC staff reviewed and found acceptable in 1989, as documented in Volume 4 of NUREG-1232 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML073512032). This plan was successfully implemented and subsequently, WBN Unit 1 received its full-power OL in early 1996. When TVA resumed construction, they focused their efforts on finishing WBN Unit 1 and deferred activities on WBN Unit 2. Because of this, the Supplemental Safety Evaluation Reports (SSERs) published after the NRC staff resumed the licensing review for Unit 1 did not contain conclusions involving Unit 2. Enclosure 1 provides a table of all SSERs. A complete licensing history of WBN Unit 2 is given in Enclosure 2.

## LICENSING PROCESS

All operating nuclear power plants in the United States were licensed under a two-step process described in 10 CFR Part 50 (Part 50). The licensing process under 10 CFR Part 50 has two review stages. First, an application is submitted for a CP that would authorize construction of the proposed facility. The focus of this stage of the NRC staff's review is on the preliminary design of the facility and on the suitability of the proposed site. The second stage of the staff's review involves the evaluation of an OL application in which the staff reviews the final design of the plant, verifies its construction, and inspects the testing, operations, and emergency preparedness (EP) aspects of the review. The initial CP for WBN Unit 2 was granted in 1973 under the Part 50 licensing process. When TVA informed the NRC of its plan to complete WBN Unit 2, they chose to proceed under the Part 50 licensing process.

### Establishment of Regulatory Framework for WBN Unit 2

On August 3, 2007, TVA informed the NRC of its plan to complete construction activities at WBN Unit 2 under the existing CP. In Staff Requirements Memorandum (SRM)-SECY-07-0096, "Staff Requirements—Possible Reactivation of Construction and Licensing Activities for the Watts Bar Nuclear Plant, Unit 2," dated July 25, 2007, the Commission directed the NRC staff to

employ the current licensing basis for Unit 1 as the reference basis for the licensing review of WBN Unit 2.

In 2008, the NRC staff developed Inspection Manual Chapter (IMC) 2517, "Watts Bar Unit 2 Construction Inspection Program," to provide overall inspection guidance specifically for WBN Unit 2. IMC 2517 provides guidance for planning, scheduling, and implementing inspections specified in IMC 2512, "Light Water Reactor Inspection Program - Construction Phase," and IMC 2513, "Light Water Reactor Inspection Program - Preoperational Testing and Operational Preparedness Phase." After the license is issued, IMC 2517 will remain in effect until commercial operation. This will encompass inspections of startup testing activities in accordance with IMC 2514, "Light Water Reactor Inspection Program Startup Testing Phase."

Also in 2008, the NRC staff developed a licensing process, documented in Office Instruction (OI) LIC-110, "Watts Bar Unit 2 License Application Review," that describes the NRC staff's approach to perform the OL review for WBN Unit 2. This licensing review process implements the direction given to the NRC staff by the Commission documented in SRM-SECY-07-0096. Since the implementation of this licensing review process, the NRC staff continued its review of the WBN Unit 2 OL review with SSER 21 (see Enclosure 1). The NRC staff developed an Action Items Table to provide a status of all the open items, confirmatory issues, and proposed license conditions starting in SSER 22 as Appendix HH.

On July 10, 2009, the NRC established the WBN Unit 2 Reactivation Assessment Group (WRAG) and its initial charter (ADAMS Accession No. ML091250168). The charter was last updated in 2012 (ADAMS Accession No. ML12163A406) and identifies WRAG members, who are led by division-level management from Region II and the Office of Nuclear Reactor Regulation (NRR). The WRAG has the responsibility to oversee the project completion and serves as the focal point for the status of the project and for coordination between the Region and Offices at Headquarters. The WRAG meets periodically and, at the appropriate time, will inform the Office Director of NRR and the Regional Administrator for Region II that activities discussed in NRR OI LIC-110 and NRC IMC 2517 have been successfully completed.

### CURRENT LICENSING ACTIVITIES

The NRC staff has provided the Commission with updates of the licensing activities for WBN Unit 2 since 2009, as documented in Information SECY papers SECY-09-0012, SECY-10-0015, SECY-10-0166, SECY-11-0102, SECY-12-0020, and SECY-12-0103. Since the last Information Paper on July 24, 2012, the NRC staff issued SSER 26, received a letter from the Federal Emergency Management Agency (FEMA) documenting its reasonable assurance finding, held ACRS subcommittee and full committee meetings, issued Supplement 2 to the WBN Unit 2 Final Environmental Statement (FES), resolved the last remaining contention about the FES, renewed the CP, resolved Generic Safety Issue (GSI)-191, "Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance," and renewed Special Nuclear Material License (SNM)-2014.

Regarding GSI-191, the NRC staff completed its review of TVA's response to Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors," dated September 13, 2004, as supplemented on May 17, 2012, based on the "clean plant" guidelines and methodology developed by the Nuclear Energy Institute. The NRC staff found TVA's results satisfactory as noted in the

September 18, 2014, letter, to TVA at ADAMS Accession No. ML14163A658. In SRM-SECY-07-0096, the Commission had provided this GSI as an example where the unirradiated state of WBN Unit 2 would make it easier to resolve the issue prior to plant operation.

#### Licensing Activities Nearing Completion

The NRC staff is nearing completion of its safety review of TVA's Final Safety Analysis Report (FSAR). The next SSER to be issued is SSER 27 which will document the remaining Appendix HH open items related to the FSAR topics that will require confirmation, inspection verification, receipt of final technical specification (TS) information, or submission of additional information for the NRC staff's evaluation. TVA is addressing the remaining open issues as the construction progresses. SSER 27 will also capture specific topics of interest identified by the ACRS for its review. They include the NRC staff's evaluation of the hydrology analysis; GSI-191; the emergency raw cooling water system as part of General Design Criterion (GDC) 5, "Sharing of Structures, Systems, and Components," in Appendix A, "General Design Criteria for Nuclear Power Plants, to 10 CFR Part 50; use of Performance Analysis and Design Model (PAD) 4.0 code to model fuel thermal conductivity degradation; the as-built version of the fire protection report; and Eagle 21 process protection system communication tests. For both the hydrology and as-built fire protection report reviews, the NRC staff is waiting for information from TVA to complete these complex technical reviews. Timely submittals are necessary to allow the NRC staff to complete its safety review and to schedule upcoming ACRS meetings.

Regarding the NRC staff's review of the EP plan in SSER 22, the NRC staff had documented its review of the EP plan and concluded, subject to confirmatory items, that the EP plan provided an adequate basis for an acceptable state of onsite emergency preparedness and that there was reasonable assurance that adequate protective measures can and will be taken in a radiological emergency at either WBN Unit 1 or WBN Unit 2. One of these confirmatory items required TVA to provide the latest revision of the EP plan for the NRC staff to review any changes that had been made since the earlier SER was issued in February 2011. In addition, the final EP regulations issued in November 2011 added new regulatory requirements and amended others. On September 12, 2014, TVA submitted its final revision to the EP plan; the NRC staff will document its review of the changes in SSER 27.

Each license authorizing operation of a utilization facility includes TSs, which are required by 10 CFR 50.34. The Commission may include such additional TSs as the Commission finds appropriate. To be consistent with SRM-SECY-07-0096, the WBN Unit 2 TSs will be similar to the WBN Unit 1 TSs, but will take into account some design differences between the two units. The NRC staff is currently reviewing the latest revision to the TSs. The completion of the NRC staff's review of the TSs is based on the timely resolution by TVA of any technical issues identified by the NRC staff.

The NRC staff is addressing pre-1995 generic communications (i.e., bulletins, generic letters, and orders), including Three Mile Island Action Plan items, as part of the FSAR review. This effort is still in progress and includes evaluation of certain changes to the proposed TSs. With regard to post-1995 generic communications, the NRC staff has completed its review of TVA responses to all but two of the required generic communications. The first, NRC Bulletin 2012-01, "Design Vulnerability in Electric Power System," dated July 27, 2012, requested that information be provided describing how the protection scheme for Engineered

Safety Feature (ESF) buses is designed to detect and automatically respond to single-phase open-circuit conditions. The NRC staff is performing its review of TVA's responses to a Request for Additional Information, which will be documented in SSER 27.

The second, NRC Bulletin 2011-01, "Mitigating Strategies," dated May 11, 2011, required addressees to provide a comprehensive verification of their compliance with the regulatory requirements in 10 CFR 50.54(hh)(2) in light of the recent events at Japan's Fukushima Dai-ichi facility. In a letter dated July 18, 2011, TVA stated that it will respond to the bulletin in a way consistent with the response taken for WBN Unit 1 prior to licensing of Unit 2. In a safety evaluation dated April 23, 2012, the NRC staff verified that TVA provided the information requested in Bulletin 2011-01 and concluded that TVA has completed all of the requirements of the bulletin for WBN Unit 1. The NRC staff will review TVA's response for WBN Unit 2, which is expected in October 2014, and will take appropriate action should it deem that further regulatory action is necessary based on the ongoing evaluations of this event.

On March 12, 2012, the NRC issued orders to OL and CP holders requiring them to take actions that the NRC determined would provide a substantial increase in protection to public health and safety based on the events that occurred at the Fukushima Dai-ichi power plant in Japan. Of these three orders issued on March 12, 2012, two are applicable to the design of WBN Unit 2 (those regarding spent fuel pool instrumentation and mitigating strategies). The orders state that the holder of a CP must complete full implementation before issuance of an OL, and that the holder shall report to the Commission when full compliance is achieved. TVA is expected to submit its compliance letters for the two orders in October 2014. The NRC staff intends to issue its safety evaluation and perform inspections to document the NRC staff's review of the actions taken for WBN Unit 2.

Also on March 12, 2012, the NRC issued requests for information under 10 CFR 50.54(f) regarding Recommendations 2.1, 2.3, and 9.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident (ADAMS Accession No. ML112510271). The purpose of these 50.54(f) letters is to gather information for the NRC staff to determine whether further regulatory action is required. Because of the co-located nature of the site and the sharing of certain systems and facilities, the NRC staff intends to hold WBN Unit 2 to the same timelines that WBN Unit 1 has committed to in their responses. The NRC staff will review TVA's response and will take appropriate action should it deem that further regulatory action is necessary based on the ongoing evaluations of this event.

As part of its updated OL application, TVA submitted a supplement to its final environmental impact statement for the completion and operation of WBN Unit 2. The NRC staff completed its review and published Supplement 2 to the Final Environment Statement in May 2013 (Vols. 1 and 2 of Supplement 2 to NUREG-0498, ADAMS Accession No. ML13144A202). The NRC staff's recommendation related to environmental aspects of issuing the WBN Unit 2 OL is that the license should be issued as proposed. This recommendation is based on TVA's application, including the NRC's staff review of the original Final Environmental Statement (FES) OL from 1978; consultation with Federal, State, Tribal, and local agencies; the NRC staff's own independent review of information available since the preparation and publication of the 1978 FES OL; and assessments summarized in Supplement 2 to NUREG-0498, including consideration of public comments received on the draft Supplement FES. The NRC staff's FES (published in May 2013) for WBN Unit 2 stated that the updated Waste Confidence (now Continued Storage of Spent Nuclear Fuel) rule and supporting Generic Environmental Impact

Statement (GEIS) will provide the necessary NEPA analyses of waste-confidence-related human health and environmental issues and that if the results of the GEIS identify information that requires a supplement to the WBN Unit 2 FES, the NRC staff would perform any appropriate NEPA review before making a final licensing decision. The NRC staff is currently evaluating the implementation of the Continued Storage of Spent Nuclear Fuel rule that was approved by the Commission on August 26, 2014.

As part of its statutory responsibilities, ACRS reviews applications for CPs and facility OLs and advises the Commission on the hazards of proposed reactor facilities. The NRC staff presented the licensing and oversight status of the WBN project to the ACRS in a subcommittee meeting on June 4, 2013, and a full committee meeting on November 6, 2013. On November 26, 2013, the ACRS issued an interim letter requesting that the NRC staff prepare to discuss the following at the final ACRS meetings:

- NRC staff's evaluation of TVA's response to addressing GSI-191 at WBN Unit 2
- NRC staff's evaluation of TVA's demonstration that Model PAD 4.0 can handle thermal conductivity degradation
- NRC staff's evaluation of TVA's testing of the Eagle 21 communication system
- NRC staff's evaluation of how WBN Unit 2 meets GDC 5
- NRC staff's evaluation of the hydrology review
- NRC staff's evaluation of how TVA addressed fire-protection procedures related to operator manual actions

The NRC staff expects the upcoming subcommittee and full committee meetings to be the last ACRS meetings on the WBN Unit 2 OL application (see Enclosure 3). The NRC staff will request the ACRS to endorse the NRC's review of the OL application in the form of a letter to the Commission.

### OVERSIGHT ACTIVITIES

The NRC staff has developed customized approaches specifically for WBN Unit 2 for construction inspection, corrective-action programs, oversight of TVA's refurbishment program, and an ROP Transition plan. These programs are tailored to ensure that the WBN Unit 2 site is constructed in accordance with regulations and that NRC oversight is maintained during the licensing process and as WBN Unit 2 transitions to commercial operation.

#### Construction Inspection Program

To address the unique history of WBN Unit 2, a customized construction inspection program was created. New inspection guidance, IMC 2517, was developed to (1) provide the policies and requirements for the WBN Unit 2 construction inspection program during that unit's resumption of construction after an approximately 20-year suspension of construction activities, and (2) establish a record of the inspection activities, applicant actions, and technical issues

resolved to support the decision for issuing an OL. IMCs 2512, 2513, and 2514 are being used as written.

In addition to the inspection procedures contained in the above IMCs, the NRC staff recognized that other areas needed to be considered for inspection at WBN Unit 2. These areas included generic communications, corrective-action programs (CAPs), special programs (SPs), cyber security, historical inspection open items, construction deficiency reports, items identified during licensing reviews, allegations, and refurbishment activities. The NRC staff screened generic communications, inspection open items and allegations to determine which items warranted further inspections. To allow tracking and monitoring of construction inspection items for WBN Unit 2, the NRC staff developed the Inspection Planning and Scheduling (IP&S) database. This database included the inspection procedures from IMC 2512 and the items from the other areas mentioned above.

As of September 15, 2014, 430 IP&S items have been completed and closed. The majority of the remaining 120 open IP&S items have been inspected at least once and the inspectors are waiting on either additional information or completion of field activities before closing. Inspections for many of the construction-related programs (such as engineering and design control, corrective actions, and quality assurance) have been completed. Some of the inspection areas that remain open include fire protection, as-built verifications, and instrumentation and controls.

The inspections of preoperational testing (IMC 2513) and startup testing (IMC 2514) are being performed as specified in the applicable program requirements. As part of the inspection-scoping process specific to WBN Unit 2, Region II identified 86 separate inspections from IMC 2513 and 2514. These include the operational-preparedness inspections.

### Corrective-Action Programs

The NRC staff's corrective-action inspections include a continuing review of TVA's implementation of the CAPs and SPs to resolve concerns about the quality of construction at WBN in the 1970s and early 1980. The NRC staff has completed inspections for 18 CAPs and SPs. 11 open CAPs and SPs remain to be reviewed and closed. Each of these items has received some level of inspection; however, TVA must complete additional activities associated with these items before the NRC staff can complete their inspection.

### Construction Inspection Planning Activities

Region II is maintaining the inspection schedule by using the best information available about the remaining construction activities and the preoperational schedule. To ensure that inspectors are available to observe and review construction and preoperational test activities, Region II conducts routine communications with TVA to discuss the schedule and ensure that inspection needs are supported. In addition, more of the field verification inspections have been assigned to the resident inspectors, who have been flexible in meeting changes to TVA's construction schedule.

Region II conducted comprehensive planning for pre-operational testing inspections and assigned a team leader to oversee this effort. This has resulted in sufficient inspection resources being applied to allow observation and review of ongoing and completed construction

activities, as well as witnessing of preoperational testing activities. The inspection program implementation has largely moved from inspection of bulk construction activities to reviewing the individual IP&S open items, reviewing completion of individual plant systems, and reviewing the preoperational testing program.

Preoperational testing inspection, in accordance with IMC 2513, was completed for the open-vessel test involving verification of the emergency core-cooling system's capability to inject into the reactor vessel. Remaining preoperational testing activities include cold reactor coolant system pressurization testing, plant hot functional testing, containment leak-rate testing, and reactor protection system testing. NRC inspection activities will be coordinated to observe and review the results of each of these tests. Planning efforts for startup testing inspections specified in IMC 2514 are underway.

### Refurbishment Program

The refurbishment program was created by TVA to ensure that the design and licensing basis, including original equipment design specifications, would be met, given that most of the safety-related and quality-related equipment was installed during original construction.

The NRC staff reviewed TVA's refurbishment program and found the following: (1) TVA was refurbishing or replacing most active components and instruments; (2) TVA had determined the potential degradation mechanism for each category of components, along with any contributing environmental factors; (3) the acceptance criteria were developed from the licensing basis, design specifications, and vendor specifications; (4) the proposed inspections and testing included in the program could be expected to identify degradation; and (5) refurbishment activities would be in accordance with applicable vendor and design specifications or requirements. The NRC staff also found that TVA's proposed refurbishment plan provides adequate guidance and objectives for the development of implementing procedures. The NRC staff concluded that the TVA refurbishment program, if properly implemented, will provide reasonable assurance that the equipment will meet its design criteria and perform its intended function.

Inspection guidance specific to the WBN Unit 2 refurbishment program was developed by the NRC staff and issued as Inspection Procedure (IP) 37002, "Construction Refurbishment Process - Watts Bar Unit 2," on February 5, 2010. Region II has been inspecting refurbishment activities since the IP was issued. Both active and passive components were included in these inspections. One area the inspectors focused on was TVA's inspection of piping and their identification of any piping degradation. Although the inspection objectives of IP 37002 were satisfied and the IP was closed, construction inspections to review refurbishment activities continue. For example, inspecting the installation of a new pressure transmitter under the IP 52053, "Instrument Components and Systems - Work Observation," would also cover a refurbishment activity that replaced the originally installed transmitter.

### Force-on-Force (FoF) Performance Inspections

NRC-conducted Force-on-Force (FoF) performance inspections typically do not have a direct bearing on a licensing decision for a power reactor. In the case of WBN Unit 2 licensing, the security posture for WBN Unit 2 will be merged with that of WBN Unit 1, and the NRC-conducted FoF inspections for both units will occur during the regular inspection cycle.



The verification of effective integration of the site's protective strategy to incorporate protection of WBN Unit 2 will be accomplished before unit operation by NRC regional inspectors observing and evaluating a licensee-conducted FoF exercise to demonstrate that the protective strategy can defend against the attributes of the design-basis threat.

### Cyber Security Implementation

In April 2011, WBN Unit 2 submitted a cyber security plan and associated implementation schedule which were reviewed and approved by staff and incorporated into the licensing basis. The licensee's implementation schedule for WBN Unit 2 requires full cyber security program implementation (completion of Milestones 1 through 8) before startup, with the exception of two systems common to operation of WBN Unit 1 and 2. Based on insights gained during inspection of the WBN cyber security program for Milestones 1 through 7, staff anticipates that WBN Unit 2 may be challenged to fully implement cyber security controls in accordance with its implementation schedule, as approved. TVA plans to submit an update to its implementation schedule for WBN Unit 2 to revise commitments regarding timing of cyber security control full implementation (i.e., Milestone 8) in October 2014. The NRC staff will review any revised commitments to ensure compliance with 10 CFR 73.54, "Protection of Digital Computer and Communication Systems and Networks" and 10 CFR 73.55, "Requirements for Physical Protection of Licensed Activities in Nuclear Power Reactors Against Radiological Sabotage." WBN Unit 1, which shares cyber security program elements with WBN Unit 2, has requested to delay full cyber security program implementation until June 30, 2016, which is after WBN Unit 2's anticipated startup date. This request is currently under review by the NRC staff.

### Reactor Oversight Process Transition

The overall approach for transitioning WBN Unit 2 to the ROP will be in accordance with the guidance contained in IMC 2517. Construction inspection, assessment, and enforcement under IMC 2517 will apply to WBN Unit 2 through the implementation of the IMC 2514 inspection program. Should an OL be issued, the NRC staff will also conduct the IMC 2515 baseline inspection program. The successful completion of these inspection programs will provide reasonable assurance that each cornerstone of safety is ready to be monitored under the ROP. The transition of WBN Unit 2 to the ROP will be a phased approach on an individual cornerstone basis. It is expected that the Emergency Preparedness, Security, and Radiation Protection cornerstones will be transitioned to the ROP at the time the OL is issued because these programs are already established for WBN Unit 1 and immediately applicable to WBN Unit 2. The transition of the remaining three cornerstones (Mitigating Systems, Barrier Integrity, and Initiating Events) will occur after the startup test program is completed and commercial operation begins. The ROP transition plan will outline the inspection details, including the duration of augmented inspection required until all Performance Indicators are determined to be valid.

### FUTURE ACTIONS AND MILESTONES

On September 9, 2014, the Atomic Safety and Licensing Board issued an order denying the only pending contention and terminated the adjudicatory proceeding related to WBN Unit 2, noting that, in accordance with 10 CFR 2.341(b), any petition for review of its Memorandum and Order must be filed within twenty-five days after it was served.

In accordance with the Commission's regulations and policies, the NRC staff plans to request needed authority to issue the OL for WBN Unit 2 at the appropriate time. To do so, the NRC staff will submit a Commission Notation Vote Paper after TVA's construction of the plant and the NRC's review of the operating license application are substantially complete. The NRC staff estimates that the Commission Notation Vote Paper will be submitted between 30 to 60 days before the NRC staff forecasts that the final decision on issuance of the WBN Unit 2 OL could be made.

A number of key activities will occur concurrent with or after submission of the Commission Notation Vote Paper. These activities include: a letter by ACRS to the Commission providing its views of the staff's review of the OL application, a letter by TVA certifying its readiness for fuel load, and a report from the Region II Administrator to the Office Director of NRR of a status of construction inspection activities. The latter report will provide significant inspection insights, inspection items that remain open, and the Region II Administrator's recommendations regarding issuance of an OL. Should the Commission grant the authority, the Office Director of NRR will require this final information before making a finding that the requirements of 10 CFR 50.57 have been met and therefore issue the OL.

Should it receive an OL, TVA plans to load fuel between April and June of 2015 to support commercial operation of WBN Unit 2 by December 2015. Currently, the NRC expects to make an OL decision between April and June of 2015, which would be consistent with TVA's request for issuance. NRC's issuance of the OL is contingent on TVA providing the NRC staff with sufficient detailed information required to complete the NRC staff's review. TVA could load fuel immediately after receiving the OL, at which point startup testing and associated NRC inspections would be performed to verify all safety requirements are met before commercial operation.

Enclosure 3 provides a pictorial depiction of future activities and milestones, along with the expected periods for accomplishment. The representation of these activities and milestones should not be taken as any predisposition of findings or conclusions by the NRC staff.

## OUTREACH

Since 2007, the NRC has held over 100 public meetings across various topics including the environmental review, technical issues in the safety review, and construction inspection performance assessment. In addition, the WRAG held several Category 1 and 3 public meetings near the site.

At the WRAG public meetings, TVA provides the status of construction activities, and the NRC describes the status of the licensing and inspection program at WBN Unit 2. Current technical topics are also routinely discussed. The NRC staff provides the public time to ask questions about and comment on the WBN Unit 2 construction project. Typically about a dozen members of the public attend these meetings and actively participate. Members of the media have also attended these meetings. The last meeting took place on April 9, 2014, in Athens, TN. The next meeting is planned for October 1, 2014.

In addition to public meetings, the NRC staff uses the agency's social media tools, such as the NRC blog and twitter account, to enhance public participation and awareness of the WBN Unit 2 project.

Information about the NRC's licensing and oversight activities related to WBN Unit 2 is available to the public at <http://www.nrc.gov/info-finder/reactor/wb/watts-bar.html>.

COORDINATION

The Office of the General Counsel has reviewed this paper and has no legal objection. The Office of the Chief Financial Officer has reviewed this paper for resource implications and has no objections.

Daniel H. Dorman, Acting Director  
Office of Nuclear Reactor Regulation

Enclosures:

1. Supplemental Safety  
Evaluation Reports (SSERs) to Date
2. Watts Bar Nuclear Plant Unit 2 History
3. Watts Bar Nuclear Plant Unit 2  
Licensing Timeline

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**ADAMS Accession Nos.: SECY Paper: ML14238A672**

\*via email \*\*via phone

OFFICE	NRR/LPL2-2	NRR/LPL2-2/PM	NRR/LPL2-2/LA	NRR/LWBP/BC	NRR/DLR*	NRR/DIRS*	NRR/DE*	NRR/JLD*	NRR/DRA*
NAME	JDion	JPoole	BClayton	JQuichocho	JLubinski (SWeerakkody for)	SMorris (AHowe for)	PHiland	JDavis	JGitter
DATE	8/27/14	8/28/14	8/27/14	8/28/14	9/15/14	9/15/14	9/15/14	9/11/14	9/16/17
OFFICE	NRO**	NSIR*	NMSS/FCSS/D*	R-II/RA*	TechEditor*	NRR/DORL/D (A)	OGC - NLO	NRR/D	
NAME	GTracy (JMonninger for)	JWiggins	MBailey (ABlamey for)	VMcCree	CHsu	LLund	DRoth	DDorman	
DATE	9/15/14	9/15/14	9/15/14	9/19/14	9/17/14	9/8/14	9/22/14	9/29/14	

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Supplemental Safety Evaluation Reports (SSERs) to Date

<b>Supplemental Safety Evaluation Report (Number of the Supplement to NUREG-0847)</b>	<b>Agencywide Documents Access and Management System Accession No.</b>	<b>WBN Unit to Which the SSER is Primarily Applicable</b>	<b>Publication Date</b>
<a href="#">Supplement 26</a>	ML13205A136	Unit 2	June 2013
<a href="#">Supplement 25</a>	ML12011A024	Unit 2	December 2011
<a href="#">Supplement 24</a>	ML11277A148	Unit 2	September 2011
<a href="#">Supplement 23</a>	ML11206A499	Unit 2	July 2011
<a href="#">Supplement 22</a>	ML110390197	Unit 2	February 2011
<a href="#">Supplement 21</a>	ML090570741	Unit 2	February 2009
<a href="#">Supplement 20</a>	ML072060498	Unit 1, full power license	February 1996
<a href="#">Supplement 19</a>	ML070530539	Unit 1, low power license	November 1995
<a href="#">Supplement 18</a>	ML070530364	Unit 1	October 1995
<a href="#">Supplement 17</a>	ML072060496	Unit 1	October 1995
<a href="#">Supplement 16</a>	ML072060493	Unit 1	September 1995
<a href="#">Supplement 15</a>	ML072060488	Unit 1	June 1995
<a href="#">Supplement 14</a>	ML072060486	Unit 1	December 1994
<a href="#">Supplement 13</a>	ML072060484	Unit 1	April 1994
<a href="#">Supplement 12</a>	ML072060479	Unit 1	October 1993
<a href="#">Supplement 11</a>	ML072060476	Unit 1	April 1993
<a href="#">Supplement 10</a>	ML072060473	Unit 1	October 1992
<a href="#">Supplement 9</a>	ML072060469	Unit 1	June 1992
<a href="#">Supplement 8</a>	ML072060478	Unit 1	January 1992
<a href="#">Supplement 7</a>	ML072060471	Unit 1	September 1991
<a href="#">Supplement 6</a>	ML072060464	Unit 1	April 1991
<a href="#">Supplement 5</a>	ML072060527	Unit 1	November 1990
<a href="#">Supplement 4</a>	ML072060524	Unit 1 and Unit 2	March 1985
<a href="#">Supplement 3</a>	ML072060520	Unit 1 and Unit 2	January 1985
<a href="#">Supplement 2</a>	ML072060518	Unit 1 and Unit 2	January 1984
<a href="#">Supplement 1</a>	ML072060500	Unit 1 and Unit 2	September 1982
<a href="#">Initial Report</a>	ML072060490	Unit 1 and Unit 2	June 1982

## Watts Bar Nuclear Plant Unit 2 History

Watts Bar Nuclear Plant (WBN) Units 1 and 2 have a unique licensing history and regulatory framework. The Tennessee Valley Authority (TVA) received a construction permit (CP) for each unit in 1973 under Part 50, "Domestic Licensing of Production and Utilization Facilities," of Title 10, "Energy," of the *Code of Federal Regulations* (10 CFR). Construction proceeded until 1985, when WBN Unit 1 was thought to be essentially complete and nearly ready to receive an operating license (OL), as documented in the initial revision of NUREG-0847, "Safety Evaluation Report Related to the Operation of WBN, Units 1 and 2," and in its Supplements 1 through 4. As a consequence of the identification of a large number of deficiencies shortly before the WBN Unit 1 license was expected to be issued, the U.S. Nuclear Regulatory Commission (NRC) sent a letter to TVA on September 17, 1985, requesting information under 10 CFR 50.54(f) on TVA's plans to address the deficiencies for its operating and construction activities at WBN and at TVA's other nuclear facilities. In response to this letter, TVA developed a Nuclear Performance Plan (NPP) to address corporate and site-specific issues, establishing programs to address a wide variety of material, design, and programmatic deficiencies.

TVA suspended construction of all nuclear facilities under construction in 1985 with major structures at WBN in place and with equipment such as reactor coolant system piping installed. The NRC staff reviewed components of the NPP for WBN Unit 1 and, as documented in NUREG-1232, Volume 4, "Safety Evaluation Report on Tennessee Valley Authority: Watts Bar Nuclear Performance Plan, Watts Bar Unit 1," the NRC staff endorsed the general approaches of various corrective actions. The NRC staff determined that when implemented thoroughly, the proposed corrective actions should address the identified deficiencies for Unit 1; however, no conclusions were stated for WBN Unit 2. Satisfactory resolution of NPP topics for WBN Unit 1 were documented in the later supplements to NUREG-0847, with Supplement 19 supporting issuance of the low-power license for WBN Unit 1 in November 1995 and Supplement 20 supporting issuance of the full-power license for WBN Unit 1 in February 1996.

On October 13, 1999, TVA filed a request for extension of the completion date for WBN Unit 2. Subsequently, by letter dated July 14, 2000, TVA informed the NRC that WBN Unit 2 meets the NRC's definition for deferred nuclear plant units as described in the Commission's Policy Statement on Deferred Plants, as published in the *Federal Register* at 52 FR 38077 (dated October 14, 1987). On October 24, 2000, the NRC issued an order extending the Unit 2 construction permit (CP) to December 31, 2010, as published in the *Federal Register* at 65 FR 60225. On March 6, 2008, as supplemented May 8, 2008, TVA requested an extension to the WBN Unit 2 CP. On July 7, 2008, the NRC issued an order extending the Unit 2 CP to March 31, 2013 (at 73 FR 39995, dated July 11, 2008). On May 17, 2012, TVA requested that the NRC extend the CP to September 30, 2016. The NRC staff reviewed the submittal and performed an environmental assessment, which was issued in October 2013. In November 2013, the NRC staff issued an order to extend the CP to 2016.

The NRC used Inspection Manual Chapter (IMC) 2512, "Light Water Reactor Inspection Program - Construction Phase," to ensure that WBN Unit 1 was constructed in accordance with NRC-approved design and construction standards. In 1985, the NRC had completed its initial IMC 2512 inspection program for the construction of WBN Unit 1. However, the initial WBN inspection program was found to have some weaknesses, which were identified and corrected after the construction inspection program was completed for Unit 1 but before the facility was

licensed. Because of the complexity of the rework activities under the NPP, the NRC implemented a “reconstitution” of the construction inspection program to verify that construction-related inspections conducted after 1985 met the requirements of the IMC 2512 program. The results of this program were published in NUREG-1528, “Reconstitution of the Manual Chapter 2512 Construction Inspection Program for Watts Bar Unit 1” (Agencywide Documents Access and Management System (ADAMS) Accession No. ML073450842). The NRC staff had completed a substantial number of IMC 2512 inspections for WBN Unit 2 at the same time; however, TVA suspended WBN Unit 2 construction before the inspection program was completed, and the NRC staff then suspended its licensing and inspection activities.

TVA informed the NRC in a November 14, 2006, letter of its intent to perform a study of the feasibility of completing WBN Unit 2, with the goal of producing power from the reactor in 2013. Based on the results of this study, on August 3, 2007, TVA notified the Director of the Office of Nuclear Reactor Regulation (NRR) of its intention to complete construction activities at WBN Unit 2. TVA indicated that it planned to resume unrestricted construction activities under the existing CP. TVA also indicated that it would align the licensing and design bases of both units to the fullest extent practicable and that it would complete WBN Unit 2 in compliance with applicable regulations promulgated before and after the issuance of the Unit 1 OL.

In addition, the WBN Unit 2 licensing and design bases incorporated modifications made to WBN Unit 1, as well as those modifications captured in the WBN Unit 1 five-year plan. TVA believed that this alignment of the licensing and design bases for WBN Units 1 and 2 ensured operational fidelity between the units and demonstrated that WBN Unit 2 complied with applicable NRC regulatory requirements.

TVA submitted Site Security Plan changes which have been reviewed and accepted by the NRC staff. In accordance with a Memorandum of Understanding (MOU) between the NRC and Department of Homeland Security (DHS) which establishes a process to implement the provisions of Section 657 of the Energy Policy Act of 2005, the NRC staff consulted with DHS during August 2008 concerning the potential vulnerabilities of the location of the proposed facility to terrorist attack. The NRC staff reviewed of the DHS Consultation Report and determined that there were no issues of concern.

In accordance with an MOU between the Federal Emergency Management Agency (FEMA) and the NRC (Appendix A, “Memorandum of Understanding Between Federal Emergency Management Agency and Nuclear Regulatory Commission,” to 44 CFR Part 353, “Fee for Services in Support, Review, and Approval of State and Local Government or Licensee Radiological Emergency Plans and Preparedness”), the NRC staff also followed up with the FEMA to confirm that their findings and determinations regarding offsite preparedness documented in SSER 22 remained valid. FEMA responded by letter on August 28, 2014, stating their continued finding of reasonable assurance that appropriate measures can and will be taken to protect the health and safety of the general public in the event of a radiological event. FEMA identified the successful WBN Unit 1 full-participation biennial exercises conducted in October 2011 and October 2013 as a basis, in part, for its continued finding of reasonable assurance. As such, the exercise requirement for the WBN site in Appendix E, “Emergency Planning and Preparedness for Production and Utilization Facilities,” to 10 CFR Part 50 was met with the issuance of the operating license for WBN Unit 1. As such, another

exercise will not be needed before WBN Unit 2 licensing and TVA will proceed with the normal biennial exercise schedule.

On January 29, 2008, with the latest update being January 30, 2014, TVA submitted a regulatory framework document to cite key correspondence and describe open issues or commitments that need to be resolved to obtain an OL for WBN Unit 2.

To be consistent with Commission direction in a Staff Requirements Memorandum dated July 25, 2007 (ADAMS Accession No. ML072060688), the NRC staff used the current licensing basis for Unit 1 as the reference basis for the review and licensing of Unit 2. Significant changes to this licensing approach were allowed where the existing backfit rule would be met or, as necessary, to support dual-unit operation. In accordance with the Commission's direction, the NRC expected TVA to review any exemptions, reliefs, and other actions that were specifically granted for Unit 1 to determine whether the same allowances were appropriate for Unit 2 and to submit such requests to the NRC for review and approval as necessary. The NRC staff encouraged TVA to adopt updated standards for Unit 2 where doing so would not significantly detract from design and operational consistency between Units 1 and 2. The NRC also expected TVA to look for opportunities to resolve issues such as generic safety issues which the unirradiated state of Unit 2 makes easier to resolve before plant operation. The Commission also directed the NRC staff to reissue a notice about the opportunity for a hearing on WBN Unit 2.

TVA submitted a Final Supplemental Environmental Impact statement supporting completion of WBN Unit 2 on February 15, 2008. On January 27, 2009, in response to NRC's request for additional information, TVA provided the Severe Accident Management Alternatives (SAMA) analysis report for WBN Unit 2. On October 14, 2010, TVA submitted a new SAMA analysis that supersedes the previous submittals. The NRC prepared a Supplement Final Environmental Statement based on this submittal and other information following the process outlined in LIC-203, "Procedural Guidance for Preparing Environmental Assessments and Considering Environmental Issues." This supplement was published as a draft for comment and announced with a notice in the *Federal Register* (at 76 FR 70169) on November 10, 2011. The NRC staff held a public meeting on December 8, 2011, to provide the local public the opportunity to provide comments. During this meeting several members of the public requested an extension of the period to submit written comments. The NRC staff granted an extension and moved the closure of the comment period from December 27, 2011, to January 24, 2012. The NRC staff evaluated and developed responses to the written and verbal comments received. The final version of Supplement 2 to NUREG-0498 (ADAMS Accession Nos. ML13144A092 and ML13144A093) was published in May 2013.

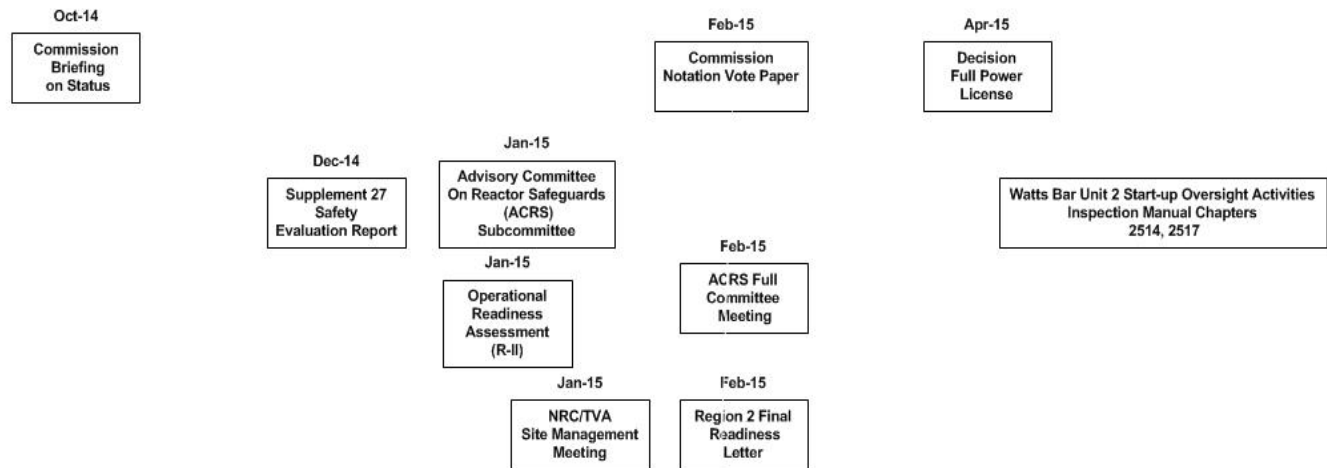
Early in the process, the NRC staff conducted public outreach meetings in the vicinity of the site on December 4, 2007, and December 11, 2008, to inform the public about NRC's licensing and inspection activities, including how they can monitor and participate in the licensing process. As part of the assessment process, public meetings are held on an annual basis to inform the public of the NRC's assessment results of TVA's performance in completing the construction of WBN Unit 2. The first meeting was held April 14, 2009, with subsequent meetings held on April 20, 2010; April 28, 2011; April 12, 2012; April 16, 2013; and April 9, 2014.



TVA originally expected to complete Unit 2 by April 2012 based on its initial detailed scoping, estimating, and planning study completed and approved by the TVA Board of Directors in 2007. However, in a press release dated April 5, 2012, TVA announced the findings of a 7-month construction review at WBN Unit 2, detailing cost and time estimates to complete the facility. In this announcement, TVA stated that the emerging estimate to complete Unit 2 would require additional funding of \$1.5 billion to \$2 billion and estimated completion between September and December of 2015. As part of its rationale for the cost and delay, TVA management stated that “walk downs to support the initial estimate were not completed. Management was misaligned, and planning was poor.” In its revised time and cost estimates, TVA stated that it has “added contingency and an allowance for addressing Fukushima impacts.” As a result of the delay in the project schedule, on May 17, 2012, TVA submitted a request to extend the expiration date of the construction permit from March 31, 2012, to September 30, 2016. On August 23, 2012, TVA submitted their request to renew the special nuclear material license (under 10 CFR Part 70, “Domestic Licensing of Special Nuclear Material,” and 10 CFR 2.109, “Effect of Timely Renewal Application”) for 3 more years, which would allow TVA to continue storing the fresh fuel assemblies during the construction of (and OL application process for) WBN Unit 2. The NRC completed its review of this information and granted TVA’s request for both an extension on the expiration of the CP and a renewal of TVA’s special nuclear material license. The CP was extended on November 21, 2013, while the renewed special nuclear material license was issued on July 24, 2014.



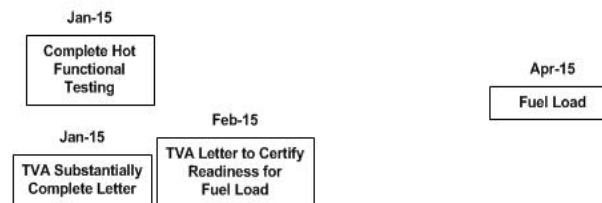
**NRC Milestones**



Reviews, Hearings, and Briefings Supporting Operating License Issuance

Oversight Prior to Commercial Operation

**TVA Milestones**



**Watts Bar Nuclear Plant Unit 2 Licensing Timeline**  
**U.S. Nuclear Regulatory Commission**  
**Office of Nuclear Reactor Regulation**

*As of September 18, 2014*  
*Dates are subject to change*