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**WATTS BAR NUCLEAR UNITS 1 AND 2
LICENSE RENEWAL
FINAL SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT
Rhea County, Tennessee**

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CHAPTER 1 PURPOSE AND NEED FOR ACTION

1.1 DECISION TO BE MADE

The Tennessee Valley Authority (TVA) must decide whether to submit an application to the U.S. Nuclear Regulatory Commission (NRC) to renew the operating licenses of Watts Bar Nuclear Plant (WBN) Units 1 and 2 for an additional 20 years beyond their current license expiration dates. TVA has prepared this Supplemental Environmental Assessment (SEA) to inform TVA decision-makers, cooperating agencies, and the public of the potential environmental impacts associated with the Proposed Action and to support TVA's decision-making under the National Environmental Policy Act (NEPA).

This SEA has been prepared in accordance with NEPA (42 United States Code [U.S.C.] § 4321 et seq.); TVA's NEPA regulations (18 Code of Federal Regulations [CFR] Part 1318); the Fiscal Responsibility Act of 2023 (Public Law 118-5 - June 3, 2023); and associated guidance from various federal and state agencies. The SEA will also be provided to NRC for their consideration. Accordingly, the SEA is prepared consistent with NRC *Regulatory Guide 4.2, Supplement 1, Revision 2, Preparation of Environmental Reports for Nuclear Power Plant License Renewal Applications* (August 2024) (NRC 2024a), to ensure all required information is addressed. TVA conducted a new and significant review and incorporated, where appropriate, information from NRC's 2024 *Generic Environmental Impact Statement (GEIS) for License Renewal of Nuclear Plants* (2024 NRC GEIS) (NRC 2024b) by reference as appropriate for resources for which additional analysis is not necessary (see Section 1.5.1).

1.2 PURPOSE AND NEED

TVA is the largest producer of public power in the United States (U.S.). Based on current forecasting and power system planning models, TVA anticipates energy growth of about 1.0 percent per year and peak (demand) growth of about 0.6 percent per year over the next 10 years (TVA 2025b). TVA has a legal obligation to meet this demand while maintaining low-cost, reliable power for consumers in the power service area. The TVA Act requires power be sold at rates as low as feasible, and TVA's ability to provide safe, reliable, and cost-effective electricity supports regional economic development, industrial recruitment, and stable power costs for homes and businesses.

Consistent with, and as mandated by the Energy Policy Act of 1992, TVA engages in a long-range, "least-cost planning" process that "evaluates the full range of existing and incremental resources (including new power supplies, energy conservation and efficiency, and renewable energy resources) to provide adequate and reliable service to electric customers of [TVA] at the lowest system cost" (16 U.S.C. § 831m-1(b)(1)). TVA engages in this least-cost planning through development of the Integrated Resource Plan (IRP).

The current NRC operating licenses for WBN Unit 1 will expire on February 7, 2036, and WBN Unit 2 on October 21, 2055. WBN provides baseload generation that supports forecasted system needs, as outlined in TVA's 2026 IRP, by helping to maintain grid stability and generating capacity for TVA's generation portfolio mix (TVA 2026). In 2024, WBN produced approximately 12 percent of TVA's total power supply.

Additionally, under agreement with the U.S. Department of Energy (DOE), WBN supplies tritium to DOE for national security purposes. In 2001 and 2017, TVA filed an application with NRC to amend the WBN Unit 1 and Unit 2 operating licenses to allow irradiation of tritium-producing burnable absorber rods (TPBARs) in the reactor cores. The maximum number of TPBARs to be produced at WBN has varied with TVA applying for an NRC license amendment and conducting a separate NEPA review each time.

The purpose and need for the proposed action is to enable TVA to consider extending the current term of the nuclear power plant operating licensing to continue 1) operation for future system generation needs and 2) tritium production for DOE.

Unless there are findings in the safety review required by the Atomic Energy Act or the NEPA environmental review that would lead the NRC to reject a license renewal application, the NRC does not have a role in the energy-planning decisions about whether a particular nuclear power plant should continue to operate. Renewal of the current operating license would allow WBN Units 1 and 2 to continue supplying approximately 2,300 megawatts (MW) electric (MWe) of safe, clean, reliable, and cost-effective baseload generation for an additional 20 years beyond their current license terms, thereby supporting TVA's statutory responsibility to provide low-cost, dependable power to the Tennessee Valley region.

1.3 BACKGROUND

TVA operates WBN Units 1 and 2, in Rhea County, Tennessee, consistent with its broad responsibilities for the natural and social well-being of the Tennessee Valley region as charged under the TVA Act of 1933. WBN occupies approximately 995 acres (herein referred to as the WBN site) of a 1,770-acre TVA-managed tract on the northern end of Chickamauga Reservoir about 8 miles from Spring City, Tennessee. It is adjacent to the TVA Watts Bar Dam Reservation, at Tennessee River Mile (TRM) 528 on the western shore of Chickamauga Reservoir. WBN consists of two Westinghouse pressurized water reactors (PWRs) and associated turbine generators that collectively supply approximately 2,300 MWe power to the TVA transmission and distribution system. Producing approximately 1,150 MW per unit, WBN typically generates nearly 19,000 gigawatt hours per year, or enough to power 1.3 million homes. WBN Unit 1 began commercial operation in May 1996 followed by Unit 2 in October 2016.

1.3.1 General Plant Information

The plant—designed, built, and operated by TVA—consists of several major structures located on the WBN site: two reactor buildings, a turbine building, an auxiliary building, a control building, a service and office building, power stores building, diesel generator buildings, an intake pumping station, two natural draft cooling towers and an independent spent fuel storage installation (ISFSI). **Figure 1-1** shows the general features of the facility and the WBN site boundary.

1.3.1.1 Reactor and Containment Systems

Each WBN unit is a four-loop PWR Nuclear Steam Supply System furnished by Westinghouse Electric Corporation. Each unit contains a reactor core composed of 193 fuel assemblies and 57 control rod assemblies (Silver-Indium-Cadmium [Ag-In-Cd]). Each fuel assembly consists of 264 fuel rods arranged in a structured grid configuration. The fuel rods are supported at intervals by grid assemblies that maintain proper lateral spacing. The fuel rods consist of slightly enriched uranium dioxide, ceramic cylindrical pellets contained in Zircaloy-4 or Optimized ZIRLO[™] tubing which is plugged and seal welded at the ends to encapsulate the fuel pellets. All fuel rods are pressurized with helium during fabrication to reduce stress and strain, which serves to increase fatigue life. The maximum enrichment of uranium fuel used at WBN is less than 5 percent by weight of uranium-235 (U-235), consistent with NRC regulatory limits. Current fuel enrichment levels also remain below 5 percent U-235. The core average enrichment is determined by the amount of fissionable material required to provide the desired core lifetime and energy requirements.



Figure 1-1. WBN Site Layout

WBN is limited by Westinghouse licensed methodology and the safety analysis to a maximum fuel rod burn-up of 62 gigawatt-days per metric tons of uranium (GWD/MTU). Recent cycles have operated with maximum peak rod fuel burn-up significantly less than this limit (<53 GWD/MTU). An approximate peak pellet exposure, as determined using an average maximum node burn-up, is 57 GWD/MTU. Fuel is reloaded approximately every 18 months at WBN. During each refueling outage, approximately 45 percent of the core is replaced with about 90 fresh (feed) fuel assemblies, while the remaining assemblies are reinserted based on their burnup and performance characteristics.

The containment for the reactor consists of a free-standing steel vessel with an ice condenser and separate reinforced concrete shield building. The free-standing steel vessel and the concrete shield building were designed by TVA and the ice condenser was designed and furnished by the Westinghouse Electric Corporation. The reactor containment is designed to retain fission products and minimize the quantities released to the atmosphere using a pressurized water, closed-cycle reactor. The containment systems and their engineered safeguards are designed to ensure that offsite doses resulting from postulated design-basis events are well below the guidelines in 10 CFR 50.67 and 10 CFR 100.

WBN units are licensed for a thermal power output of 3,459 megawatts thermal (MWt). The corresponding electrical output varies depending on operational conditions and turbine-generator efficiency but is approximately one-third of the thermal output, or around 1,200 MWe.

1.3.1.2 Cooling and Auxiliary Water Systems

The Chickamauga Reservoir (Tennessee River) is the primary cooling water source waterbody for WBN. The reservoir covers a surface area of about 36,050 acres and has a volume of approximately 628,000 acre-feet. Average daily flow past WBN is 27,500 cubic feet per second (cfs). The reservoir extends from

Chickamauga Hydroelectric Dam at TRM 471 approximately 58.9 river miles upstream to Watts Bar Hydroelectric Dam (WBH) at TRM 529.9 and 32 miles up the Hiwassee River.

The Intake Pumping Station (IPS) houses the Essential Raw Cooling Water (ERCW) and Raw Cooling Water (RCW) systems and is located about 1.9 miles below WBH at TRM 528.0 in the tailwater of WBH and inflow zone of Chickamauga Reservoir. The IPS has two sump areas, each with two intake openings fitted with two vertical traveling water screens (total of four screens). Each traveling screen is 4 foot (ft) wide and the height of the water column passing through the screens ranges from 29 ft in the summer to 25 ft in the winter, due to the fluctuations in the pool elevation for Chickamauga Reservoir. The traveling screens have a fractional open area of 0.503 (50.3 percent open area). The open area through the trash racks at each bay opening in the IPS is approximately 95.1 square feet (ft²), for a total of 380 ft² open for the passage of water through the trash racks. The water flows through the trash racks, then through the traveling screens, where it subsequently enters the sump areas within the IPS.

The ERCW system provides the essential auxiliary support functions to the engineered safety features of the plant. The system is designed to provide a continuous flow of cooling water to those systems and components necessary to plant safety either during normal operation or under accident conditions. The system consists of eight essential raw cooling water pumps (four per train), four traveling screens, four traveling screen wash pumps, and four strainers located in the IPS. The IPS is located approximately 800 ft from the reservoir at the end of the plant intake channel which provides direct communication with the main river channel. Water for the ERCW system enters two separate sump areas of the pumping station through four traveling water screens, two for each sump, and two diver protection barriers, one for each sump. Four ERCW pumping units, on the same plant train, take suction from one of the sumps, and four more on the opposite plant train take suction from the other sump. Two paths are available for water discharge from the ERCW system. The normal path is to the cooling tower basins of the condenser circulating water (CCW) system for use as makeup for evaporative losses. The alternate path is to the yard holding pond through yard ERCW standpipes and an ERCW overflow box. Typical operation for two units would have two ERCW pumps operating in each sump. As such, the practical design intake flow for the ERCW system is 43,200 gallons per minute (gpm; 62.2 million gallons per day [mgd]).

The RCW system provides cooling water to the turbine generator auxiliary equipment and miscellaneous equipment in the turbine building. It also serves as a non-qualified source of cooling water for the ice condenser system. It provides cooling water to nonessential air conditioning equipment in the auxiliary building. It serves as a source of water to fill and pressurize the raw service water and as a source of makeup water to the CCW system. The RCW system also serves to keep the fire header pressurized to minimize water hammer if the high-pressure fire pump starts. The RCW system is a non-safety related, shared system. Water is supplied by eight electric motor driven pumps located in the plant IPS. Maximum normal system flow requirements for the two WBN units provided by the combination of six of the eight RCW pumps located in the IPS. Water is supplied to the Turbine Building through two sectional legs of a single loop header. The RCW discharge from the heat exchangers and coolers located in the Turbine Building is directed to the cold water outlet flumes of the CCW cooling towers. This RCW discharge serves as a portion of the makeup water to the CCW system. Since the flow through major components within the RCW system is varied by temperature control valves, the total system flow is decreased in the winter when the river temperature decreases. Subsequently, fewer than six pumps operate and less flow is available for CCW cooling tower makeup water. Therefore, to enable the RCW system to be utilized to the fullest extent as a makeup source to the CCW system, a bypass line with modulating valve is provided from the RCW supply to RCW discharge headers. This line permits that portion of the RCW system flow in excess of the RCW component requirements to bypass the Turbine Building and serve as additional makeup water to the

CCW system on demand. While total design pumping capacity for the RCW system is 35,945 gpm (51.8 mgd), the practical design intake flow (six pumps) is 30,810 gpm (44.4 mgd).

WBN also operates a supplemental condenser cooling water (SCCW) diversion structure located in the forebay of Watts Bar Reservoir, constructed contemporaneously with WBH to initially supply cooling water to the Watts Bar Fossil Plant (WBF) (which was retired in 1982 and demolished in 2011). The SCCW system supplies water from the Watts Bar Reservoir to provide a source of cooler water to the cooling tower discharge flumes. WBN connected to the piping from this structure in July 1999 to provide SCCW via passive diversion to the WBN cooling water system. Watts Bar Reservoir covers a surface area of about 39,090 acres with a storage capacity of approximately 1.1 million acre-ft. The reservoir extends from WBH at TRM 529.9 approximately 72.4 river miles upstream to Ft. Loudoun Hydroelectric Dam at TRM 602.3, to Melton Hill Hydroelectric Dam located about 23 miles up the Clinch River, and about 12 miles up the Emory River near Harriman, TN. Average daily flow through WBH is 27,500 cfs. Flow into the SCCW system is not measured, but is estimated based on the dimensions of system components and calculations based on water levels or plant operations. Losses due to evaporation are also estimated.

The IPS intake and SCCW diversion structure also obtain cooling water from two physically distinct and separate source waterbodies (Chickamauga and Watts Bar Reservoirs). Debris and fish drawn into the IPS intake and SCCW structure are collected by vertical traveling screen units. A spray wash system cleans the screens removing debris and fish that drop into a water-filled trough located in front of the screens. The debris/fish trough for the IPS intake leads to a collection basket in the Yard Holding Pond, and for the SCCW structure the trough routes through WBH and exits in the dam tailwater (Chickamauga Reservoir) via a sluice located at elevation 673 ft.

The CCW system provides cooling water for the dissipation of waste heat for the power generation. The CCW system includes the pumping station, circulating water pumps, circulating water conduits, yard holding pond, main condensers, two hyperbolic natural draft cooling towers, desilting basin, and the supplemental CCW system. Two cooling towers, one for each unit, dissipate waste heat from the plant. Each tower is 354 feet in diameter and 478 feet high (TVA 1972). The CCW pumping station is located in the yard between the turbine building and the cooling towers. There are eight circulating water pumps. Four pumps for each unit operate in parallel and circulate water from the cooling tower cold water basin, through the condenser, and back into the heat exchanger section of the cooling tower. The CCW system provides a design flow of approximately 410,000 gpm to the main condenser.

Cooling tower blowdown water is taken from each cooling tower's discharge flume and released to the reservoir through multiport diffusers. The blowdown rate depends on the water level in the flume and is managed based on river flow, which must be at least 3,500 cfs for continuous discharge. If river flow drops below 3,500 cfs, as measured at Watts Bar Dam, blowdown is diverted to the yard holding pond for temporary storage to prevent violation of thermal or chemical discharge standards. Once river flow returns to acceptable levels, blowdown and the water stored in the yard holding pond are discharged to the river. The diffuser system ensures proper dilution and compliance with effluent standards during all operating conditions.

1.3.1.3 Radioactive Waste Management

The waste processing system provides the equipment necessary for controlled treatment, and preparation for retention or disposal of the liquid, gaseous, and solid wastes produced as a result of reactor operation.

The liquid waste system collects, processes, and recycles reactor grade water, removes or concentrates radioactive constituents and processes them until suitable for release or shipment offsite. The blowdown

from the CCW is used to dilute and dispense liquid low-level radioactive wastes (LLRW). The LLRW system is described in further detail in Updated Final Safety Analysis Report (UFSAR) Section 11.2.

The gaseous waste processing system (GWPS) removes fission product gases from the reactor coolant and also collects the gases generated from the boron recycle evaporator. The waste processing systems, including both liquid and gas, are designed to ensure that the quantities of radioactive releases from the total plant to the surrounding environment would not exceed the 10 CFR 20 limits and are as low as reasonably achievable (ALARA). The GWPS system is described in further detail in UFSAR Section 11.3.

Solid radwaste produced at WBN includes dry active waste and wet active waste, which are products of plant operation and maintenance, as well as slurries and other solid radwaste (including resin waste). All solid radwaste is prepared for shipment or for temporary onsite storage in compliance with the requirements in 10 CFR 61, 10 CFR 71, and 49 CFR 171, 172, 173, 177, and 178. Solid wastes are processed by the Solid Waste System which is located in a seismic Category I structure. The waste packaging area, divided into three sections by thick concrete walls, is composed of the mobile demineralizer area, an area for high-level storage, and an area for dry active LLRW. Radiological monitoring is provided for the waste packaging area (TVA 2021). The complete description of the solid radioactive waste system is described in further detail in UFSAR Section 11.5.

The liquid, gaseous, and solid waste systems are described further in Section 3.11 of this SEA.

1.3.1.4 Nonradioactive Waste Management

TVA expects that during the period of extended operation WBN would continue to generate types and quantities of nonradioactive wastes similar to those generated during current and past operations. The nonradioactive waste management system receives and processes non-radiological wastes including hazardous, non-hazardous, universal, and sanitary wastes. Wastes are managed in accordance with applicable federal and state regulations as implemented through corporate procedures. Nonradioactive waste management is described in more detail in Section 3.12 of this SEA.

1.3.1.5 Power Transmission System

TVA is the owner and operator of the transmission lines (TLs) that connect WBN to the transmission grid. The in-scope TLs are completely within the WBN protected area boundary and not accessible to the public. Each WBN unit is connected into the TVA 500-kilovolt (kV) transmission system by three 500-kV transmission lines via an onsite 500-kV switchyard. The 500-kV switchyard receives the output of Units 1 and 2 and delivers it to the 500-kV system network for transmission to system loads. Offsite electrical power supplies Class 1E circuits through the 161-kV system via Common Station Service Transformers. The primaries of the unit station service transformers are connected to the isolated-phase bus at a point between the generator terminals and the low-voltage connection of the main transformers. During normal operation, station auxiliary power is taken from the main generator through the unit station service transformers and from the 161-kV system through the common station service transformers. Continued operation of WBN would not require transmission system upgrades during the proposed period of extended operation. The in-scope TLs at WBN are shown in (Figure 1-2).

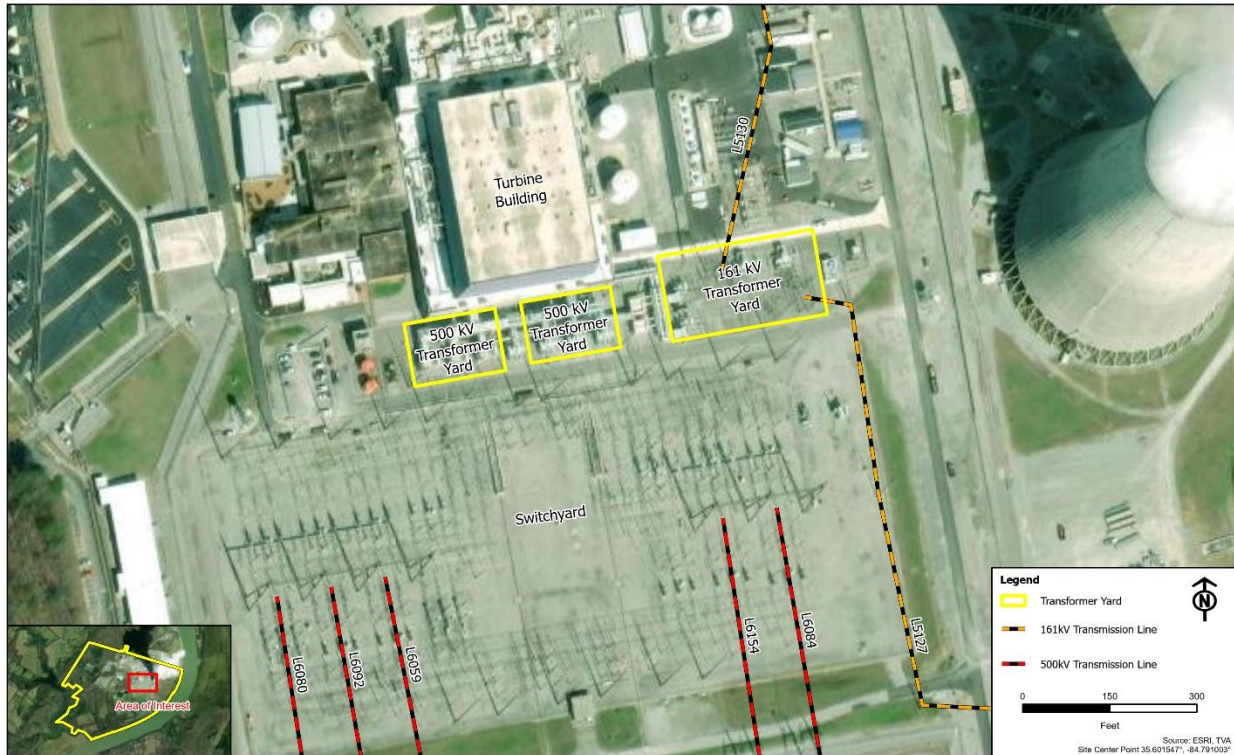


Figure 1-2. WBN In-Scope Transmission Lines

1.3.2 Refurbishment Activities

In 2022, a new building was constructed to store Steam Generators that had been replaced. There are no known plans for refurbishment activities or modifications beyond normal maintenance at WBN Unit 1 or Unit 2 associated with license renewal. However, there may be regular maintenance or upgrade projects in the vicinity of WBN in the future which would receive appropriate environmental reviews as applicable.

TVA may consider pursuing extended operating cycles (24-month cycles) and potential power uprates at WBN in the future. These changes could necessitate the use of high burn-up fuel, or fuel enriched above 5 percent U-235, which exceeds the current licensing basis. Should TVA decide to pursue such changes, they would be subject to a separate and appropriate NRC licensing process, including all required safety and environmental reviews, in accordance with applicable regulatory requirements.

TVA has no immediate plans for refurbishments that would significantly change the amount of activated or contaminated equipment that would need to be disposed of at decommissioning. However, reactor pressure vessel head replacements and/or steam generator replacements may become necessary at some point in the future. Although such replacements would increase the amount of radioactive equipment disposal, they are common in the industry and are not considered unreasonable. There are currently no reactor pressure vessel head or steam generator replacements planned.

In the future, it is likely that the ISFSI would need to be expanded as described in Section 3.12.1.4. There is adequate space onsite to accommodate ISFSI expansion. However, the ISFSI is covered under a separate license, and any expansions would require separate environmental reviews.

1.3.3 Programs and Activities for Managing the Effects of Aging

Changes to power plant operations, inspections, maintenance activities, systems, and administrative control procedures designed to manage the effects of aging during the license renewal term will be

described in the body of the WBN UFSAR (TVA 2021) and associated Appendices, as required by 10 CFR Part 54. Implementing such aging management activities during the license renewal term would not substantially alter previously reviewed environmental impacts from WBN.

1.3.4 Employment

WBN supports a permanent, full-time onsite workforce of 1,171 TVA employees and contractors responsible for operations, maintenance, engineering, security, and administrative functions. Periodically engineering, supply chain, and other employees supplement and support WBN functions. Approximately 80 percent of these workers reside in Hamilton, Knox, Loudon, Megis, McMinn, Rhea, and Roane counties in Tennessee with the remaining workers living within a 50-mile radius of WBN (NRC 2013a). Based on current labor force estimates, the WBN workforce represents approximately 8.5 percent of employed persons in Rhea County and about 0.55 percent of employed persons when Hamilton, Meigs, and Rhea counties are considered collectively.

Refueling outages are conducted periodically for each unit to replace fuel assemblies and perform inspections, maintenance, and testing activities. Refueling and maintenance outages for WBN are on an 18-month cycle. Refueling outages last approximately 28-45 days with an additional 900 temporary contract workers onsite. License renewal is not expected to substantially alter plant operations. Therefore, TVA does not anticipate changes in onsite staffing associated with surveillance, monitoring, inspections, testing, trending, or recordkeeping during the license renewal term.

1.4 RELATED ENVIRONMENTAL REVIEWS AND DOCUMENTATION

Related environmental documents and materials were reviewed concerning this assessment and are listed in **Appendix B**. The contents of these documents help describe the affected properties and are incorporated by reference as appropriate.

TVA conducted a new and significant review to identify which resources are adequately addressed and do not need to be carried forward for analysis in this SEA. Information from the 2024 NRC GEIS is incorporated by reference as appropriate for resources for which additional analysis is not necessary, and the previous analysis for the Proposed Action is incorporated for those resources by reference as appropriate. **Appendix D** describes the new and significant review process.

1.5 NECESSARY PERMITS, LICENSES, OR CONSULTATIONS

TVA currently holds and would continue to maintain all applicable permits, licenses, and approvals for operation of WBN. **Appendix E**, Table 1 provides a list of current permits and licenses that would be maintained throughout the proposed period of extended operation. **Appendix E**, Table 2 provides a list of the other federal environmental regulations and guidance potentially relevant to plant activities.

TVA anticipates maintaining and/or seeking required permits or authorizations as appropriate, from the following governmental entities: NRC; U.S. Army Corps of Engineers (USACE); U.S. Environmental Protection Agency (USEPA); Tennessee Department of Environment and Conservation (TDEC); U.S. Fish and Wildlife Service (USFWS); Tennessee State Historic Preservation Officer (SHPO); and Tribal Historic Preservation Officers. TVA anticipates consulting with the required authorities in order to adhere to compliance with federal laws and regulations, including, but not limited to: the Endangered Species Act (ESA); Bald and Golden Eagle Protection Act (BGEPA); Migratory Bird Treaty Act (MBTA); National Historic Preservation Act (NHPA); Clean Air Act (CAA); and Clean Water Act (CWA).

Regulatory requirements must be addressed by this environmental document. **Appendix E**, Table 3 states each regulatory requirement associated with license renewal and which section in this SEA they are addressed.

1.6 PUBLIC INVOLVEMENT

A draft of the SEA was released for public review and comment on May 29, 2026. The availability of the Draft SEA and request for comments was posted on TVA's website and published in The Herald News, the newspaper which serves the Rhea County area. TVA's agency involvement included notification of the availability of the Draft SEA to local, state, and federal agencies and federally recognized tribes. Comments were accepted through June 30, 2026, via TVA's website, mail, and e-mail.

TVA received two comment submissions: one comment letter from a member of the public submitted via TVA's website and one comment letter from TDEC. TVA carefully reviewed the eight distinct comments received in these comment letters. Substantive comments raised during the comment period are summarized in Appendix L. Non-substantive or out-of-scope comments not specific to the NEPA analysis were not addressed in the Final SEA. A copy of each of the comment letters is included in Appendix L.

CHAPTER 2 ALTERNATIVES

2.1 DESCRIPTION OF ALTERNATIVES

In the 2026 IRP, TVA used an integrated, least-cost framework that considered multiple views of the future to determine how potential power generation resource portfolios could perform in different market and external conditions (TVA 2026). TVA has identified two alternatives for consideration in this SEA, the No Action Alternative and the Proposed Action of license renewal of WBN Units 1 and 2 to continue to supply approximately 3,900 MWe of baseload power generation through 2056.

2.1.1 Alternative A – The No Action Alternative

The No Action Alternative (Alternative A) would be the WBN Units 1 and 2 operating licenses not being renewed. Under Alternative A, the current WBN operating licenses would expire and the units shut down at the end of their term, February 7, 2036, and October 21, 2055, respectively.

Under the No Action Alternative, TVA would need to replace lost generation capacity with an alternative generating portfolio of resources that would together add up to compensate for a lost baseload resource. In Fiscal Year 2024, WBN provided approximately 12 percent of TVA's total power supply. Therefore, unless replacement generating capacity is provided as part of the No-Action Alternative, approximately 2,300 MWe of baseload generation would no longer be available to meet TVA's electricity customers' needs, and the alternative would not satisfy the project's purpose and need. Thus, the No-Action Alternative has two components, decommissioning of WBN and replacement generation. TVA would replace lost generation capacity with an alternative generating portfolio of resources. Under the No Action Alternative WBN would no longer be able to provide tritium to the DOE unless an alternative were identified. Therefore, selection of the No Action Alternative would require TVA and/or DOE to identify alternative sources of tritium.

2.1.1.1 Alternative Generation

Alternative generating technologies were evaluated to identify a combination of candidate technologies that would be capable of replacing the WBN total net baseload capacity when the WBN licenses expire. For this alternatives analysis, TVA assumed that the region of interest (ROI) within which facilities would be sited includes the entire TVA power service area because it is too early to know where exactly the replacement generating assets would be constructed. It is also assumed that each new generating asset would have its own separate environmental review under NEPA. Further, TVA has limited the analysis of impacts from new generating plant technology alternatives in this SEA to the technologies it deems as reasonably likely to be commercially viable on a utility scale and operational by the time of license expiration.

Alternative generating capacity would need to be commercially viable on a utility scale and operational before the expiration of one of the nuclear operating licenses. Therefore, the alternative analysis was identified using a combination of the following power sources to meet the NRC criteria for reasonableness for replacement of nuclear generation during the proposed period of extended operation: natural gas-fired combined-cycle (CC) generation, natural gas-fired combustion turbine (CT) generation, solar, storage, and small modular reactors. While the precise mix cannot be predetermined, the impacts of a representative portfolio would be qualitatively assessed to provide a bounding comparison to the Proposed Action.

2.1.1.2 Decommissioning

If WBN Units 1 and 2 are shut down as required by the current licenses, they would then be required to enter the long-term process of decommissioning. TVA notes that decommissioning activities and their impacts are not discriminators between the Proposed Action and the No Action Alternative as WBN would have to be decommissioned regardless of the NRC decision on license renewal, which would only postpone decommissioning for another 20 years for each unit respectively. The impacts from

decommissioning a nuclear plant are evaluated in NRC's Decommissioning Generic Environmental Impact Statement (NRC 2002). The NRC had also established in NUREG-1437, Revision 2, that the timing of decommissioning operations does not substantially influence the environmental impacts of decommissioning (NRC 2024b). During decommissioning, WBN Units 1 and 2 (at the end of their respective licenses) would be placed in a safe condition and all fuel would be removed from the reactor. Once each WBN unit achieves safe shutdown conditions, the current work force supporting that unit would decline over a period of a few years to a minimal maintenance size.

Decommissioning activities would begin after the permanent and safe shutdown of both WBN units are achieved and after the formal decommissioning plans are approved by the NRC. TVA typically begins making future land-use decisions after NRC decommissioning plans are approved. During decommissioning, a new but smaller temporary work force would be employed to deconstruct the radioactive components and structures while stored radioactive waste would be shipped offsite for permanent disposal. Based on potential new land-use changes, the workforce would remove and clear any buildings, structures, facilities, impoundments, etc. that would not be part of the new land-use plans for the WBN site property. The goal of decommissioning would be to remove and appropriately dispose of all radioactive materials throughout the WBN facility and return the WBN site to a condition that no longer requires any control or oversight by the NRC. The ISFSI would continue to be regulated by NRC under its separate general license. The ISFSI would be operated as a separate facility until DOE takes responsibility for the spent fuel and removes it from the WBN site. Eventual decommissioning of the ISFSI would be conducted according to NRC and other applicable requirements.

2.1.2 Alternative B – WBN License Renewal

Under Alternative B, TVA would seek renewal of the WBN Units 1 and 2 operating licenses to allow for continued operation of both units for an additional 20 years beyond their current license expiration dates. Under Alternative B, TVA would submit Units 1 and 2 LRAs to NRC. Assuming NRC approves the LRA, WBN Unit 1 would be available as a reliable base load generation plant until midnight on February 7, 2056, and Unit 2 until October 21, 2075. Under Alternative B, WBN Unit 1 and 2's PWRs would continue to operate within the approved design basis and operational limits as allowed by the individual NRC licenses.

2.1.2.1 Description of the Proposed Action – WBN License Renewal

The WBN Unit 1 license currently expires on February 7, 2036, and Unit 2 on October 21, 2055. To continue to provide low-cost reliable power to the TVA grid, and tritium production for DOE, the Units 1 and 2 NRC licenses must be renewed. TVA plans to submit this LRA to the NRC by the end of 2026 requesting an additional 20 years of operation of WBN Units 1 and 2. With the receipt of license renewal from NRC, TVA proposes to maintain and operate WBN Unit 1 until 2056 and Unit 2 until 2075.

No major modifications, component replacements, or transmission upgrades have been identified as being required for WBN Unit 1 to operate until 2056 and Unit 2 to operate until 2075. Based on Electric Power Research Institute (EPRI) Report 1021115 (EPRI Life-Limiting Issues for Long-Term Operation of Nuclear Power Plants), plant improvements including intake structures, buried piping, and large external tanks would be expected for continued operation beyond 60 years (EPRI 2012).

2.1.2.2 Decommissioning

As described previously, decommissioning activities and their impacts are not discriminators between the Proposed Action and the No Action Alternative as WBN Units 1 and 2 would have to be decommissioned regardless of the NRC decision on license renewal, which would only postpone decommissioning for another 20 years. The characteristics of decommissioning as described in the No Action Alternative also apply to the Proposed Action Alternative.

2.1.3 Alternatives Considered but Eliminated from Further Discussion

As introduced in Section 2.1.1.1, alternative generating sources would be required to replace the baseload energy lost from WBN. However, not all alternative sources were considered. TVA has determined that alternatives that are not reasonable for replacement include renewable resources (other than solar), oil, coal, purchase power, demand-side management, and delayed retirement. Each of these was eliminated because they were not feasible due to either cost prohibitive reasons, local resource availability, lack of infrastructure, time prohibitions, and/or did not produce enough power to replace the baseload generating capacity. There are no alternatives other than those considered for energy replacement.

2.2 COMPARISON OF ALTERNATIVES

Table 2-1 below provides a summary of the potential environmental impacts of the Action and No Action Alternatives. As a general guide to the evaluation of impacts for this SEA, significance is used as a subjective interpretation of the intensity of the impact. With the exception of cultural resources and endangered species, TVA used the following terminology and definitions used by 2024 NRC GEIS and codified in footnotes to Table B-1 in Appendix B to Subpart A of 10 CFR Part 51 in assessing the significance of environmental impacts:

- **SMALL** – Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource. For the purpose of assessing radiological impacts, those impacts that do not exceed permissible levels in the Commission's regulations are small.
- **MODERATE** – Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
- **LARGE** – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

Consistent with the NRC guidance provided in 10 CFR Part 51, Appendix B to Subpart A, TVA has adopted the impact determinations described in Section 3.8 for historic and cultural resources. For federally protected species, TVA has used effects determinations developed in accordance with the ESA Section 7 guidance in assessing the significance of impacts, as discussed in Section 3.7.3.

Table 2-1. Summary and Comparison of Alternatives by Resource Area

Resource Area	Impacts From No Action Alternative	Impacts From Proposed Action Alternative
Land Use and Visual Resources	SMALL to LARGE	SMALL
Meteorology and Air Quality	SMALL to MODERATE	SMALL
Noise	SMALL to MODERATE	SMALL
Geologic Environment	SMALL to MODERATE	SMALL
Water Resources	SMALL to LARGE	SMALL
Ecological Resources	SMALL to MODERATE	SMALL
Threatened or Endangered Species ¹	NO EFFECT to NOT LIKELY TO ADVERSELY AFFECT	NO EFFECT to NOT LIKELY TO ADVERSELY AFFECT
Historic and Cultural Resources ²	NOT PRESENT to ADVERSE EFFECT	NO ADVERSE EFFECT
Socioeconomics	SMALL to MODERATE	SMALL
Human Health	SMALL	SMALL or UNCERTAIN
Waste Management	SMALL to MODERATE	SMALL
Greenhouse Gas Emissions and Climate Change	SMALL to MODERATE	SMALL
Uranium Fuel Cycle and Transportation	SMALL	SMALL
Postulated Accidents	N/A	SMALL

Resource Area	Impacts From No Action Alternative	Impacts From Proposed Action Alternative
Decommissioning Impact Evaluation	SMALL	SMALL

N/A = not applicable

¹ Effects on threatened or endangered species may be characterized as follows: (1) no effect, (2) not likely to affect, (3) likely to affect, (4) likely to jeopardize continued existence.

² Effects on historic properties may be characterized as follows: (1) no historic properties present, (2) historic properties are present, but not adversely affected, or (3) historic properties are adversely affected

2.3 IDENTIFICATION OF ROUTINE AND NON-ROUTINE MITIGATION MEASURES

Best management practices (BMPs) identified in Chapter 3 to avoid, minimize, or reduce adverse impacts to the environment from the preferred alternative are summarized below. WBN would continue operating within all applicable federal, state, and local regulations and no new construction or modifications to the facility would occur during the proposed period of extended operations. Therefore, no new mitigation measures would be required beyond those already implemented due to initial construction and operations.

- BMPs would continue to be implemented as described in A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities, Revision 4 – 2022 (TVA 2022a), stormwater pollution and Spill Prevention, Control, and Countermeasure plan, and other permit conditions.
- The Integrated Pollution Prevention Plan (IPPP) and Spill Response Plan that addresses storage, secondary containment, and inspections of fuel, hazardous materials, and chemicals, like biocides, would be maintained as described in the Environmental Compliance Manual (ECM-8) (TVA 2025c).
- The discharge to surface water would continue to be regulated by the conditions set forth in the National Pollutant Discharge Elimination System (NPDES) permit.
- Dredged material would be stockpiled on land above the 500-year flood elevation outside the floodplain.
- Flood-damageable equipment and facilities would be located at a minimum outside 100-year floodplains, and Critical Actions would be located at a minimum outside 500-year floodplains.
- All handling and disposal of non-radioactive and radioactive wastes would continue to be managed in accordance with applicable rules, regulations, and requirements of local, state, and federal laws; and existing WBN waste management procedures and general BMPs. Any radioactive wastes would be managed by TVA in accordance with 10 CFR Part 100 limits and WBN's implementing procedures.
- TVA would coordinate with the TVA River Forecast Center during any delivery operations.
- All excavation would be performed in accordance with digging permits, TVA-TSP-18.804, TVA Safety Manual Form 29205, and appropriate BMPs. TVA would obtain any necessary permits for excavation and grading (i.e. Construction Storm Water Permit, Aquatic Resource Alteration Permit, etc.)

2.4 THE PREFERRED ALTERNATIVE

TVA has identified *Alternative B – WBN Units 1 and 2 License Renewal* as the preferred alternative. Implementing the preferred alternative would provide the Tennessee Valley with an additional 20 years of reliable base load power while making beneficial use of existing assets and continuing to deliver power to TVA's service area at the lowest feasible cost consistent with the TVA Act. As an existing facility operating within its current WBN site boundary and design basis, continued operation under renewed licenses is not expected to result in new or significantly different environmental impacts beyond those previously evaluated. License renewal would contribute to meeting projected system demand and maintaining generation diversity and reliability within the TVA power system during the extended operating period.

CHAPTER 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter contains discussion of potential effects and environmental impacts of implementing the alternatives presented in Chapter 2. The sections in Chapter 3 identify the specific 2024 NRC GEIS issues that apply to WBN for each environmental resource area, and the existence of new and significant information (N&SI) for each is addressed.

3.1 REASONABLY FORESEEABLE FUTURE ACTIONS

Table 3-1 lists the cumulative effects issue and associated findings identified in the 2024 NRC GEIS. This issue was reviewed with respect to impacts associated with the WBN license renewal and any reasonably foreseeable future actions (RFFAs) at WBN or in the immediate vicinity.

Table 3-1. Cumulative Impacts Issues and the 2024 NRC GEIS Findings

Issue	GEIS Finding	Impact
Cumulative effects	(Category 2). Cumulative effects or impacts of continued operations and refurbishment associated with license renewal must be considered on a plant-specific basis. The effects depend on regional resource characteristics, the incremental resource-specific effects of license renewal, and the cumulative significance of other factors affecting the environmental resource.	SMALL

Source: (NRC 2024b)

Past, present, and RFFAs occurring in the vicinity of WBN that may result in a cumulative effect are generally covered in Section 1.3.2 (Refurbishment Activities). The most relevant RFFA is the likely future expansion of the ISFSI, for which there is adequate space onsite to accommodate. However, the ISFSI is covered under a separate license, and would require separate environmental reviews.

WBN is planning to construct a new building to produce ice for emergency cooling, which was evaluated under a separate environmental review. It would be constructed within a previously disturbed area and would use standard BMPs during construction.

No major modifications, component replacements, or transmission upgrades have been identified as being required for WBN license renewal. Additionally, TVA is not aware of any N&SI that would be relevant to an analysis of effects related to RFFAs. Therefore, RFFAs, including cumulative effects, would be SMALL and are not discussed further in this SEA.

3.2 LAND USE AND VISUAL RESOURCES

3.2.1 Affected Environment

3.2.1.1 Land Use

The WBN site is approximately 995 acres (403 hectares) (**Figure 1-1**). The WBN site lies entirely within an unincorporated area of Rhea County, Tennessee, approximately 13 kilometers (km; 8 miles) southeast of Spring City. The towns of Spring City and Dalton in Rhea County are zoned for commercial and residential land uses; however, unincorporated areas of Rhea County are not zoned for any particular land uses (NRC 2013a, SETD 2026). The WBN site is bounded by Chickamauga Reservoir, part of the Tennessee River, to the east and south. A rural road, Morrison Lane, and forested land, partially comprised of the Yellow Creek Wildlife Management Area, form the western border of the WBN site, while TN-68 (also known as Watts Bar Highway) forms the northern border.

Onsite Land Use

The WBN site contains structures to support two nuclear units, as described in Section 1.3.1 (**Figure 1-1**). The WBN site lies on the western shore of Chickamauga Reservoir on the Tennessee River at TRM 528. There are no active land leases within the WBN site.

There has been one change regarding onsite land use from previous descriptions of the area. In 2022, a new building was constructed to store steam generators that had been replaced. However, this type of onsite use is consistent with onsite land use described in the 2024 NRC GEIS.

Table 3-2 and **Figure 3-1** include the National Land Cover Database (NLCD) acreage estimates for land cover categories within the WBN site. The developable unused open portions of the WBN site, including fields and forest uplands, comprise 594 acres, or 60 percent of the WBN site, while nondevelopable wetlands and open waterbodies make up 51 acres, or 5 percent of the WBN site. The developed portions of the WBN site, including facilities, structures, parking, landscaped areas, and visitor and recreation areas, comprise 350 acres, or 35 percent of the WBN site. Aside from standard maintenance, no ground disturbing activities are anticipated during continued operation of WBN. TVA has not discovered new information that would make the issue of onsite land use of concern for license renewal.

Table 3-2. NLCD Land Cover Onsite and a 6-mile Radius from the WBN Property Boundary*

Land Use/land Cover Type	Onsite		6-mile Radius	
	Acreage	Percent of total (%)	Acreage	Percent of Total (%)
Deciduous Forest	304.12	30.58	24,262.29	33.52
Hay/ Pasture**	192.00	19.30	19,546.16	27
Developed, High Intensity	136.37	13.71	277.49	0.38
Developed, Medium Intensity	119.12	11.98	775.83	1.07
Developed, Low Intensity	58.92	5.92	1,976.71	2.73
Evergreen Forest	44.96	4.52	5,257.97	7.26
Mixed Forest	39.27	3.95	3,658.93	5.06
Developed, Open Space	34.64	3.48	2,705.90	3.74
Water	24.43	2.46	8,208.88	11.34
Woody Wetlands	21.15	2.13	793.68	1.1
Barren Land (Rock/Sand/Clay)	8.64	0.87	41.72	0.06
Emergent Herbaceous Wetlands	5.57	0.56	164.86	0.23
Shrub/Scrub	2.98	0.30	925.86	1.28
Herbaceous	2.50	0.25	2,707.98	3.74
Cultivated Crops	N/A	N/A	1,077.01	1.49
Total	994.66	100.00	72,381.27	100

Source: Land cover data from (NLCD/LULC 2021) (as shown in **Figure 3-1**).

*Land cover classifications are based on satellite data and may not represent actual ground conditions.

**No active or maintained hay or pasture fields occur on WBN site.

Offsite Land Use

In addition to activities onsite, offsite land use for TVA is generally restricted to use and maintenance of TVA transmission lines, which run outside a 6-mile radius of the WBN site in all directions (**Figure 1-1**). There have been no notable changes to the transmission lines since the last assessment has been conducted; however, TVA conducts routine maintenance along the transmission lines as needed. TVA has standard operating procedures for inspections, right-of-way (ROW) maintenance plans, modification plans, procedures, and protocols that are provided to all personnel conducting these activities. Most of the lines at WBN are on a 10-year inspection cycle. The exceptions are WBN HP-WBN NP No. 1 and No. 2 lines (L5130 and 5127), which are inspected annually and provide offsite power to the nuclear plant.

Table 3-2 includes the NLCD acreage estimates for land cover categories within a 6-mile radius of the WBN site. **Figure 3-1** also depicts the land cover within the 6-mile radius. Deciduous and evergreen forest, along with grass, shrub, and brush cover more than 50 percent of the area.

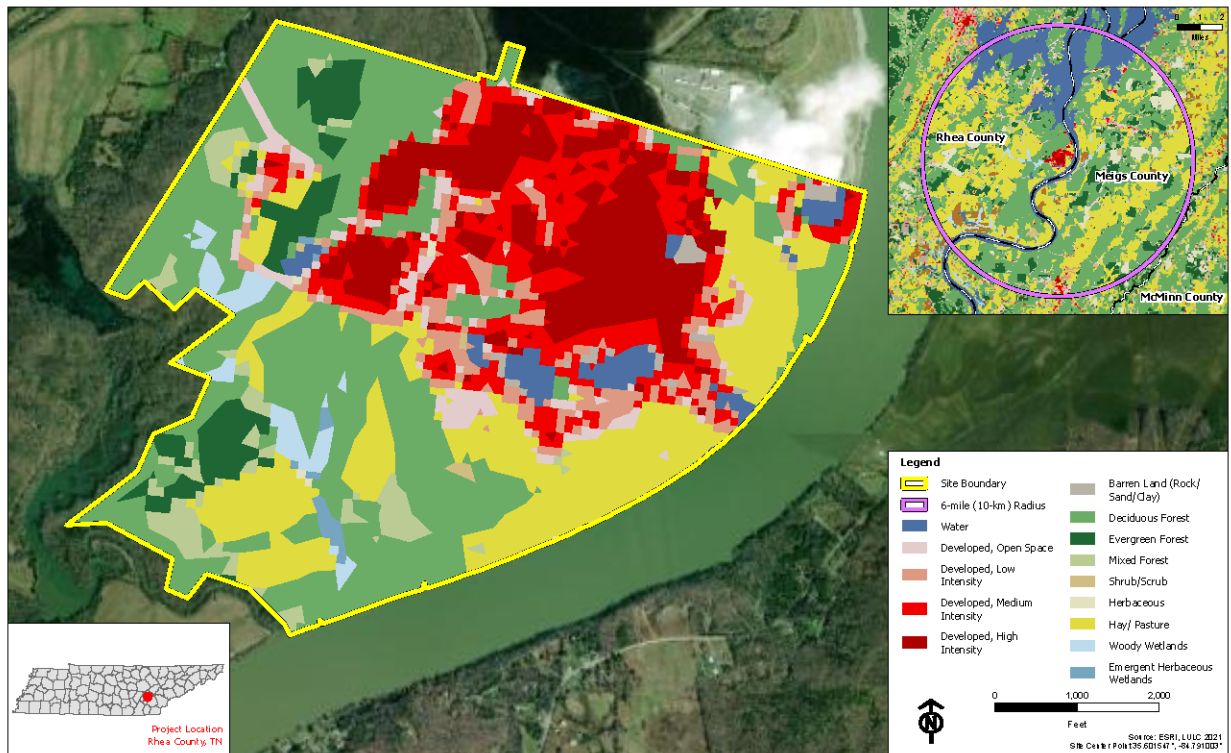


Figure 3-1. Land Cover within WBN Site and within 6-mile Radius of WBN (inset, upper right corner)

The land within a 6-mile radius of the WBN Site mostly is comprised of property from two Tennessee counties which are split by the Tennessee River: Rhea County, where the plant is located, to the west, and Meigs County, to the east (**Figure 3-1**). A very small portion of McMinn County falls within the east side of the boundary; however, as the portion is so small, it is not included in further descriptions of the area.

Multiple campgrounds and recreational areas are within Rhea County, especially near the water. There are also wildlife areas, such as Yellow Creek Wildlife Management Area to the west, and Yuchi Wildlife Refuge to the south. Farms and residential homes make up most of the buildings. The town of Decatur, Tennessee is to the east and Spring City to the west.

TVA owns and manages the Chickamauga Dam and Reservoir and Watts Bar Dam and Reservoir, along the Tennessee River, as well as several thousand acres of land around the two reservoirs (TVA 2004). TVA has comprehensive plans for the management of the public land around each reservoir (TVA 2009a).

3.2.1.2 Visual Resources

WBN is located in rural Rhea County, Tennessee, just south of State Route (SR) 68 between Spring City and Sweetwater. The topography surrounding the WBN site is moderately sloping and remains consistent along the valley floor between Walden Ridge and the eastern shore of the Tennessee River. Vegetation is mixed within the valley as the land use transitions from dense forestland along the eastern shore to agricultural lands to sparsely populated residential development to the east and north (TVA 2017).

The WBN site is adjacent to the former WBF site and Watts Bar Hydroelectric (WBH) Plant, where the existing landscape character is industrial. The predominant visual features of the WBN are the cooling towers for Unit 1 and 2, both of which are about 500-feet in height. There are also transmission lines onsite within the plant area that are not visible from outside of the WBN site. The 500-kv transmission lines streaming from the power production facilities and the natural-draft cooling towers are dominant elements within the foreground (0 to 0.5 mile from the observer) viewing distance. Recreational river users have prominent views of the cooling towers, transmission structures, and a few of the internal plant facilities as they rise from the western shore of the river near TRM 528. The cooling towers are also prominently visible from SR 68 near WBH dam. Shoreline and near shore residents to the north are generally not afforded views of plant structures and operations, as most are within the middle ground (0.5 miles to 4 miles from the observer) or background (4 miles and beyond) viewing distances. In general, the scenic attractiveness of the WBN site is minimal, and the scenic integrity is low to very low. There have been no changes to the visual appearance of WBN Units 1 and 2 since previous evaluation.

3.2.2 Environmental Consequences

Table 3-3 lists the land use and visual resources issues and findings identified in the 2024 NRC GEIS. Each of these issues was reviewed with respect to impacts associated with the WBN license renewal.

Table 3-3. Land Use and Visual Resource Issues, 2024 NRC GEIS Findings, and Environmental Impacts

Issue	GEIS Finding	Impact
Onsite land use	SMALL (Category 1). Changes in onsite land use from continued operations and refurbishment associated with license renewal would be a small fraction of the nuclear power plant site and would involve only land that is controlled by the licensee.	SMALL
Offsite land use	SMALL (Category 1). Offsite land use would not be affected by continued operations and refurbishment associated with license renewal.	SMALL
Offsite land use in transmission line rights of way (ROWs)	SMALL (Category 1). Use of transmission line ROWs from continued operations and refurbishment associated with license renewal would continue with no change in land use restrictions.	SMALL
Aesthetic impacts	SMALL (Category 1). No important changes to the visual appearance of plant structures or transmission lines are expected from continued operations and refurbishment associated with license renewal.	SMALL

Source: (NRC 2024b)

3.2.2.1 Land Use

Alternative A – The No Action Alternative

Under the No Action Alternative, operational impacts would not change, as land use would not change, only requiring maintenance operations. Decommissioning impacts to the WBN site would likely be SMALL. Overall impacts, including construction and operation of new generation facilities may be SMALL to LARGE, depending on the assets chosen. Some of the new assets could be sited on the WBN site, and some would be sited offsite. The level of impact anticipated during construction and operation would vary depending upon the type of land chosen (i.e., disturbed industrial, commercial, or agricultural lands).

Alternative B – WBN License Renewal

TVA evaluated each Category 1 issue related to land use and visual resources listed in **Table 3-3** for N&SI. No N&SI was identified. Industrial land use at nuclear plants is not expected to change appreciably until after decommissioning is completed. Similarly, land use activity within transmission line ROWs would continue with few, if any, changes in land use restrictions and easements. The NRC has found that license renewal and refurbishment activities had little or no effect on onsite land use, offsite land use, and offsite land use in transmission line ROWs (NRC 2024b). Therefore, TVA characterizes the environmental impacts

relating to land use and aesthetic impacts under license renewal as SMALL, in agreement with 2024 NRC GEIS finding.

3.2.2.2 Visual Resources

Impacts to visual resources are evaluated based on existing landscape character, distances of available views, sensitivity of viewing points, human perceptions of landscape beauty/sense of place (scenic attractiveness), and the degree of visual unity and wholeness of the natural landscape in the course of human alteration (scenic integrity).

Alternative A – The No Action Alternative

Under the No Action Alternative, operational impacts would not change, as no visual resources would be impacted. Decommissioning impacts at the WBN site would likely be SMALL, however, overall impacts, including construction and operation of new generation facilities may be SMALL to LARGE, depending on the assets. Some of the new generation assets could be sited on the WBN site, and some would be sited offsite. The level of impact anticipated during construction and operation would vary depending upon the location of the new generation facility and the visual buffers in place between the new generation and the viewpoints (i.e. hilly landscapes, other previously built buildings, etc.).

Alternative B – WBN License Renewal

License renewal environmental reviews have shown that nuclear power plants and transmission lines do not change in appearance over time, and thus aesthetic impacts are not anticipated (NRC 2024b). No physical changes are anticipated to WBN in association with the license renewal and any maintenance would have a minimal visual impact on neighboring residential areas and communities. Therefore, TVA characterizes the environmental impact to visual resources under license renewal as SMALL, in agreement with 2024 NRC GEIS findings.

3.3 METEOROLOGY AND AIR QUALITY

3.3.1 Affected Environment

3.3.1.1 Meteorology

Detailed meteorological analysis is provided in Section 2.3 of the WBN UFSAR (TVA 2021). No known long-term meteorological measurements other than rainfall have been recorded in the immediate vicinity of the WBN site. Therefore, the climatological appraisal of the WBN site has been developed from meteorological data collected at stations within 50 miles. Based on the onsite data, categories of atmospheric stability conditions, by Pasquill classification, have been developed and atmospheric diffusion characteristics have been predicted for the WBN site for use in accident analyses presented in the UFSAR for WBN (TVA 2021). A permanent onsite meteorological facility has been in operation since May 1973 per NRC requirements for the existence and operational use of such a facility at any nuclear plant site. Despite some variation in wind speeds and frequencies of various stability classes, the NRC determined that recent data from the WBN meteorological system indicate that current meteorological conditions are consistent with the meteorological conditions described in the 1978 FES-OL and the 1995 SFES-OL-1 (NRC 2013a). There are no limiting meteorological factors. Despite the low probability of tornado occurrence at the WBN site, the design of plant Seismic Category I structures includes consideration of the effects of a tornado having winds of 300 miles per hour (mph) rotational velocity plus 60 mph translational velocity and a 3-pounds per square inch pressure differential in 3 seconds (TVA 2021).

3.3.1.2 Air Quality

The WBN site is located in Rhea County, Tennessee, in the Eastern Tennessee-Southwestern Virginia Air Quality Control Region (40 CFR 81.57). This region generally includes counties to the north and east of

Rhea County, including Knox County (Knoxville). The area to the south of Rhea County, including Hamilton County (Chattanooga), is part of the Chattanooga Interstate Air Quality Control Region (40 CFR 81.42).

Under the CAA, the USEPA has established National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50) that specify maximum concentrations for six criteria pollutants: carbon monoxide (CO), particulate matter with aerodynamic diameters of 10 microns or less (PM10), particulate matter with aerodynamic diameters of 2.5 microns or less (PM2.5), ozone, sulfur dioxide (SO2), lead, and nitrogen dioxide. Areas of the United States that are and have historically been in compliance with the NAAQS are designated by the USEPA as attainment areas. Areas that violate federal air quality standards are designated by the USEPA as nonattainment areas. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are required to adhere to maintenance plans to ensure continued attainment. Rhea County, in which WBN is located, is in attainment area for all criteria pollutants.

However, within a 62-mile (100-km) radius of the WBN site, there are maintenance areas associated with Knoxville, Tennessee, to the northeast of the WBN site, and Chattanooga, Tennessee, to the south of the WBN site. Both areas achieved maintenance status for PM2.5 Annual (1997 Standard). Additionally, Knoxville achieved maintenance status for PM2.5 24 hour (hr; 2006 standard) and Ozone 8-hr (2008 standard) (USEPA 2026a) (**Figure 3-2**).

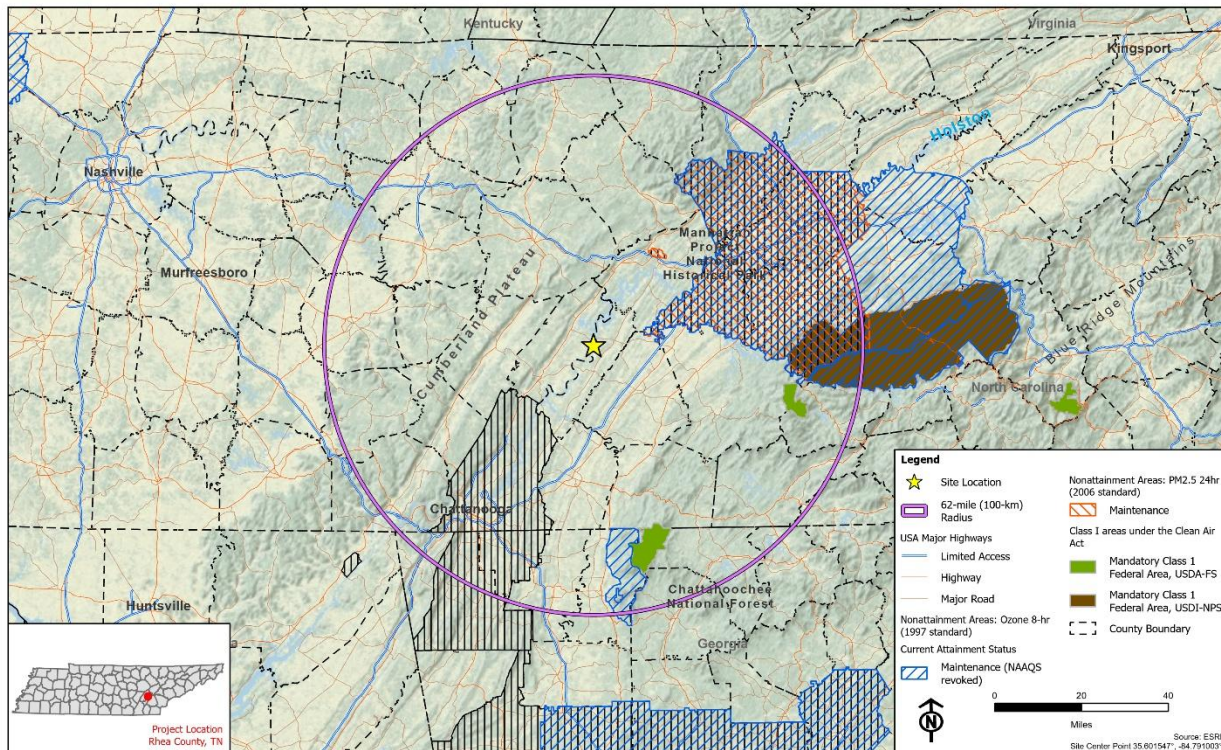


Figure 3-2. Maintenance and Class I Areas within a 62-mile Radius of WBN

The CAA, as amended, also established Mandatory Class I Federal Areas where visibility is an important issue. A Class I area exist within 62 miles of the WBN site, to the east over Great Smokey Mountains National Park (NPS 2026) (**Figure 3-2**).

The air emissions sources at WBN include the auxiliary boilers, the emergency diesel or propane fired generators, and miscellaneous sources such as fuel storage facilities. Air emissions from WBN are covered under the Conditional Major Operating Permit 482013 issued April 5, 2024, pursuant to the Tennessee Air

Quality Act and by the Technical Secretary, Tennessee Air Pollution Control Board, Department of Environment and Conservation. The permit expires September 1, 2033. No refurbishment activities are anticipated, and emissions estimates are not expected to change due to any new, proposed, modified, or replacement stationary sources.

WBN tracks monthly operating hours and outputs for all equipment on a 12-month rolling basis, including particulate matter (PM), SO₂, nitrogen oxide (NO_x); CO and volatile organic compounds (VOCs), as well as for hazardous air pollutants (HAPs) and greenhouse gases (GHG), which are measured using carbon dioxide (CO₂) equivalent (CO₂e). WBN does not monitor for the production of ozone and oxides of nitrogen. **Table 3-4** shows the annual estimated emissions based on the average annual hours of operation for the auxiliary boilers and diesel generators from calendar years (CY) 2016 to 2020. Sandblasting emissions are estimated based on a calculated hourly rate and 2,080 hours per year of operation. VOC emissions from surface coating are based on the average emissions from 2016-2020 from the monthly and yearly logs kept at WBN. NO_x emissions are the highest pollutant and averaged 16 tons per year. WBN would continue to keep all criteria pollutants below 99.9 tons per year.

Table 3-5 shows the most recent annual emissions for SO₂, NO_x and CO based on 12-month rolling annual emissions calculations at WBN as recorded for CY 2025. **Table 3-6** shows the most recent annual VOC and HAP emissions for various materials based on WBN monthly logs for CY 2025. HAPs are represented as a total, but include measurements for ethylbenzene, xylene, toluene, and naphthalene. TVA does not expect any increase or decrease of air emissions in the near future, nor are there any future upgrades or replacement activities necessary for station operations that would affect air emissions.

Table 3-4. WBN Annual Emissions (tons per year)

Source	PM	SO ₂	NO _x	CO	VOC	HAPs ^a	GHG (CO ₂ e)
Auxiliary Boilers (AB-1 & AB-2) ^b	1.93E-03	6.84E-02	1.93E-02	4.82E-03	1.93E-04	6.84E-05	21.6
Sandblasting Operation (SS-1) ^c	1.71	---	---	---	---	---	---
Surface Coating Op. (SS-2) ^d	---	---	---	---	4.26E-01	---	---
Diesel Generators DG-1 to DG-5	2.93E-01	2.12	13.5	3.57	3.44E-01	6.62E-03	688
Diesel Generator DG-6	3.16E-03	2.96E-03	4.50E-02	9.69E-03	3.67E-03	3.95E-05	1.67
Diesel Fire Pump FP-1	7.32E-03	6.84E-03	1.04E-01	2.24E-02	8.50E-03	9.14E-05	3.86
Diesel Generator DG-13	1.96E-03	1.84E-03	2.79E-02	6.01E-03	2.28E-03	2.45E-05	1.04
Propane Generator PG-1	7.76E-04	5.43E-05	2.16E-02	2.00E-02	1.29E-02	---	1.93
Propane Generator PG-2	5.12E-04	3.58E-05	1.42E-02	1.32E-02	8.50E-03	---	1.27
Diesel Generator DG-14	3.09E-03	9.26E-05	9.28E-02	5.36E-02	6.19E-03	9.62E-05	10.00
Diesel Generator DG-15	2.32E-03	6.94E-05	6.96E-02	4.02E-02	4.64E-03	7.21E-05	7.50
Diesel Generator DG-16	1.56E-04	4.20E-06	2.92E-03	2.71E-03	2.08E-04	1.07E-05	0.45
Diesel Generator DG-17	1.04E-04	2.80E-06	1.94E-03	1.81E-03	1.39E-04	7.16E-06	0.30
Diesel Generator DG-8	5.32E-04	1.64E-05	9.94E-03	9.23E-03	7.10E-04	4.20E-05	1.77
Diesel Generator DG-9	4.95E-04	1.57E-05	9.23E-03	8.57E-03	6.60E-04	4.01E-05	1.70
Diesel Generator DG-18 ^e	1.29E-01	1.49E-03	2.23	2.75	3.24E-01	1.53E-02	646
Total	2.15	2.20	16.1	6.51	1.14	0.0224	1,387.10

^a HAPs include Formaldehyde, POMs, Arsenic, Beryllium, Cadmium, Chromium, Lead, Manganese, Mercury, Nickel, Selenium

^b Annual estimates for auxiliary boilers and generators based on average annual hours of operation CY16 to CY20.

^c Sandblasting emissions based on calculated value of 1.64 pound/hr and 2,080 hr/year operation.

^d Surface coating emissions based on average VOC emissions CY16 to CY20.

^e Based on potential emissions for DG-18 because generator was under construction at time of estimation.

Table 3-5. WBN Emissions Recorded for CY 2025 (tons per year)

Source	SO ₂	NO _x	CO
Auxiliary Boilers (AB-1 & AB-2)	0.00E+00	0.00E+00	0.00E+00
Large Diesel Generators (DG-1 to DG-5, DG-7, & DG-12)	4.38E-01	2.78E+00	7.37E-01
Small Diesel Generators (DG-6, Diesel Fire Pump [FP] DG-8, DG-9, & DG-13)	3.69E-03	5.88E-02	1.47E-02
Propane Generators (P-1 & P-2)	1.12E-05	4.46E-03	4.14E-03
FLEX Generators (DG-14 FLEX1 & DG-15 FLEX2)	5.09E-05	4.76E-02	2.75E-02
AUX Generators (DG-16 AUX1 & DG-17 AUX2)	6.81E-06	3.97E-03	3.68E-03
Chiller (DG-18)	0.00E+00	0.00E+00	0.00E+00
Total	0.442	2.89	0.787

Table 3-6. WBN VOC and HAP Emissions Recorded for CY 2025 (tons per year)

Material Name	VOC Emissions	Total HAP Emissions
Amercoat 450H	0.00*	0
Amerlock 400	0.0352	0.0213
CarboZinc 11 SG	0.0219	0
Amercoat 8 Thinner	0.00*	0
Methyl Ethyl Ketone	0.0720	0
Carboline thinner # 26	0.00486	0
Amercoat 65 Thinner	0.00836	0.0110
3500 KOLOR-POXY enamel Part A	0.00*	0.00*
3500 KOLOR-POXY enamel Part B	0	0
KOLOR POXY Thinner 3700	0.00*	0.00*
Kem Kromik	0.00218	0.00078
PSX700	0.00236	0
Amercoat 101 Thinner	0.00*	0.00*
Dimetecote	0.00*	0.00*
Total	0.147	0.0330

* This value was so low in pounds per gallons as to equal zero tons, but it not completely absent
HAP (includes ethylbenzene, xylene, toluene, and naphthalene)

Air Quality Effects of Transmission Lines

Both ozone and NO_x are potential corona discharges from in-scope transmission lines, and the potential exists for ozone production resulting from corona effects, i.e., the electrical breakdown of air into charged particles around the conductors. Using environmental and transmission line factors, the ozone concentrations have been simulated and calculated to be less than 1 part per billion in the immediate vicinity of the conductors at three general sites (USEPA 1973) Such levels of coronal ozone production from high voltage transmission lines are well below the 8-hour ozone standard of 70 parts per billion and therefore, operation of transmission lines would have minimal impacts to local ozone levels.

TVA has not conducted field tests concerning ozone and NO_x emissions generated by WBN's in-scope transmission lines, however, TVA substation design standards specifically address corona affect influences. TVA substation design standards require components be free of corona under fair-weather conditions at the intended operating voltage, altitude, and temperature. Furthermore, design and construction standards employed by TVA in building transmission facilities requires grading rings for non-ceramic insulators for voltages above 161 kV.

3.3.2 Environmental Consequences

Table 3-7 lists the air quality issues and findings identified in the 2024 NRC GEIS. Each of these issues was reviewed with respect to impacts associated with the WBN license renewal.

Table 3-7. Air Quality Issues, 2024 NRC GEIS Findings, and Environmental Impacts

Issue	GEIS Finding	Impact
Air quality impacts	SMALL (Category 1). Air quality impacts from continued operations and refurbishment associated with license renewal are expected to be small at all plants. Emissions from emergency diesel generators and fire pumps and routine operations of boilers used for space heating are minor. Impacts from cooling tower particulate emissions have been small. Emissions resulting from refurbishment activities at locations in or near air quality nonattainment or maintenance areas would be short-lived and would cease after these activities are completed. Operating experience has shown that the scale of refurbishment activities has not resulted in exceedance of the de minimis thresholds for criteria pollutants, and best management practices, including fugitive dust controls and the imposition of permit conditions in State and local air emissions permits, would ensure conformance with applicable State or Tribal implementation plans.	SMALL
Air quality effects of transmission lines	SMALL (Category 1). Production of ozone and oxides of nitrogen from transmission lines is insignificant and does not contribute measurably to ambient levels of these gases.	SMALL

Source: (NRC 2024a)

3.3.2.1 Alternative A – The No Action Alternative

Under the No Action Alternative, there would be no impacts of operation to meteorology and air quality. Decommissioning impacts would be small; however, impacts related to alternative generation assets would be SMALL to MODERATE, depending on the site and type of generation. Construction impacts would be minimized by the use of BMPs. To contribute to replacing a baseload of 3,900 MWe, operation of a 500 MWe natural gas-fired generation assets could generate approximately: 66 tons SO₂/year; 1,925 tons NO_x/year; 292 tons CO/year; 37 tons PM/PM₁₀/PM_{2.5} filterable/year; 2,274,878 tons CO₂/year. All other generation asset operations would have SMALL impacts.

3.3.2.2 Alternative B – WBN License Renewal

TVA evaluated each Category 1 issue related to meteorology and air quality listed in **Table 3-7** for N&SI. No N&SI was identified. The NRC has identified no information that would lead to different impacts on air quality during the license renewal term (NRC 2024b). TVA is also not aware of any similar offsite activities that could contribute to impacts with these issues. Therefore, TVA characterizes the environmental impacts relating to air quality impacts and air quality effects of transmission lines under license renewal as SMALL, in agreement with 2024 NRC GEIS finding.

3.4 NOISE

3.4.1 Affected Environment

Sources of noise at the WBN site are those associated with operation of both WBN Units, including transformers and other electrical equipment, circulating water pumps, cooling tower, and the public address system. In addition, high-voltage transmission lines emit a corona discharge noise consisting of broadband noise, characterized as a crackling noise, and pure tones, characterized as a humming noise (NRC 2013a).

Noise is measured in units called decibels (dB), which are typically weighted to correspond to the limits of human hearing, known as the A-weighted decibel (dBA). The equivalent sound level is the constant sound level that conveys the same sound energy as the actual varying instantaneous sounds over a given period. It averages the fluctuating noise heard over a specific period as if it had been a steady sound. The day-night sound level (L_{dn}) is the 24-hour average noise level with a 10-dBA penalty between 10 p.m. and 7

a.m. to account for the fact that most people are more sensitive to noise while they are sleeping. There are no federal, state, or local regulations for community noise levels in Rhea County; however, USEPA guidelines recommend Ldn not exceed 55 dBA (USEPA 1971). The U.S. Department of Housing and Urban Development considers an Ldn of 65 dBA or less compatible with residential areas (HUD 1985).

WBN is situated in a rural area and the nearest sensitive receptors are two homes located approximately 0.9 miles west of WBN Unit 2 on Morrison Lane as well as several homes located along River Road, approximately 0.9 miles southeast of WBN Unit 2. There are also homes along the road to the M&M Dock and numerous homes along Crosby Lane and along Old Dixie Highway; these homes range from within 1 to 2 miles of WBN Units 1 and 2 (TVA 2017). Ambient noise was measured with a Bruel & Kjaer 2237 Integrating Sound Level Meter on October 22, 2004, in association with the WBN Unit 1 steam generator replacement project. Given the limited number of changes in the area, these measurements are assumed to adequately represent current noise levels in these areas. Measurements were taken in seven locations surrounding the WBN site (TVA 2017) as shown in **Figure 3-3**.

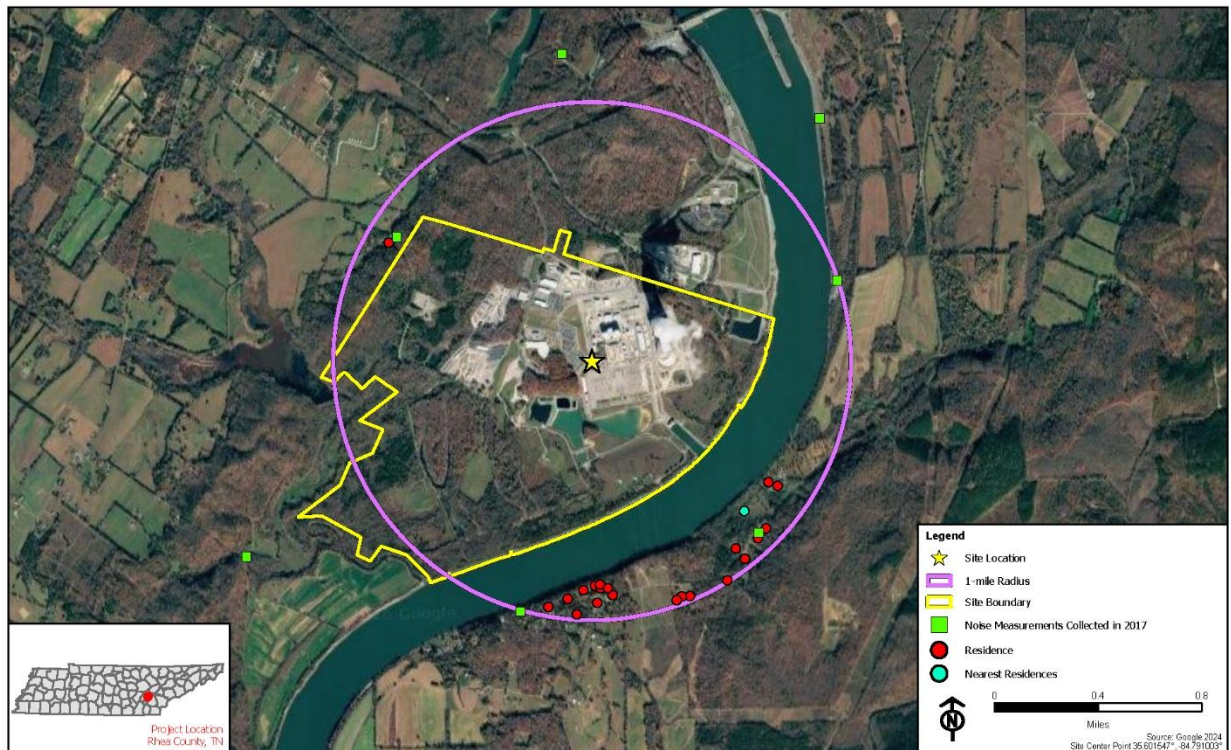


Figure 3-3. Noise Receptors within a 1-mile Radius of WBN

Noise levels were measured three times at each location, and each measurement lasted for 5 minutes. Only one location was dominated by traffic noise, while noise sources at other locations included mules, horses, dogs, birds, insects, rustling leaves, and boats. Noise from earthmoving equipment at WBN was audible at three locations as work was going on at the time of recording. Average noise levels in rural areas are typically around 40 dBA during the day, so noise levels at these locations, except at the traffic dominated location, are fairly typical for rural areas (TVA 2017). Noise receptors within a 1-mile radius of the WBN site are pictured in **Figure 3-3**.

3.4.2 Environmental Consequences

Table 3-8 lists the noise issue and finding identified in the 2024 NRC GEIS. This issue was reviewed with respect to impacts associated with the WBN license renewal.

Table 3-8. Noise Issue, 2024 NRC GEIS Finding, and Environmental Impact

Issue	GEIS Finding	Impact
Noise impacts	SMALL (Category 1). Noise levels would remain below regulatory guidelines for offsite receptors during continued operations and refurbishment associated with license renewal.	SMALL

Source: (NRC 2024b)

3.4.2.1 Alternative A – The No Action Alternative

Under the No Action Alternative, impacts would be SMALL during operation, as there would be no changes. Decommissioning impacts would also be SMALL. However, noise impacts associated with the construction for new generation would rise above ambient levels, but below 60 dBA 1 mile from the site of construction, and range from SMALL to MODERATE, based on site-specific conditions and mitigation measures. Operational noise impacts would be SMALL for all generation assets

3.4.2.2 Alternative B – WBN License Renewal

TVA evaluated the Category 1 issue related to noise impacts listed in **Table 3-8** for N&SI. No N&SI was identified. No operational changes are anticipated in association with license renewal and the noise environment is expected to be unchanged. Therefore, TVA characterizes the environmental impact of noise under license renewal as SMALL, in agreement with 2024 NRC GEIS findings.

3.5 GEOLOGIC ENVIRONMENT

3.5.1 Affected Environment

3.5.1.1 Geology

WBN is located in the Tennessee Section of the Valley and Ridge U.S. Geological Survey (USGS) Physiographic Province in the Appalachian Highlands Division (USGS 2023). This province is made up of a series of folded and faulted mountains and valleys which are underlain by Paleozoic sedimentary formations 40,000 feet in thickness. The WBN site is situated in a bend of the Tennessee River that has been covered by unconsolidated terrace and alluvial deposits. Beneath these deposits lies the bedrock of Middle Cambrian Conasauga Formation, an interbedded shale and limestone unit upon which the Category I structures were founded after the removal of unconsolidated materials and replacement with engineered fill during the construction of WBN (TVA 2021). The bedrock surface, which is about 2,000 feet in thickness, elevation was confirmed as ranging 690 to 702 feet below the ground surface, declining to 660 feet at some monitoring wells (Arcadis 2021, TVA 2021). The controlling feature of the geologic structure at the WBN site is the Kingston thrust fault, which developed some 250 million years ago. The fault has been inactive for many millions of years, and recurrence of movement is not expected. The fault lies to the northwest of the WBN site area and was not involved in the foundation for any of the major plant structures.

WBN was designed based on the largest historic earthquake to occur in the Southern Appalachian Tectonic Province - the 1897 Giles County, Virginia earthquake. This earthquake is estimated to have had a body wave magnitude of 5.8. The Safe Shutdown Earthquake limits for the plant has been established as having a maximum horizontal gravitational acceleration (g) of 0.18g and a simultaneous maximum vertical acceleration of 0.12g (TVA 2021).

Figure 3-4 provides a map of earthquake epicenters within 50 miles of WBN and a seismic hazard map within 50 miles of WBN. WBN is in a moderate hazard zone. The WBN site has a low to moderate risk of seismic hazards according to the American Society of Civil Engineers (ASCE 2026), and a moderate risk over the next 50 years according to the USGS National Seismic Hazard Map (Petersen, et al. 2023).

Geotechnical studies were previously performed at various stages of WBN site development and are covered thoroughly within the TVA WBN UFSAR (TVA 2021). TVA has not identified any geologic hazards since plant construction, such as landslide areas, karst features (e.g., sinkholes), or other conditions that could lead to land subsidence and unstable soils. There are no rare or unique geologic resources, including rock, mineral, or energy rights and assets at or adjoining the site.

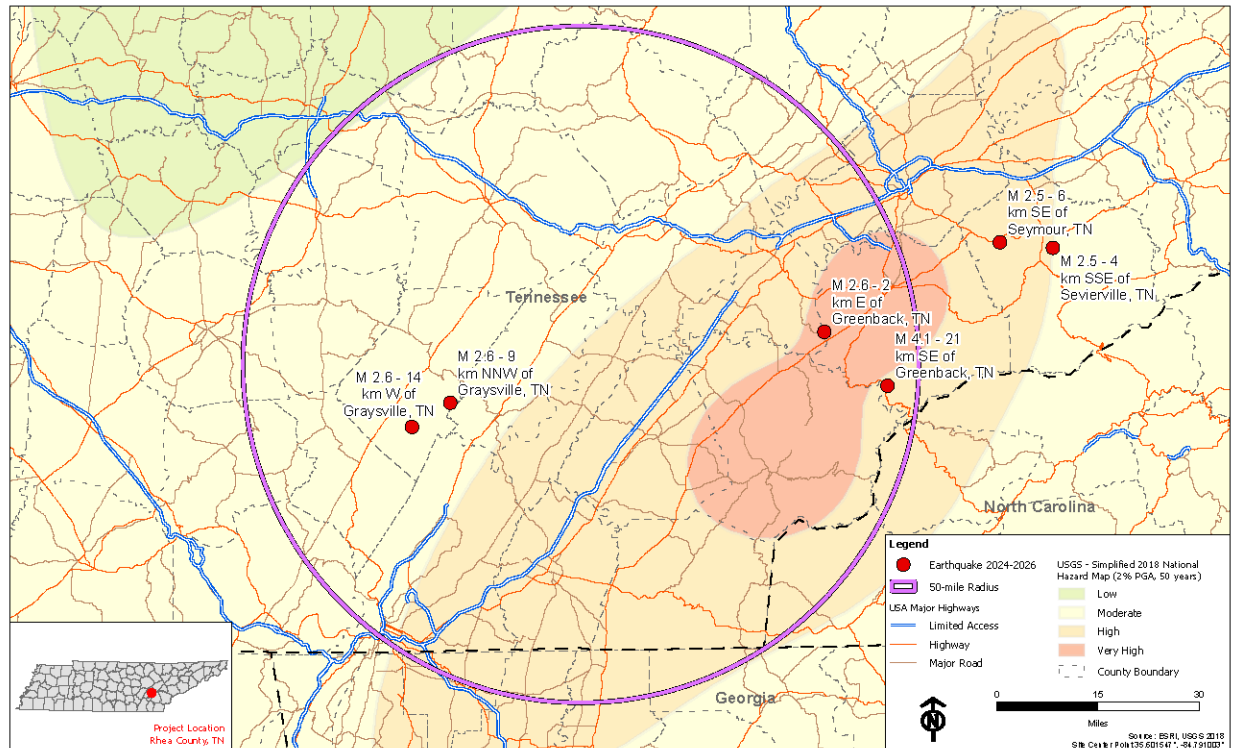


Figure 3-4. Earthquake Epicenters and Seismic Risks within a 50-mile Radius of WBN

3.5.1.2 Soils

Soil at a large part of the WBN site has been excavated and reworked due to plant construction. Soils are most commonly loam or silt loam, and consists of 15 soil types that are not developed or urban land (NRCS 2026a) (see **Table 3-9** and **Figure 3-5**). Most of the soils are well drained with low chance of runoff or flooding. Less than 4 percent of the soils in the WBN site are classified as hydric (NRCS 2026a). **Figure 3-5** provides the soil map for the WBN property and **Table 3-9** shows the characteristics of the soil. Many of these characteristics have been confirmed via monitoring wells in place at the WBN site in recent studies (Arcadis 2021).

The unconsolidated materials overlying bedrock are primarily alluvial deposits on the elevated floodplain near the lake shore and terrace materials. These deposits were delivered by the Tennessee River when flowing at a higher level over the bench that covers most of the WBN site. The layers of deposits vary in thickness, generally measuring 25 to 30-feet thick, but can reach 40 feet in thickness at some points along the area (Arcadis 2021). The alluvium is composed of fine-grained, finely sorted silts and clays, with

micaceous sand and some quartz gravel. The thickness varies, averaging approximately 25 feet. Near the base of the terrace bench the alluvial deposits thin out to a feather edge.

The terrace deposits are much older than the recent floodplain deposits and their edge is marked by a distinct topographic bench some 30 feet high which lies from 200 to 1,000 feet northwest of the edge of Chickamauga Lake. The thickness of the terrace deposits vary from a minimum of 31 feet to a maximum of 46 feet. The average thickness is 40 feet (TVA 2021).

Approximately the upper half of the unit is composed of sandy, silty clay and the lower half is much coarser, consisting of pebbles, cobbles, and small boulders of quartz or quartzitic sandstone embedded in a sandy clay matrix. Very little residual material derived from weathering of the underlying shale is present under the terrace deposits at the WBN site. During onsite soil studies, a foot or two of residual clay was encountered in a few holes, but in most instances the terrace deposits are immediately underlain by a few feet of soft but unweathered shale. Full results of these studies can be found in the TVA WBN UFSAR Section 2.5.4.2.1.3 Test Results and Selection of Design Properties.

The Farmland Protection Policy Act (7 U.S.C. § 4201 et seq.) protects designated farmlands by requiring federal agencies to consider the adverse effects of their actions on farmland soils. Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for such uses, according to the U.S. Department of Agriculture (USDA). Farmland soils comprise 40 percent of the WBN site, mostly located in the southwest portion of the WBN site, away from the plant and closer to the water (NRCS 2026a). This area is mostly used for drainage and spoil areas, but is otherwise unaltered. All other designated farmland soils in the WBN site are negligible patches spread out in the WBN site.

There have been various ground-disturbing activities around WBN that have disturbed soils and may have affected site drainage; however, appropriate BMPs have been applied in every case to ensure erosion potential and drainage of stormwater in and around the vicinity of WBN is not affected. As stated previously, runoff classification is relatively low and soils are well drained, so there is relatively low to moderate erosion potential. This is also indicated using the K factor for erosion potential, which are listed in **Table 3-9** (NRCS 2026b).

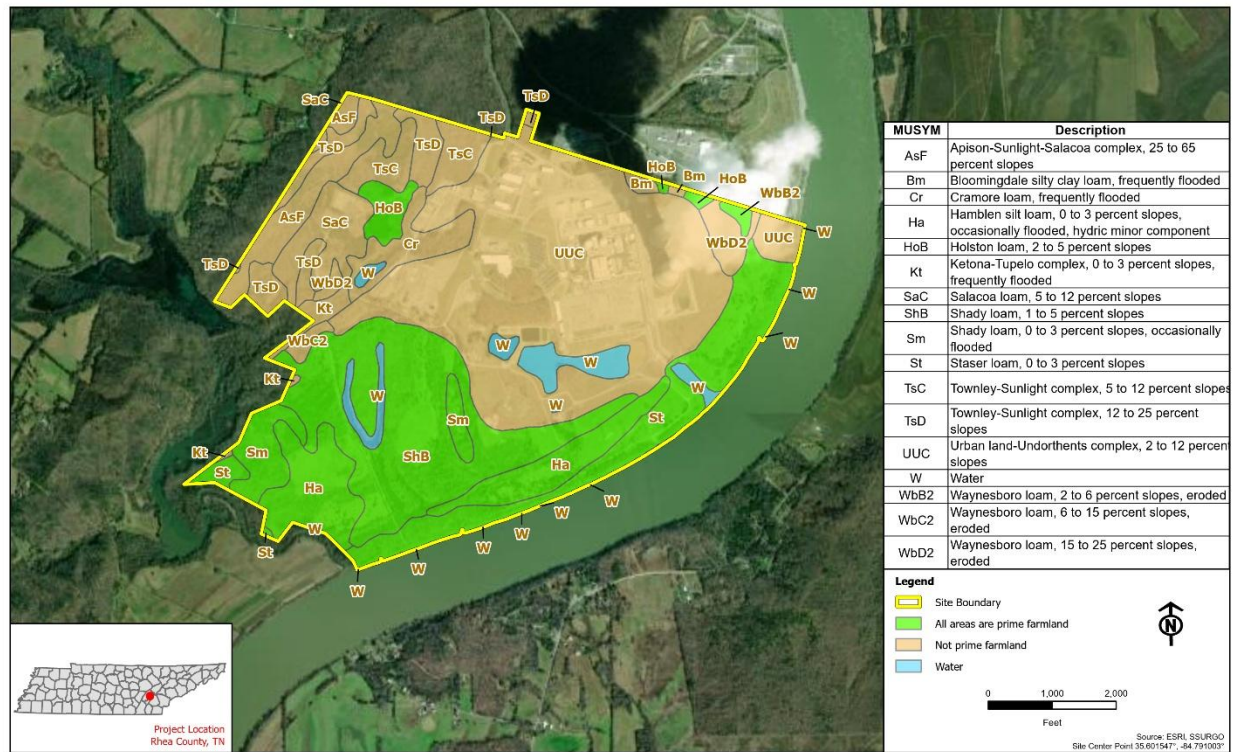


Figure 3-5. Soils and Prime Farmland at WBN Site

Table 3-9. Soil Characterization Details

Soil Type	Soil Type Name	USDA Soil Texture Classification	Farmland Classification	Hydric soil	Erosion Potential ^a	Acres in AOI	Percent AOI
AsF	Apison-Sunlight-Salacoa complex, 25 to 65 percent slopes	Silt loam	Not prime farmland	No	0.25	40.2	4.0%
Bm	Bloomington silty clay loam, frequently flooded	Silty clay loam	Not prime farmland	Yes	0.27	3.8	0.4%
Cr	Cranmore loam, frequently flooded	Loam	Not prime farmland	Yes	0.37	24.6	2.5%
Ha	Hamblen silt loam, 0 to 3 percent slopes, occasionally flooded, hydric minor component	Silt loam	All areas are prime farmland	No	0.37	79.6	8.0%
HoB	Holston loam, 2 to 5 percent slopes	Loam	All areas are prime farmland	No	0.30	15.1	1.5%
Kt	Ketona-Tupelo complex, 0 to 3 percent slopes, frequently flooded	Silty clay loam	Not prime farmland	Yes	0.33	8.3	0.8%
SaC	Salacoa loam, 5 to 12 percent slopes	Loam	Not prime farmland	No	0.28	32.9	3.3%
ShB	Shady loam, 1 to 5 percent slopes	Loam	All areas are prime farmland	No	0.27	170.8	17.2%
Sm	Shady loam, 0 to 3 percent slopes, occasionally flooded	Loam	All areas are prime farmland	No	0.25	30.6	3.1%
St	Staser loam, 0 to 3 percent slopes	Loam	All areas are prime farmland	No	0.30	98.2	9.9%
TsC	Townley-Sunlight complex, 5 to 12 percent slopes	Silt loam	Not prime farmland	No	0.30	30.1	3.0%
TsD	Townley-Sunlight complex, 12 to 25 percent slopes	Silt loam	Not prime farmland	No	0.30	35.9	3.6%
UUC	Urban land-Udorthents complex, 2 to 12 percent slopes	n/a	Not prime farmland	No	---	366.0	36.8%
W	Water	n/a	Not prime farmland	No	---	35.3	3.5%
WbB2	Waynesboro loam, 2 to 6 percent slopes, eroded	Loam	All areas are prime farmland	No	0.23	3.1	0.3%
WbC2	Waynesboro loam, 6 to 15 percent slopes, eroded	Loam	Not prime farmland	No	0.23	4.2	0.4%
WbD2	Waynesboro loam, 15 to 25 percent slopes, eroded	Loam	Not prime farmland	No	0.23	15.9	1.6%
Totals for Soil Types in AOI						994.7	100.0%
Totals for Prime Farmland in AOI						397.4	40.0%

Source: (NRCS 2026a, NRCS 2026b)

^a Erosion potential is presented as the average of the values of erosion factor Kw of the components of the soil type. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Erosion factor Kw indicates the erodibility of the whole soil. Values of K range from 0.02 to 0.69.

3.5.2 Environmental Consequences

Table 3-10 lists the geology and soil issue and finding identified in the 2024 NRC GEIS. This issue was reviewed with respect to impacts associated with the WBN license renewal.

Table 3-10. Geology and Soil Issue, 2024 NRC GEIS Finding, and Environmental Impact

Issue	GEIS Finding	Impact
Geology and soils	SMALL (Category 1). The impact of continued operations and refurbishment activities on geology and soils would be small for all nuclear power plants and would not change appreciably during the license renewal term.	SMALL

Source: (NRC 2024b)

3.5.2.1 Alternative A – The No Action Alternative

There would be no operational impacts to the geological environment under the No Action Alternative. Impacts to the geologic environment from decommissioning would be SMALL, though, ground disturbance activities associated with replacement generation facility on a previously developed site or greenfield site would cause SMALL impacts related to geology and soils, including seismic related impacts. Depending on the presence of prime or important farmland soils, the level of impact could range from SMALL to MODERATE. Impacts may differ based on site-specific conditions and the technology.

3.5.2.2 Alternative B – WBN License Renewal

TVA evaluated each Category 1 issue related to the geologic environment listed in **Table 3-10** for N&SI. No N&SI was identified. The NRC has determined that geologic and soil conditions at all nuclear power plants and associated transmission lines have been well established during the current licensing term, and are expected to remain unchanged or within the range of natural variability during the 20-year license renewal (NRC 2024b). The impact on soil resources of continued operations and refurbishment associated with license renewal would consist of soil disturbance, including sediment and/or any associated bedrock, for projects, such as replacing or adding buildings, roads, parking lots, and utility structures, which may result in stormwater runoff. However, TVA has no plans for modifications or refurbishment activities beyond normal maintenance at WBN associated with the license renewal. TVA concludes that compliance with current NPDES permit conditions, SWPPP, and BMPs as appropriate would ensure that impacts from continued plant operations would remain minimal. Therefore, TVA characterizes the environmental impact on the geologic environment under license renewal as SMALL, in agreement with 2024 NRC GEIS findings.

3.6 WATER RESOURCES

3.6.1 Surface Water

3.6.1.1 Affected Environment

WBN sits beside the Tennessee River (Chickamauga Reservoir) and contains various surface waters onsite. After an initial desktop review, which included reviewing the National Wetland Inventory, a field investigation to delineate wetlands was conducted by AECOM throughout the WBN site between October 7 and 12, 2025. Stream and drainage features present on the WBN site are shown in **Figure 3-6**. Delineation methods and general descriptions of each feature identified within the WBN site are provided in the *Wetlands and Waterbodies Report*, provided in **Appendix F**.

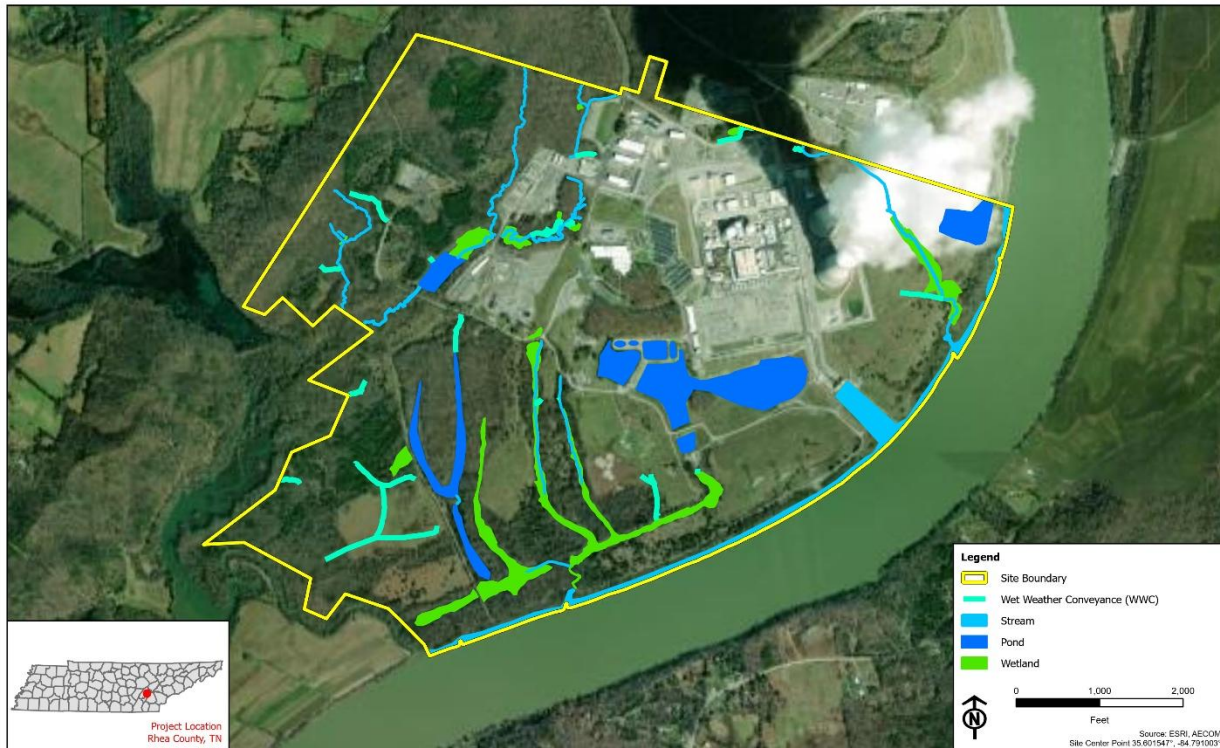


Figure 3-6. Delineated Water Features within WBN

On the WBN site, it was determined that there are: 13 wetlands, 19 streams, 24 wet weather conveyances, and 11 manmade ponds. Based on field determinations, nine wetlands, three ponds, and all 19 streams are provisionally jurisdictional to USACE, while the 24 wet weather conveyances are non-jurisdictional; together these features route stormwater toward the Tennessee River or to Yellow Creek then the Tennessee River. Total acres of wetlands are approximately 27.25 acres and ponds are approximately 43.64 acres differing from the 2013 Final Environmental Statement of 38.8 acres of wetlands and 41.7 acres of ponds. This change can likely be attributed to natural processes associated with time and the presence of nearby impermeable surfaces that can affect hydrology.

The plant uses the river for cooling water withdrawals and for permitted discharges (**Table 3-11**), which accounts for only a small fraction, about 0.1 percent, of the Tennessee River's flow at this location (NRC 2013a). Cooling water is drawn through engineered intake structures as established by design criteria in 10 CFR Part 50 and then returned to the reservoir through NPDES regulated outfalls (Outfalls 101, 102, and 113), which have set limits for temperature, water quality, and allowable chemicals. Temperature limits for these outfalls are set in the NPDES permit (e.g., maximum 95 degrees Fahrenheit [°F] for most discharges) for permitted discharges. Review of available operational and historical information does not indicate flooding has been a recurring issue affecting WBN operations since the reactors began operating. WBN is consistent with federal floodplain protection requirements, including those indicated by Tennessee state rules, NEPA, and Executive Order 11988. The existing UFSAR floodplain protection plan was updated in May 2025, determined as consistent with guidance, did not change the determination of no significant hazards, and the state concurred in January 2025 (NRC 2025a). Existing facilities were designed considering historic flood elevations, and drainage/outfall systems must operate only when upstream dam releases meet required flow thresholds. A flood map using data from the Federal Emergency Management Agency National Flood Hazard Layer can be seen in **Figure 3-7**.

Table 3-11. 2023 Water Usage Data for WBN)

	Daily Avg Diffuser Flow OSN-101 (MGD)	Daily Avg SCCW Flow OSN-113 (MGD)	Average Cooling Tower Loss (MGD)	Total Average Daily Usage (MGD)	Withdrawal Monthly Totals (million gallons)	Total Discharges (million gallons)
Year Total*	18,786	37,755	2,877	59,419	43,526	40,649
Daily Average	52	103	8	163	—	—

Source: (NRC 2013a)

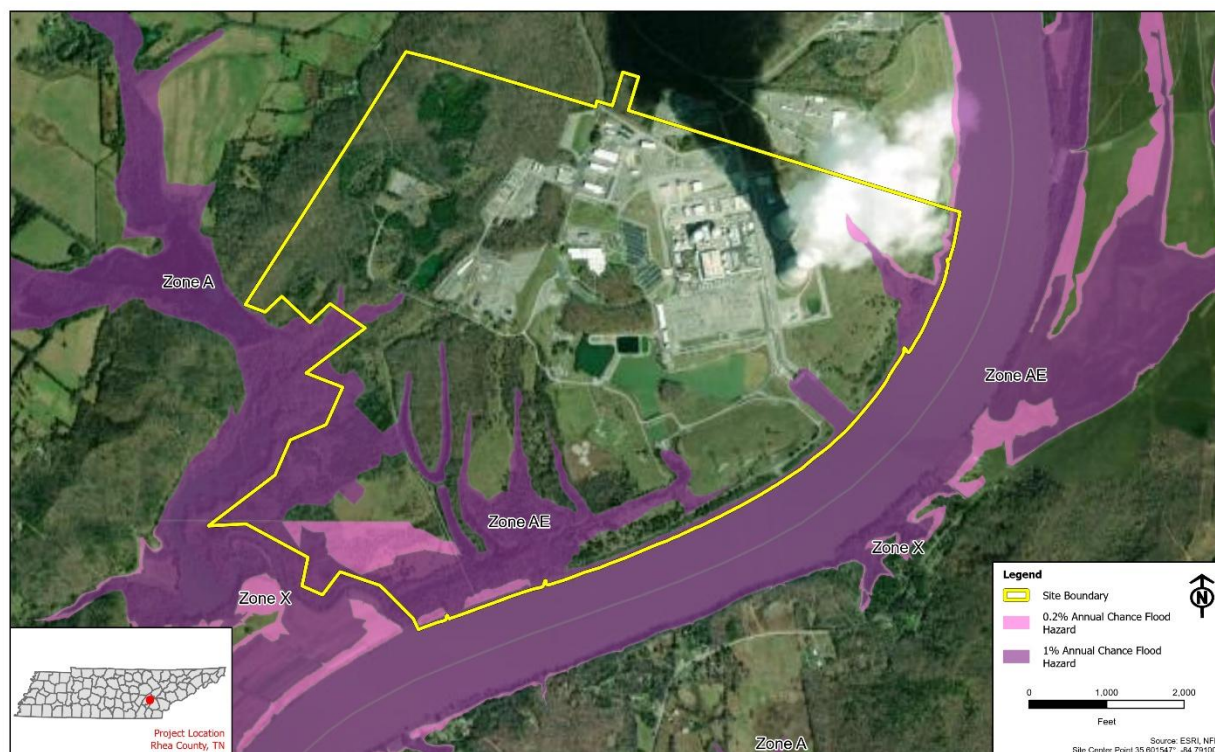


Figure 3-7. Flood Map of WBN

Water use, intake operation, and surface water discharges associated with WBN are regulated primarily under the CWA, with NPDES permits (CWA §402) and State water quality certification (CWA §401) governing allowable discharge parameters, stormwater controls, and thermal limits. The Tennessee River downstream of the plant is a drinking water source for several municipal water providers including the City of Dayton, TN, North West Utility District, and Eastside Utility District, Chattanooga, TN, as well as other industrial and smaller system users (i.e. irrigation systems). Within 50-miles of WBN, approximately 289,813 people rely on the Tennessee River for drinking water.

Water discharges associated with WBN are regulated primarily under the CWA water quality certification (CWA §401 and §402), which governs allowable discharge parameters, stormwater controls, and thermal limits (TDEC 2024, EWG 2024). TVA requested and obtained a CWA Section 401 State water-quality certification waiver from TDEC May 6, 2026 (see **Appendix I** for Consultation History). No Section 404 dredge/fill permits are required for ongoing operations, because no plant activities involve placing dredged or fill material into waters of the U.S. Under the federal CWA, Section 402, any facility that releases treated water, cooling water, or industrial wastewater to rivers, lakes, or reservoirs must operate under a NPDES

permit. This permit sets strict limits on what the plant can release into the Tennessee River, including the temperature of cooling water discharges and any chemicals used in plant systems, and requires ongoing monitoring and reporting to ensure compliance.

-WBN has several types of water discharges that are monitored under its NPDES permit (TN0020168), and each one is monitored and maintained within safe limits before it reaches the Tennessee River. These discharges include cooling tower blowdown water, which contains heat from the plant and small amounts of treatment chemicals like biocides (e.g., sodium hypochlorite), corrosion inhibitors, and scale control additives that prevent mineral buildup in pipes. WBN also maintains a Tennessee Multi-Sector Permit (TMSP), TNR051343, which regulates stormwater runoff and requires WBN to maintain engineered drainage systems, settling ponds, and erosion controls so that stormwater runoff does not discharge pollutants into nearby streams (NRC 2024b).

3.6.1.2 Environmental Consequences

Table 3-12 lists surface water issues and findings identified in the 2024 NRC GEIS. Each of these issues was reviewed with respect to impacts associated with the WBN license renewal.

Table 3-12. Surface Water Issues, 2024 NRC GEIS Findings, and Environmental Impacts

Issue	GEIS Finding	Impact
Surface water use and quality (non-cooling system impacts)	SMALL (Category 1). Impacts are expected to be small if best management practices are employed to control soil erosion and spills. Surface water use associated with continued operations and refurbishment associated with license renewal would not increase significantly or would be reduced if refurbishment occurs during a plant outage.	SMALL
Altered current patterns at intake and discharge structures	SMALL (Category 1). Altered current patterns would be limited to the area in the vicinity of the intake and discharge structures. These impacts have been small at operating nuclear power plants.	SMALL
Altered salinity gradients	SMALL (Category 1). Effects on salinity gradients would be limited to the area in the vicinity of the intake and discharge structures. These impacts have been small at operating nuclear power plants.	N/A
Altered thermal stratification of lakes	SMALL (Category 1). Effects on thermal stratification would be limited to the area in the vicinity of the intake and discharge structures. These impacts have been small at operating nuclear power plants.	SMALL
Scouring caused by discharged cooling water	SMALL (Category 1). Scouring effects would be limited to the area in the vicinity of the intake and discharge structures. These impacts have been small at operating nuclear power plants.	SMALL
Discharge of metals in cooling system effluent	SMALL (Category 1). Discharges of metals have not been found to be a problem at operating nuclear power plants with cooling-tower-based heat dissipation systems and have been satisfactorily mitigated at other plants. Discharges are monitored and controlled as part of the National Pollutant Discharge Elimination System (NPDES) permit process.	SMALL
Discharge of biocides, sanitary wastes, and minor chemical spills	SMALL (Category 1). The effects of these discharges are regulated by Federal and State environmental agencies. Discharges are monitored and controlled as part of the NPDES permit process. These impacts have been small at operating nuclear power plants.	SMALL
Surface water use conflicts (plants with once-through cooling systems)	SMALL (Category 1). These conflicts have not been found to be a problem at operating nuclear power plants with once-through heat dissipation systems.	SMALL
Surface water use conflicts (plants with cooling ponds or cooling towers using makeup water from a river)	(Category 2). Impacts could be of small or moderate significance, depending on makeup water requirements, water availability, and competing water demands.	SMALL

Issue	GEIS Finding	Impact
Effects of dredging on surface water quality	SMALL (Category 1). Dredging to remove accumulated sediments in the vicinity of intake and discharge structures and to maintain barge shipping has not been found to be a problem for surface water quality. Dredging is performed under permit from the U.S. Army Corps of Engineers, and possibly, from other State or local agencies.	SMALL
Temperature effects on sediment transport capacity	SMALL (Category 1). These effects have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.	SMALL

Source: (NRC 2024b)

Alternative A – The No Action Alternative

Under the No Action Alternative, operations would continue, unchanged and creating no additional impacts during operation. TVA would then allow the existing operating licenses to expire, cease operations, and enter decommissioning pursuant to NRC requirements.

General decommissioning of the plant impacts would be SMALL, and there is no N&SI available that would contradict the 2024 NRC GEIS findings. The permanent cessation of operations eliminates cooling system withdrawals and thermal/chemical discharges, thereby reducing or eliminating most operating phase surface water pathways. Decommissioning activities would be temporary, construction like, and permit controlled, resulting in SMALL impacts when BMPs are implemented, in agreement with and bounded by the conclusions of the 2024 NRC GEIS findings. The Category 2 water use conflict issue becomes not applicable after shutdown.

Impacts related to replacement of baseload generation associated with decommissioning would be addressed in separate NEPA reviews as locations, designs, and schedules are not yet defined. The type and magnitude of surface water impacts would depend on technology and siting, and would be avoided, minimized, and mitigated through siting, design, and permit mandated BMPs. Any new construction would require an NPDES permit and would comply with applicable water quality standards and criteria and therefore minimize any impacts which could be expected to range from SMALL to LARGE.

Alternative B – WBN License Renewal

TVA evaluated each Category 1 issue related to surface water listed in **Table 3-12** for N&SI. No N&SI was identified. For WBN license renewal, operations would continue and findings would be similar to those found in previous environmental assessments, as well as those found within the 2024 NRC GEIS. During operation, TVA would maintain permits and continue to follow all state and federal guidelines. Therefore, TVA characterizes the environmental impact to Category 1 issues related to surface water under license renewal as SMALL, in agreement with 2024 NRC GEIS findings.

TVA also evaluated the applicable Category 2 issue related to surface water for N&SI. No N&SI was identified. WBN Units 1 and 2 withdraw water from the Tennessee River for once through condenser cooling while also using cooling towers that recirculate the water to dissipate heat and manage thermal discharges to the Tennessee River system. Previous NRC environmental reviews determined that consumptive water use for these systems represents less than 0.1 percent of mean annual river flow (**Table 3-11**) and does not result in conflicts with other water users (NRC 2013a). Continued operation under license renewal would not change withdrawal rates or operational practices. Therefore, TVA has determined that Category 2 issue impacts of continued operation to surface water would be SMALL.

3.6.2 Groundwater

3.6.2.1 Affected Environment

The WBN site is underlain by sedimentary bedrock of the Conasauga Group, consisting predominantly of interbedded shale with lesser limestone. Overlying the bedrock is a layer of regolith (weathered soil and

broken-up rock) and residuum, derived from in-place weathering of the underlying formations. Together, the regolith and the upper fractured bedrock comprise the shallow groundwater system at the WBN site, which functions as a water table aquifer. Groundwater occurrence and movement mostly moves through cracks, fractures, and bedding planes in the rock rather than flowing through large open spaces (NRC 2013a). The thickness of the weathered rock layer varies across the WBN site. Depth to groundwater at WBN varies seasonally and spatially but is generally shallow, particularly near surface water features. Monitoring data indicate that groundwater depths typically range from approximately 10 to 25 feet below ground surface, with the shallowest depths occurring near tributaries, wetlands, and the Tennessee River/Chickamauga Reservoir shoreline (DOE 2016). Groundwater flow generally follows WBN site topography, with flow moving from higher elevations beneath developed plant areas toward adjacent surface waters. Estimated hydraulic gradients in the shallow system are low to moderate, consistent with Valley and Ridge fractured rock settings, and groundwater velocities are correspondingly slow. There is no saltwater intrusion at the WBN site due to its inland location and freshwater hydrogeologic setting.

The shallow groundwater system at WBN is hydraulically connected to nearby surface waters, including small tributaries and the Tennessee River/Chickamauga Reservoir. Groundwater discharge to surface water occurs as baseflow to these features, particularly during dry periods. Because of this connection, groundwater quality is an important component of surface water protection and is addressed through monitoring and compliance programs.

WBN does not use groundwater as a primary source of process water. Surface water from the Tennessee River system supplies plant operational needs. As a result, onsite groundwater withdrawals are negligible. Offsite groundwater use in the vicinity of WBN consists primarily of domestic and small community wells, generally completed in the shallow regolith or upper fractured bedrock. These wells are distributed across rural areas of Rhea and Meigs Counties and typically have low withdrawal rates suitable for household use and do not significantly affect groundwater levels or flow patterns.

Groundwater beneath the WBN site naturally contains small amounts of minerals and metals, which is typical for the area that has a mostly shale bedrock. TVA maintains a Groundwater Protection Program (GPP) that includes routine sampling of a network of 15 onsite groundwater monitoring wells strategically located around plant structures, former industrial areas, and potential source locations. These wells are used to characterize groundwater quality, detect potential releases, and evaluate trends over time. Monitoring well locations are documented in WBN site environmental records and depicted on TVA facility maps (DOE 2016). Onsite wells are sampled periodically, at least on a semi-annual basis. While seasonal or climate related fluctuations are observed, no consistent groundwater decline has been identified. No withdrawal wells are located on WBN or in the immediate vicinity. The nearest receptor for groundwater with the potential to be impacted by leaks or spills is located at a farm 1.4 miles from WBN. The well is sampled monthly and data is included in WBN's Annual Radiological Environmental Operating Report each year, the most recent of which was released for 2025 (TVA 2025d).

Plant operations at WBN have historically involved the use and storage of fuels, lubricants, solvents, oils, and other chemicals typical of nuclear power plant facilities, all managed under applicable environmental regulations, spill-prevention and control plans, and waste-management procedures.

The potential amount of material in a leak or spill in which nuclides could be released, the concentrations, and the extent of impacts to the site is dependent on multiple variables and conditions, including the size and location of the inadvertent release and the speed at which the release is controlled and/or mitigated.

In accordance with the GPP, TVA conducts routine inspections, maintenance, and outages all of which provide opportunities to prevent inadvertent releases. This includes WBN's compliance with NRC

regulations, as well as Nuclear Energy Institute (NEI) voluntary interim Industry Ground Water Protection Initiative (NEI 07-07) and accompanying Groundwater Protection Guidelines for Nuclear Power Plants set forth by EPRI. This constitutes the reporting for the Watts Bar Annual Radiological Environmental Operating Report, Watts Bar Annual Radioactive Effluent Release Report, and Updated Risk Analysis for Systems, Structures, and Components (TVA 2025d, TVA 2024, Arcadis 2024). However, if a spill or leak was identified, plant personnel would begin responding immediately per TVA's GPP.

Water from the site flows into the site stormwater management system, whereas groundwater flow is toward the Reservoir, and some may discharge into other surface water; therefore, an inadvertent release could not cause substantial impairment or noticeable alteration of groundwater quality in an aquifer with respect to designated use classification or applicable drinking water or other applicable standards.

In 2002, TVA detected low-level tritium in a groundwater monitoring well, notified state and federal regulators, installed additional monitoring wells, and in 2004 identified the source as leakage from an underground radioactive effluent pipe and a Unit 2 fuel-transfer bellows. Corrective actions, including pipe replacement, sealing of the transfer tube, and coating of the fuel-transfer canal, were completed by 2005 (NRC 2013a). The incident was fully investigated and addressed through cleanup and mitigation measures consistent with state and federal requirements. A separate Environmental Impact Statement (EIS) was conducted regarding the tritium in the water (DOE 2016).

Where WBN site investigations identified soil or groundwater impacts, the contamination was generally localized and limited in extent. Corrective actions have included engineered controls, such as a 500,000-gallon (gal) tritiated-water storage tank and improved secondary containment measures, and ongoing monitoring, as appropriate (DOE 2016). Ongoing groundwater monitoring confirms these measures are effective and that contaminant concentrations remain well below the USEPA drinking water standards. Available data indicate concentrations decrease with distance from the source areas. No widespread groundwater contamination has been identified, and there is no evidence of adverse impacts to offsite aquifers or water supplies.

Reviews by the NRC have concluded that detected tritium is localized, stable, or declining over time, and does not pose a risk to offsite groundwater users (DOE 2016, NRC 2013a). No offsite potable water wells have been affected by plant related tritium, and concentrations at downstream locations decrease to near background levels prior to reaching WBN site boundaries. Existing monitoring and corrective action programs provide reasonable assurance that groundwater resources are protected and groundwater conditions would not change under continued operation during the license renewal term.

3.6.2.2 Environmental Consequences

Table 3-13 lists the groundwater issues and findings identified in the 2024 NRC GEIS. Each of these issues was reviewed with respect to impacts associated with the WBN license renewal.

Table 3-13. Groundwater Issues, 2024 NRC GEIS Findings, and Environmental Impacts

Issue	GEIS Finding	Impact
Groundwater contamination and use (non-cooling system impacts)	SMALL (Category 1). Extensive dewatering is not anticipated from continued operations and refurbishment associated with license renewal. Industrial practices involving the use of solvents, hydrocarbons, heavy metals, or other chemicals, and/or the use of wastewater ponds or lagoons have the potential to contaminate site groundwater, soil, and subsoil. Contamination is subject to State or U.S. Environmental Protection Agency (EPA) regulated cleanup and monitoring programs. The application of best management practices for handling any materials produced or used during these activities would reduce impacts.	SMALL

Issue	GEIS Finding	Impact
Groundwater use conflicts (plants that withdraw less than 100 gpm)	SMALL (Category 1). Plants that withdraw less than 100 gpm are not expected to cause any groundwater use conflicts.	SMALL
Groundwater use conflicts (plants that withdraw more than 100 gpm)	(Category 2). Plants that withdraw more than 100 gpm could cause groundwater use conflicts with nearby groundwater users.	N/A
Groundwater use conflicts (plants with closed-cycle cooling systems that withdraw makeup water from a river)	(Category 2). Water use conflicts could result from water withdrawals from rivers during low-flow conditions, which may affect aquifer recharge. The significance of impacts would depend on makeup water requirements, water availability, and competing water demands.	SMALL
Groundwater quality degradation resulting from water withdrawals	SMALL (Category 1). Groundwater withdrawals at operating nuclear power plants would not contribute significantly to groundwater quality degradation.	N/A
Groundwater quality degradation (plants with cooling ponds)	(Category 2). Sites with cooling ponds could degrade groundwater quality. The significance of the impact would depend on site-specific conditions including cooling pond water quality, site hydrogeologic conditions (including the interaction of surface water and groundwater), and the location, depth, and pump rate of water wells.	N/A
Radionuclides released to groundwater	(Category 2). Leaks of radioactive liquids from plant components and pipes have occurred at numerous plants. Groundwater protection programs have been established at all operating nuclear power plants to minimize the potential impact from any inadvertent releases. The magnitude of impacts would depend on site-specific characteristics.	SMALL

Source: (NRC 2024b)

Alternative A – The No Action Alternative

Under the No-Action Alternative, TVA would allow the operating licenses for WBN Units 1 and 2 to expire, permanently cease operations, and proceed with decommissioning in accordance with NRC requirements. Operations would remain unchanged until that time, resulting in no change in current impacts, which are SMALL. There is no N&SI that would alter the 2024 NRC GEIS findings.

For the decommissioning, all applicable groundwater issues are either Category 1 issues with SMALL impacts, Category 2 issues with SMALL impacts, or Category 2 issues that are not applicable due to the absence of groundwater withdrawals, cooling ponds, or ongoing operational source terms. Under decommissioning, operational sources of radionuclide releases would be removed as systems are shut down and fuel is removed from the reactors. Any residual contamination would be addressed through NRC approved decommissioning and remediation activities, with continued monitoring as required. Consistent with NUREG-0586, Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, Supplement 1: Regarding the Decommissioning of Nuclear Power Reactors (2002 NRC Decommissioning GEIS) (NRC 2002), radionuclide impacts to groundwater during and after decommissioning would be SMALL and would decline over time.

Decommissioning would eliminate routine operational pathways for groundwater impacts, and any temporary impacts associated with dismantlement activities would be managed through established regulatory controls and corrective actions. Consistent with the 2024 NRC GEIS and the 2002 NRC Decommissioning GEIS, groundwater impacts during decommissioning would be SMALL and do not require further analysis.

Impacts to groundwater related to the production of replacement energy sources would be dependent on the location and type of energy source, could range from SMALL to LARGE, and would be addressed in a separate analysis or NEPA document.

Alternative B – WBN License Renewal

TVA evaluated each Category 1 issue related to groundwater listed in **Table 3-13** for N&SI. No N&SI was identified. Groundwater impacts associated with continued operation of WBN under license renewal would be mostly unchanged from current conditions. Groundwater conditions are currently well characterized, monitored, and controlled. Groundwater monitoring data demonstrate stable or declining trends. No further discussion is required. Therefore, TVA characterizes the environmental impact on applicable groundwater issues under license renewal as SMALL, in agreement with 2024 NRC GEIS findings.

TVA also evaluated the applicable Category 2 issues related to groundwater for N&SI. No N&SI was identified. The amount of water withdrawn from the Tennessee River would remain at less than 0.1 percent of mean annual river flow and does not result in conflicts with other water users (NRC 2013a). Issues related to plants with cooling ponds would not be applicable as the yard holding pond on site is not a cooling pond and would have a SMALL impact if any blowdown would need to be diverted to it as its size is minimal. Due to historical identification of tritium at the WBN site, existing corrective actions and monitoring would stay in place, both of which show to be effective with no evidence indicating increasing concentrations, migration beyond controlled areas, or changes in source terms; and radionuclide releases to groundwater remain small. Therefore, TVA has determined that Category 2 issue impacts of continued operations to groundwater would be SMALL.

3.7 ECOLOGICAL RESOURCES

3.7.1 Terrestrial Ecology

3.7.1.1 Affected Environment

WBN is located within Level II Ecoregion 8.4, the Ozark, Ouachita–Appalachian Forests and also within the more localized Ridge and Valley Ecoregion of eastern Tennessee. The local ecoregion is characterized by a humid temperate climate with warm summers and mild winters, moderate to high annual precipitation, and a landscape consisting of parallel ridges and valleys that support an extensive karst system, including numerous caves, rock shelters, sinkholes, and springs (USDA 1999). Vegetation in this ecoregion is dominated by oak-hickory and oak-pine forests, with bottomland hardwood communities occurring along rivers and floodplains. The ecoregion supports diverse wildlife assemblages, including large and small mammals, neotropical migratory birds, reptiles and amphibians, and species associated with karst features such as bats and cave dependent fauna. Numerous federally and state-listed species are known to occur within this ecoregion (Griffith, et al. 1998).

Fourteen habitats or landcover classes were mapped during the October 2025 field surveys, with compiled data reflected in the *Protected Species and Habitat Evaluation Report* (**Appendix G**). Dominant terrestrial habitats include deciduous forest (approximately 30.6 percent of the WBN site), hay/pasture lands (19.3 percent), and developed areas (approximately 35 percent), with smaller areas of evergreen forest, mixed forest, shrub/scrub, and herbaceous vegetation. Wetland habitats include woody wetlands, emergent herbaceous wetlands, and small open water features, primarily associated with low-lying areas, streams, and ponds. Forested habitats occur throughout the WBN site and provide important riparian buffers along mapped streams and wetlands. Surrounding lands are primarily forested or agricultural, with no major urban development immediately adjacent to the WBN site. No new or in-scope transmission line ROWs were identified as requiring terrestrial habitat disturbance for the proposed license renewal.

Initial construction and continued operation of WBN have resulted in the conversion of portions of the WBN site into industrial and developed land uses, including plant structures, access roads, and maintained open areas. Remaining undeveloped portions of the WBN site exhibit evidence of historical disturbance such as selective logging, edge clearing, and maintenance activities. Forested areas are generally early to mid-

successional, with dominant canopy trees typically ranging from 3 to 15 inches in diameter at breast height, and do not exhibit old growth forest characteristics. Despite these disturbances, remnant forested and riparian areas continue to provide habitat for a variety of wildlife species, including federally listed bats and migratory birds.

Terrestrial ecology at the WBN site was evaluated through a combination of desktop reviews and field surveys. In October 2025, qualified biologists conducted reconnaissance-level vegetation and wildlife habitat surveys across the entire WBN site. Desktop analyses included review of the TVA Natural Heritage Database, USFWS Information for Planning and Consultation (IPaC) system, NLCD data, soil surveys, and published literature. Field surveys involved systematic foot coverage, global positioning system-based habitat mapping with submeter accuracy, georeferenced photography, and documentation of vegetation communities, wildlife observations, and habitat features such as snags, cavities, wetlands, and culverts. These studies identified habitat suitable for several federally listed species, particularly bats, and provided the baseline characterization of terrestrial resources for the *Protected Species and Habitat Evaluation Report* (**Appendix G**). The property has been heavily disturbed by previous land use and does not support the listed plant species in **Appendix G**, which require specific habitats including rocky, limestone shorelines and rocky, calcareous prairies or cedar glades. The 2025 field report and surveys confirm presence of raptors and migratory birds (e.g., osprey platforms mapped; bald eagles known regionally). No collision mortality at plant structures/lines has been reported.

TVA site management practices include avoidance and minimization of impacts to sensitive habitats, timing restrictions to protect nesting birds where applicable, and implementation of BMPs during maintenance or ground disturbing activities. Habitat based assessments for federally listed bat species are conducted following TVA and USFWS guidance, emphasizing evaluation of roosting and foraging habitat rather than intrusive survey methods unless otherwise required (TVA 2023).

3.7.1.2 Environmental Consequences

Table 3-14 lists the terrestrial ecology issues and findings identified in the 2024 NRC GEIS. Each of these issues was reviewed with respect to impacts associated with WBN license renewal.

Table 3-14. Terrestrial Ecology Issues, 2024 NRC GEIS Findings, and Environmental Impacts

Issue	GEIS Finding	Impact
Non-cooling system impacts on terrestrial resources	(Category 2). The magnitude of effects of continued nuclear power plant operation and refurbishment, unrelated to operation of the cooling system, would depend on numerous site-specific factors, including ecological setting, planned activities during the license renewal term, and characteristics of the plants and animals present in the area. Application of best management practices and other conservation initiatives would reduce the potential for impacts.	SMALL
Exposure of terrestrial organisms to radionuclides	SMALL (Category 1). Doses to terrestrial organisms from continued nuclear power plant operation and refurbishment during the license renewal term would be expected to remain well below U.S. DOE exposure guidelines developed to protect these organisms.	SMALL
Cooling system impacts on terrestrial resources (plants with once-through cooling systems or cooling ponds)	SMALL (Category 1). Continued operation of nuclear power plant cooling systems during license renewal could cause thermal effluent additions to receiving waterbodies, chemical effluent additions to surface water or groundwater, impingement of waterfowl, disturbance of terrestrial plants and wetlands from maintenance dredging, and erosion of shoreline habitat. However, plants where these impacts have occurred successfully mitigated the impact, and it is no longer of concern. These impacts are not expected to be significant issues during the license renewal term.	SMALL

Issue	GEIS Finding	Impact
Cooling tower impacts on terrestrial plants	SMALL (Category 1). Continued operation of nuclear power plant cooling towers could deposit particulates and water droplets or ice on vegetation and lead to structural damage or changes in terrestrial plant communities. However, nuclear power plants where these impacts occurred have successfully mitigated the impact. These impacts are not expected to be significant issues during the license renewal term.	SMALL
Bird collisions with plant structures and transmission lines*	SMALL (Category 1). Bird mortalities from collisions with nuclear power plant structures and in-scope transmission lines would be negligible for any species and are unlikely to threaten the stability of local or migratory bird populations or result in noticeable impairment of the function of a species within the ecosystem. These impacts are not expected to be significant issues during the license renewal term.	SMALL
Water use conflicts with terrestrial resources (plants with cooling ponds or cooling towers using makeup water from a river)	(Category 2). Nuclear power plants could consume water at rates that cause occasional or intermittent water use conflicts with nearby and downstream terrestrial and riparian communities. Such impacts could noticeably affect riparian or wetland species or alter characteristics of the ecological environment during the license renewal term. The one plant where impacts have occurred successfully mitigated the impact. Impacts are expected to be small at most nuclear power plants but could be moderate at some.	SMALL
Transmission line ROW management impacts on terrestrial resources*	SMALL (Category 1). In-scope transmission lines tend to occupy only industrial-use or other developed portions of nuclear power plant sites and, therefore, effects of ROW maintenance on terrestrial plants and animals during the license renewal term would be negligible. Application of best management practices would reduce the potential for impacts.	SMALL
Electromagnetic field effects on terrestrial plants and animals	SMALL (Category 1). In-scope transmission lines tend to occupy only industrial-use or other developed portions of nuclear power plant sites and, therefore, the effects of electromagnetic fields on terrestrial plants and animals during the license renewal term would be negligible.	SMALL

Source: (NRC 2024b)

Alternative A – The No Action Alternative

Under Alternative A, operations would continue with no change in impacts until decommissioning, operational sources cease, fuel is removed, and dismantlement/restoration occur under NRC approved plans and standard environmental BMPs. The 2024 NRC GEIS and rulemaking documents state that these terrestrial impacts are typically SMALL and temporary when BMPs are used. There is no N&SI that would impact this determination, and no mortality has been documented to date regarding terrestrial species. TVA would maintain vegetation where it is already managed and not create any new vegetation corridors. Therefore, TVA agrees that all Category 1 related impacts would be SMALL during decommissioning and likely decline due to cease of operations.

Regarding Category 2 issues, dismantlement and restoration would be confined primarily to developed footprints and work would follow NRC approved decommissioning plans, state and federal guidance and compliance, and standard construction BMPs. With riparian buffers and forest fragments identified in the 2025 survey, avoidance/minimization measures would prevent encroachment, and impacts would be temporary and smallest in already disturbed zones. No unusual terrestrial sensitivities were documented within the industrial core and no N&SI was identified. Under decommissioning, cooling tower makeup pulled from the Tennessee River would stop, removing a potential stressor; no terrestrial water use conflict would remain. Therefore, Category 2 issue impacts would be SMALL and temporary with BMPs.

Construction and operation impacts of new generation assets would vary based on site selection, existing site conditions, and type of generation chosen. Impacts would be SMALL to MODERATE through the use of BMPs and adhering to federal and state regulations.

Alternative B – WBN License Renewal

TVA evaluated each Category 1 issue related to terrestrial ecology listed in **Table 3-14** for N&SI. No N&SI was identified. WBN's radiological environmental monitoring program has not identified terrestrial biota impacts and NRC has documented compliance with effluent limits and lack of adverse ecological effects (NRC 2013a). The natural environment would remain unchanged from its current state, and any maintenance would be reported. Therefore, TVA characterizes the environmental impact on the applicable terrestrial ecology issues under license renewal as SMALL, in agreement with 2024 NRC GEIS findings.

TVA also evaluated each Category 2 issue for terrestrial ecology listed in **Table 3-14** for N&SI. No N&SI was identified. WBN does not consume a significant amount of water from the Tennessee River or any from groundwater that would conflict with terrestrial resources (Section 3.6). Application of BMPs and other conservation initiatives reduce other impacts. There have been no changes to management of terrestrial ecology since the last review was complete (**Appendix G**) that would lead to changes in disturbances, permit conditions or natural resource management that would alter impacts. Therefore, TVA has determined that Category 2 issue impacts of continued operation to terrestrial ecology would be SMALL.

3.7.2 Aquatic Ecology

3.7.2.1 Affected Environment

WBN is located within the Tennessee River Basin, a major freshwater system in the southeastern United States, and within the impounded river–reservoir aquatic ecoregion of the Valley and Ridge physiographic province. The Tennessee River watershed is one of the most hydrologically altered river systems in North America due to TVA's system of dams and reservoirs. Aquatic systems in this ecoregion are characterized by large, regulated rivers, reservoirs, tributary streams, wetlands, and embayments influenced by dam operations. Surface waters within the WBN site drain to Chickamauga Reservoir/Tennessee River, which in turn discharges downstream through Chickamauga Dam. Aquatic conditions at the WBN site are therefore strongly influenced by upstream watershed inputs and TVA reservoir management practices rather than site specific runoff alone. Typical conditions include altered flow regimes, seasonally fluctuating water levels, reduced sediment transport relative to free-flowing rivers, and aquatic communities adapted to reservoir environments (TVA 2011a).

The primary aquatic feature affected by WBN is the Chickamauga Reservoir, an impoundment of the Tennessee River that borders the southern and eastern portions of the WBN site. Chickamauga Reservoir functions as both the source and receiving waterbody for plant cooling water withdrawals and discharges. Aquatic features within the WBN site are addressed in Section 3.6.1. These features provide localized aquatic and semi-aquatic habitat and drain toward the Tennessee River either directly or through intermediate channels.

Cooling water for WBN is withdrawn from both Chickamauga and Watts Bar Reservoirs. Cooling water is withdrawn via an intake structure located along Chickamauga Reservoir shoreline adjacent to the plant. Additionally, there is a gravity fed supplemental cooling water system located on the face of Watts Bar Dam at the Watts Bar Reservoir. Heated effluents and cooling tower blowdown are discharged back to the reservoir through permitted outfalls regulated under the WBN site's NPDES permit. Chickamauga Dam, located downstream, regulates reservoir elevation, flow velocity, and seasonal hydrology. No additional dams or flood control structures are located between the plant and Chickamauga Dam.

Major alterations to the aquatic environment in the vicinity of WBN occurred prior to plant construction as a result of Tennessee River impoundment and dam construction, which converted a free-flowing river into a regulated reservoir system. These changes included altered flow patterns, sediment deposition, and shifts in fish and benthic communities. Construction and operation of WBN occurred within this already modified

aquatic setting. TVA monitoring data indicate that since plant operation began, aquatic conditions have remained relatively stable, with no substantial degradation attributable to plant operations beyond the localized and regulated effects of thermal discharges (TVA 2022b).

The aquatic food web in Chickamauga Reservoir and associated tributaries is driven by phytoplankton and periphyton, with energy transfer supported by detrital inputs from surrounding riparian forests and wetlands. Field observations and historical data provide no evidence that WBN operations have altered trophic relationships or caused trophic cascades within the reservoir system. Aquatic habitats in the vicinity of WBN support warm-water fish assemblages typical of large southeastern reservoirs, including sport fish, forage fish, and benthic species. Aquatic macroinvertebrates documented or expected to occur include insects, crustaceans, and mussels adapted to reservoir and tributary habitats. A full list of aquatic species can be found in the *Aquatic Species and Habitat Report* (**Appendix H**).

The broader Tennessee River Basin is recognized for its historically high mussel diversity. Database reviews identified numerous state- and federally listed aquatic species within the watershed, although suitable habitat for many of these species is limited or absent within the immediate WBN site.

Non-native and nuisance species occur within Chickamauga Reservoir and regional waterways, consistent with other TVA-managed reservoirs. These species are managed at a regional scale and were not identified as being uniquely influenced by WBN operations.

Aquatic resources at WBN have been evaluated through long term TVA and NRC monitoring programs and targeted studies. TVA conducts routine thermal monitoring, water quality sampling, and biological assessments in Chickamauga Reservoir to ensure compliance with NPDES permit limits and protection of aquatic life. The 2025 *Aquatic Species and Habitat Assessment* (**Appendix H**) included desktop reviews of the TVA Natural Heritage Database and USFWS IPaC system, geographic information system-based habitat mapping, and field surveys documenting streams, wetlands, ponds, and aquatic habitat features across the WBN site. These efforts provide baseline and trend data for evaluating aquatic conditions.

TVA implements sites-specific and fleet-wide environmental procedures to protect aquatic resources, as addressed in Section 2.3. Aquatic resource protection is integrated into routine environmental compliance and monitoring programs.

Discharges to Chickamauga Reservoir are regulated under the CWA through a TDEC-issued NPDES permit, which establishes effluent limits, monitoring requirements, and operational constraints designed to protect aquatic life and water quality. The WBN NPDES permit includes conditions addressing thermal effluents, including maximum allowable discharge temperatures and continuous or periodic monitoring at designated outfalls. The permit also includes provisions related to impingement and entrainment, requiring intake design and operational practices that minimize impacts to fish and other aquatic organisms. Available monitoring data indicate that discharges comply with permit limits and are protective of aquatic resources (TVA 2024).

3.7.2.2 Environmental Consequences

Table 3-15 lists the aquatic resources issues and findings identified in the 2024 NRC GEIS. Each of these issues was reviewed with respect to impacts associated with the WBN license renewal.

Table 3-15. Aquatic Resource Issues, 2024 NRC GEIS Findings, and Environmental Impacts

Issue	GEIS Finding	Impact
Impingement mortality and entrainment of aquatic organisms (plants with once-through cooling systems or cooling ponds)	(Category 2). The impacts of impingement mortality and entrainment would generally be small at nuclear power plants with once-through cooling systems or cooling ponds that have implemented best technology requirements for existing facilities under Clean Water Act (CWA) Section 316(b). For all other plants, impacts could be small, moderate, or large depending on characteristics of the cooling water intake system, results of impingement and entrainment studies performed at the plant, trends in local fish and shellfish populations, and implementation of mitigation measures.	SMALL
Impingement mortality and entrainment of aquatic organisms (plants with cooling towers)	SMALL (Category 1). No significant impacts on aquatic populations associated with impingement mortality and entrainment at nuclear power plants with cooling towers have been reported, including effects on fish and shellfish from direct mortality, injury, or other sublethal effects. Impacts during the license renewal term would be similar and small. Further, the effects of these cooling water intake systems would be mitigated through adherence to NPDES permit conditions established pursuant to CWA Section 316(b).	SMALL
Entrainment of phytoplankton and zooplankton	SMALL (Category 1). Entrainment has not resulted in noticeable impacts on phytoplankton or zooplankton populations near operating nuclear power plants. Impacts during the license renewal term would be similar and small. Further, effects would be mitigated through adherence to NPDES permit conditions established pursuant to CWA Section 316(b).	SMALL
Effects of thermal effluents on aquatic organisms (plants with once-through cooling systems or cooling ponds)	(Category 2). Acute, sublethal, and community-level effects of thermal effluents on aquatic organisms would generally be small at nuclear power plants with once-through cooling systems or cooling ponds that adhere to State water quality criteria or that have and maintain a valid CWA Section 316(a) variance. For all other plants, impacts could be small, moderate, or large depending on site-specific factors, including ecological setting of the plant; characteristics of the cooling system and effluent discharges; and characteristics of the fish, shellfish, and other aquatic organisms present in the area.	SMALL
Effects of thermal effluents on aquatic organisms (plants with cooling towers)	SMALL (Category 1). Acute, sublethal, and community-level effects of thermal effluents have not resulted in noticeable impacts on aquatic communities at nuclear power plants with cooling towers. Impacts during the license renewal term would be similar and small. Further, effects would be mitigated through adherence to State water quality criteria or CWA Section 316(a) variances.	SMALL
Infrequently reported effects of thermal effluents	SMALL (Category 1). Continued operation of nuclear power plant cooling systems could result in certain infrequently reported thermal impacts, including cold shock, thermal migration barriers, accelerated maturation of aquatic insects, proliferation of aquatic nuisance organisms, depletion of dissolved oxygen, gas supersaturation, eutrophication, and increased susceptibility of exposed fish and shellfish to predation, parasitism, and disease. Most of these effects have not been reported at operating nuclear power plants. Plants that have experienced these impacts successfully mitigated the impact, and it is no longer of concern. Infrequently reported thermal impacts are not expected to be significant issues during the license renewal term.	SMALL
Effects of non-radiological contaminants on aquatic organisms	SMALL (Category 1). Heavy metal leaching from condenser tubes was an issue at several operating nuclear power plants. These plants successfully mitigated the issue, and it is no longer of concern. Cooling system effluents would be the primary source of non-radiological contaminants during the license renewal term. Implementation of best management practices and adherence to NPDES permit limitations would minimize the effects of these contaminants on the aquatic environment.	SMALL

Issue	GEIS Finding	Impact
Exposure of aquatic organisms to radionuclides	SMALL (Category 1). Doses to aquatic organisms from continued nuclear power plant operation and refurbishment during the license renewal term would be expected to remain well below U.S. Department of Energy exposure guidelines developed to protect these organisms.	SMALL
Effects of dredging on aquatic resources	SMALL (Category 1). Dredging at nuclear power plants is expected to occur infrequently, would be of relatively short duration, and would affect relatively small areas. Continued operation of many plants may not require any dredging. Adherence to best management practices and CWA Section 404 permit conditions would mitigate potential impacts at plants where dredging is necessary to maintain function or reliability of cooling systems. Dredging is not expected to be a significant issue during the license renewal term.	SMALL
Water use conflicts with aquatic resources (plants with cooling ponds or cooling towers using makeup water from a river)	(Category 2). Nuclear power plants could consume water at rates that cause occasional or intermittent water use conflicts with nearby and downstream aquatic communities. Such impacts could noticeably affect aquatic plants or animals or alter characteristics of the ecological environment during the license renewal term. The one plant where impacts have occurred successfully mitigated the impact. Impacts are expected to be small at most nuclear power plants but could be moderate at some.	SMALL
Non-cooling system impacts on aquatic resources	SMALL (Category 1). No significant impacts on aquatic resources associated with landscape and grounds maintenance, stormwater management, or ground-disturbing activities at operating nuclear power plants have been reported. Impacts from continued operation and refurbishment during the license renewal term would be similar and small. Application of best management practices and other conservation initiatives would reduce the potential for impacts.	SMALL
Impacts of transmission line ROW management on aquatic resources	SMALL (Category 1). In-scope transmission lines tend to occupy only industrial-use or other developed portions of nuclear power plant sites and, therefore, the effects of ROW maintenance on aquatic plants and animals during the license renewal term would be negligible. Application of best management practices would reduce the potential for impacts.	SMALL

Source: (NRC 2024b)

Alternative A – The No Action Alternative

During continued operation, impacts would not change from SMALL as they relate to aquatic ecology, until operations cease and decommissioning begins.

Under decommissioning, where BMPs and permits apply, impacts are SMALL and typically temporary. No N&SI alters these 2024 NRC GEIS findings. Under decommissioning, operational aquatic pathways end, and any dismantlement phase effects are temporary and BMP controlled, resulting in only SMALL or no impacts for all Category 1 issues. Some Category 2 issues would remain not applicable due to established operational processes and water use conflicts are eliminated with cessation of withdrawals. No dredging or additional construction would be anticipated.

The impacts of decommissioning as they pertain to the replacement of power would vary depending on the type of power, location, and if they are near aquatic resources. All impacts would be evaluated in a separate assessment or NEPA document.

Alternative B – WBN License Renewal

TVA evaluated each Category 1 issue related to aquatic ecology listed in **Table 3-15** for N&SI. No N&SI was identified. WBN license renewal would not change impacts from those that currently exist operationally. Aquatic impacts are limited to existing infrastructure and no projects were identified that would require new stream or wetland crossings. Given existing programs, mitigation measures and

permitting protocols, impacts would be minimal. Therefore, TVA characterizes the environmental impact on aquatic ecology under license renewal as SMALL, in agreement with 2024 NRC GEIS findings.

TVA also evaluated the applicable Category 2 issue related to water use conflicts for N&SI. No N&SI was identified. Category 2 issues identified in **Table 3-15** as non-applicable to WBN remain unchanged. WBN withdrawals from Chickamauga Reservoir are a small fraction of river flow, with operations governed by TVA's systemwide water management and NPDES limits. No demonstrated conflicts with aquatic resources have been noted during operation of the closed cycle system with the installation of Best Technology Available (BTA) and there would be no change in withdrawal rates or operations. WBN is currently compliant with Closed Cycle Cooling BTA for both entrainment and impingement. No in-scope transmission line projects were identified that would require new stream or wetland crossings, and aquatic impacts associated with transmission line ROWS are limited to existing infrastructure. Therefore, TVA has determined that impacts to aquatic ecology from Category 2 issues of continued operation under license renewal would be and remain SMALL.

3.7.3 Federally Protected Resources

3.7.3.1 Affected Environment

For purposes of compliance with the ESA, the action area for the WBN license renewal includes the WBN site, associated facilities, and adjacent terrestrial and aquatic habitats where direct or indirect effects of continued operations and maintenance activities could occur. This includes forested areas, wetlands, streams, ponds, and portions of Chickamauga Reservoir adjacent to intake and discharge structures.

The affected environment for federally protected resources at WBN includes habitats with varying potential to support federally listed or proposed species, particularly bats and migratory species. While suitable habitat is present for some species, field surveys and habitat evaluations indicate limited or low likelihood of occurrence for most ESA listed species within the action area. This characterization provides the baseline for effect determinations and consultation considerations addressed in subsequent sections.

Desktop reviews of the USFWS IPaC system and the TVA Natural Heritage Database, combined with in-field surveys as reflected in the October 2025 *Protected Species and Habitat Evaluation Report* (**Appendix G**), identified seven federally listed or proposed terrestrial animal species with potential to occur within or near the action area. Each species is described in **Table 3-16** regardless of likelihood of occurrence using descriptions from USFWS and NatureServe databases. Protected status for species is at the federal level unless stated otherwise. No designated critical habitat for any federally listed or proposed species occurs within the WBN action area. Consequently, no physical or biological features essential to the conservation of listed species have been identified within the WBN site.

Table 3-16. Protected Species with Possibility of Occurrence at WBN

Species Name	Status*	Likelihood of Occurrence based on Habitat Presence and Quality**	Effects Determination
Gray bat, <i>Myotis grisescens</i>	Endangered	Moderate; 203 ac. low-quality habitat, 388 ac. medium-quality habitat, 51 ac. high-quality habitat	NOT LIKELY TO ADVERSELY AFFECT (NLAA)
Little brown bat, <i>Myotis lucifugus</i>	State-listed	See above (Gray Bat)	NLAA
Northern long-eared bat, <i>Myotis septentrionalis</i>	Endangered	See above (Gray Bat)	NLAA
Tricolored bat, <i>Perimyotis subflavus</i>	Proposed Endangered	See above (Gray Bat)	Would not jeopardize continued existence

Species Name	Status*	Likelihood of Occurrence based on Habitat Presence and Quality**	Effects Determination
Meadow jumping mouse, <i>Zapus hudsonius</i>	Partial status	Low; 192 ac. low-quality habitat	NO EFFECT
Whooping crane, <i>Grus americana</i>	EXPN, non-essential	Low, 6 ac. foraging habitat	Would not jeopardize continued existence
Bald eagle, <i>Haliaeetus leucocephalus</i>	Delisted, protected under the BGEPA	Moderate; foraging habitat present; nests recorded <3-mile of WBN	Would not significantly impact
Osprey, <i>Pandion haliaetus</i>	State-listed, MBTA	High; foraging habitat and nesting habitat (artificial platforms) present	Would not significantly impact
Eastern hellbender, <i>Cryptobranchus alleganiensis alleganiensis</i>	Proposed Endangered	None; no habitat present	Would not jeopardize continued existence
Monarch butterfly, <i>Danaus plexippus</i>	Proposed Threatened	High; 198 ac. of habitat supporting milkweed species and other forbs	Would not jeopardize continued existence
Wading bird colonies	MBTA	High; 30 acres of possible migratory stopover and foraging habitat; active colonies recorded <3-mile of WBN	Would not significantly impact.

Source: Appendix G - October 2025 Protected Species and Habitat Evaluation Report* EXPN = Experimental Population; BGEPA = Bald and Golden Eagle Protection Act; MBTA = Migratory Bird Treaty Act

** Description of habitat present is included in Appendix G Report

WBN is outside of any area wherein species under National Oceanic and Atmospheric Administration's Fisheries or Magnuson-Stevens Fishery Conservation and Management Act jurisdiction would occur. TVA has determined that ESA protected species and essential fish habitat for federally managed fish populations are not present in the vicinity of WBN. There are also no National Marine Sanctuaries at or in the vicinity of the WBN site. Therefore, affected environment and impacts related to the associated 2024 NRC GEIS issues with regards to these federally protected resources will not be further discussed in this section as they are not applicable or relevant to the WBN license renewal.

TVA has coordinated with agencies as appropriate, including USFWS and TDEC, through database queries, habitat assessments and evaluations. Information from the TVA Natural Heritage Database and USFWS IPaC system informed the identification of federally and state-listed species with potential to occur at or near the WBN site. The results of the 2025 *Protected Species and Habitat Evaluation Report* (**Appendix G**) are intended to support ongoing and future NEPA reviews and agency consultations related to the WBN license renewal. Consultation history is provided in **Appendix I**.

3.7.3.2 Environmental Consequences

Regarding species protected under the ESA, the significance of the effects from license renewal can be characterized based on a determination of whether and to what degree continued operations, including refurbishment, could affect a listed species. In accordance with the ESA, effects on federally listed species are based on the following effects categories: (1) NO EFFECT; (2) may affect but NOT LIKELY TO ADVERSELY AFFECT; (3) LIKELY TO ADVERSELY AFFECT; or (4), for listed species that are likely to be adversely affected, LIKELY (or NOT LIKELY) TO JEOPARDIZE THE CONTINUED EXISTENCE of the affected species or adversely modify designated critical habitat (78 Federal Register [FR] 37281-37324; June 20, 2013). For species proposed for listing, the determination is whether effects are LIKELY TO JEOPARDIZE the continued existence of proposed species (USFWS and NMFS 1998).

Table 3-17 lists the special status species and habitat issue and finding identified in the 2024 NRC GEIS. These issues were reviewed with respect to impacts associated with the WBN license renewal.

Table 3-17. Special Status Species and Habitat Issues, 2024 NRC GEIS Findings, and Environmental Impacts

Issue	GEIS Finding	Impact
Endangered Species Act: federally listed species and critical habitats under U.S. Fish and Wildlife Service jurisdiction	(Category 2). The potential effects of continued nuclear power plant operation and refurbishment on federally listed species and critical habitats would depend on numerous site-specific factors, including the ecological setting; listed species and critical habitats present in the action area; and plant-specific factors related to operations, including water withdrawal, effluent discharges, and other ground-disturbing activities. Consultation with the U.S. Fish and Wildlife Service under Endangered Species Act Section 7(a)(2) would be required if license renewal may affect listed species or critical habitats under this agency's jurisdiction.	NO EFFECT to NOT LIKELY TO ADVERSELY AFFECT
Endangered Species Act: federally listed species and critical habitats under National Marine Fisheries Service jurisdiction	(Category 2). The potential effects of continued nuclear power plant operation and refurbishment on federally listed species and critical habitats would depend on numerous site-specific factors, including the ecological setting; listed species and critical habitats present in the action area; and plant-specific factors related to operations, including water withdrawal, effluent discharges, and other ground-disturbing activities. Consultation with the National Marine Fisheries Service under Endangered Species Act Section 7(a)(2) would be required if license renewal may affect listed species or critical habitats under this agency's jurisdiction.	N/A
Magnuson-Stevens Act: essential fish habitat	(Category 2). The potential effects of continued nuclear power plant operation and refurbishment on essential fish habitat would depend on numerous site-specific factors, including the ecological setting; essential fish habitat present in the area, including habitats of particular concern; and plant-specific factors related to operations, including water withdrawal, effluent discharges, and other activities that may affect aquatic habitats. Consultation with the National Marine Fisheries Service under Magnuson-Stevens Act Section 305(b) would be required if license renewal could result in adverse effects to essential fish habitat.	N/A
National Marine Sanctuaries Act: sanctuary resources	(Category 2). The potential effects of continued nuclear power plant operation and refurbishment on sanctuary resources would depend on numerous site-specific factors, including the ecological setting; national marine sanctuaries present in the area; and plant-specific factors related to operations, including water withdrawal, effluent discharges, and other activities that may affect aquatic habitats. Consultation with the Office of National Marine Sanctuaries under National Marine Sanctuaries Act Section 304(d) would be required if license renewal could destroy, cause the loss of, or injure sanctuary resources.	N/A

Source: (NRC 2024b)

Alternative A – The No Action Alternative

As described in Section 3.7.3.1, multiple federally listed or proposed species were evaluated for the WBN action area. Potential habitat exists for some species, however, no designated critical habitat occurs within the action area. Therefore, under current operations, protected species under USFWS jurisdiction would continue to experience NO EFFECT or NOT LIKELY TO ADVERSELY AFFECT and formal ESA Section 7 consultation is not required.

All federally protected resource issues are Category 2; however, due to the absence of designated critical habitat within the WBN action area, and because decommissioning would eliminate operational stressors and be conducted under established environmental controls, the determination would be NO EFFECT to NOT LIKELY TO ADVERSELY AFFECT, and no formal consultations needed under onsite decommissioning, unless future site conditions change or listed species are identified. The development of replacement energy sources would need to be evaluated based on the resource type and location.

Alternative B – WBN License Renewal

Under the WBN license renewal, continued operation and refurbishment activities would occur largely within previously disturbed and developed areas, with no major new construction or land use changes proposed. Based on habitat conditions, operational controls, and the absence of critical habitat, continued

operation of WBN is NOT LIKELY TO ADVERSELY EFFECT or would have NO EFFECT on federally listed species under USFWS jurisdiction. Any routine maintenance or refurbishment would be subject to TVA environmental procedures, including seasonal and spatial avoidance measures where applicable.

TVA also evaluated the applicable Category 2 issue related to federally protected resources for N&SI. No N&SI was identified. Category 2 issues identified as non-applicable to WBN remain unchanged. Therefore, TVA has determined that impacts to federally protected resources from Category 2 issues related to continued operation under the proposed license renewal would be and remain SMALL.

3.8 HISTORIC AND CULTURAL RESOURCES

3.8.1 Affected Environment

As part of the extensive history of environmental review of constructing and operating WBN, TVA has considered the potential impact on historic and archaeological resources associated with each undertaking. The entire WBN property was subjected to a systematic archaeological survey in 2022. However, the area of potential effects (APE) for the WBN license renewal project is considered only to be those previously physically disturbed areas, and no archaeological sites have been identified within the APE. TVA would review any future ground-disturbing activity outside of the APE for potential effects on historic properties, in compliance with 36 CFR Part 800 and TVA's system-wide programmatic agreement (*Programmatic Agreement Among the Tennessee Valley Authority, the Advisory Council on Historic Preservation, and the State Historic Preservation Officers Of Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia, and Federally Recognized Indian Tribes, Regarding Undertakings Subject to Section 106 of the National Historic Preservation Act of 1966*), executed in 2020. This would include coordination with the Tennessee SHPO, as it has done with previous projects on the WBN site (TVA 2017).

The transmission line corridors associated with the WBN site were surveyed, and no archaeological sites were encountered that were potentially eligible for the National Register of Historic Places (NRHP) (NRC 1995).

3.8.1.1 Cultural Background

Prior to Euro-American settlement, the area was inhabited and used by multiple Native American groups for over 13,000 years. This area was occupied by the Cherokee Indians at the time of the earliest incursion by British long hunters; the U.S. government acquired these lands by treaty in 1805. Rhea County was formed by an act of the Tennessee legislature on December 3, 1807. The county boundaries fluctuated frequently in the early years following formation but eventually stabilized to contain an area of approximately 360 square miles. The original county seat was at Washington, but in 1890 the county seat was removed to Dayton, its present location. To the west and nearer the WBN site location is Spring City, which was developed in the latter half of the nineteenth century. In 1939 TVA authorized construction of the Watts Bar Dam, about 2 miles upstream of the WBN site, which was fully operational by 1944. Other energy producing facilities have been constructed by TVA in the area and since retired, including the Watts Bar Steam Plant (later renamed WBF) (TVA 1972).

3.8.1.2 Historic and Cultural Resources at the WBN site and in the Vicinity

TVA has previously completed archaeological investigations encompassing all areas on the WBN site. These have identified 14 archaeological sites: 40RH6, 40RH7, 40RH8, 40RH64, 40RH323, 40RH324, 40RH325, 40RH326, 40RH327, 40RH328, 40RH329, 40RH330, 40RH331, and 40RH332. TVA completed data recovery of 40RH6 and 40RH7 in the 1970s (Calabrese 1976, Schroedl 1978). prior to construction of WBN. One historic cemetery (Leuty Cemetery) was located on the property prior to plant construction. Two graves were removed in 1974 and placed in Ewing Cemetery.

After completing a “comprehensive” archaeological survey in 2022 (Stephens and Garvin, 2022) TVA determined, in consultation with the Tennessee State Historic Preservation Office (SHPO) and federally recognized Indian tribes, the following: site 40RH6 should be considered as eligible for inclusion in the National Register of Historic Places (NRHP); sites 40RH8 and 40RH64 have unassessed eligibility for inclusion; and sites 40RH7, 40RH323, 40RH324, 40RH325, 40RH326, 40RH327, 40RH328, 40RH329, 40RH330, 40RH331, and 40RH332 are ineligible due to a lack of data potential. The SHPO agreed with these determinations; none of the consulted tribes objected or identified additional resources of concern. In the 1998 review of the WBN SCCW (TVA 1998), TVA determined that WBF was eligible for listing on the NRHP. WBF has subsequently been decommissioned and demolished, following execution of a Memorandum of Agreement by TVA and SHPO regarding mitigation of the adverse effect from demolition. Therefore, the properties considered eligible or potentially eligible on the site are archaeological sites 40RH6, 40RH8, and 40RH64.

Archaeological sites also exist along the reservoir shoreline, downstream from the WBN site, but they would not be affected by plant operations. Plant operations are not expected to impact any areas along the river where any additional, but still unidentified, sites may exist (NRC 1995).

In 2023 the WBN was assessed by TRC for NRHP eligibility. The WBN was constructed between 1973 and 2016 and the span of operational life for the WBN is less than 50 years, which is below the NRHP threshold. Although the WBN has played an important role during its operational life, which started in 1996, the plant was not eligible under NRHP Criterion A, B, C, or G. It was recommended that the WBN be reevaluated in 2046 with the benefit of a broader time horizon.

3.8.1.3 2019 System-wide Section 106 PA

In 2019, TVA executed the *Programmatic Agreement Among the Tennessee Valley Authority, the Advisory Council on Historic Preservation, and the State Historic Preservation Officers of Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia, and Federally Recognized Indian Tribes, Regarding Undertakings Subject to Section 106 of the National Historic Preservation Act Of 1966* (2019 System-wide Section 106 PA). The 2019 System-wide Section 106 Programmatic Agreement (PA) identifies routine, repetitive actions TVA may undertake in the implementation of its responsibilities throughout the Power Service Area that can be excluded from further Section 106 review, as well as actions with low potential to affect historic properties for which, under specific circumstances, TVA may find, without further consultation, do not result in adverse effects on historic properties. In accordance with Section 106 of the NHPA, its implementing regulations at 36 CFR Part 800.1-16, and the 2019 System-wide Section 106 PA, TVA would avoid, minimize, or mitigate potential operation-related impacts (TVA et al. 2019). The 2019 System-wide Section 106 PA is applicable during continued operations of WBN.

3.8.2 Environmental Consequences

Error! Reference source not found. lists the historic and cultural resources issue and finding identified in the 2024 NRC GEIS. This issue was reviewed with respect to impacts associated with the WBN license renewal.

Table 3-18. Historic and Cultural Resource Issue, 2024 NRC GEIS Finding, and Environmental Impact

Issue	GEIS Finding	Impact
Historic and cultural resources*	(Category 2). Impacts from continued operations and refurbishment on historic and cultural resources located onsite and in the transmission line ROW are analyzed on a plant-specific basis. The NRC will perform a National Historic Preservation Act (NHPA) Section 106 review, in accordance with 36 CFR Part 800 which includes consultation with the State and Tribal Historic Preservation Officers, Indian Tribes, and other interested parties.	NO ADVERSE EFFECT

Source: (NRC 2024b)

3.8.2.1 **Alternative A – The No Action Alternative**

Under the No Action Alternative, operational impacts would not change, as there would be no change in the operational status or activities occurring at the WBN site that could affect historic and cultural resources. Decommissioning impacts at the WBN site could vary depending on the nature of the decommissioning activities and would require evaluation through NEPA and NHPA processes when proposed in the future.

3.8.2.2 **Alternative B – WBN License Renewal**

The NHPA requires federal agencies to consider the effects on historic properties site and provide a reasonable opportunity for the Advisory Council on Historic Preservation to comment, for any action that is of a type with potential to affect historic properties. The proposed action (WBN relicensing) does not currently include any ground-disturbing actions, new construction, or modifications to any above-ground historic properties. As such, TVA has determined the proposed action is not a type of activity with potential to affect historic properties, even if any are located within the affected area. Therefore, TVA is not required to comply with Section 106 of the National Historic Preservation Act for the proposed action.

-Any proposed future new construction or ground disturbance or any action that could result in modifications to an above-ground historic property at WBN would require additional TVA review. TVA would review the action under Section 106 and TVA's System-wide PA and complete all necessary steps. TVA's review would include the identification of appropriate consulting parties, modification of the undertaking's APE, identification of historic properties, evaluations of effect, seeking ways to avoid or minimize any adverse effects, and mitigating adverse effects, in consultation with the Tennessee SHPO, federally recognized Indian tribes, and any additional consulting parties as appropriate.

TVA evaluated the relevant Category 2 issue for N&SI; none was identified. Therefore, TVA determined that impacts of continued operation would be NO ADVERSE EFFECT.

3.9 **SOCIOECONOMICS**

3.9.1 **Affected Environment**

The nuclear plant and the communities that support it can be described as a dynamic socioeconomic ecosystem. The communities provide the people, goods, and services needed to operate the nuclear power plant. Power plant operations, in turn, provide employment and income and pay for goods and services from the communities. The measure of a community's ability to support power plant operations depends on the ability of the community to respond to changing economic conditions (NRC 2024b). Therefore, this section considers factors related to demographics, employment and income, recreation and tourism, tax revenue, community services and education, housing, and transportation (NRC 2024b).

The socioeconomic ROI is defined by the counties where the nuclear power plant employees and their families reside, spend their income, and use their benefits, thereby affecting economic conditions in the region. The most significant impacts of plant operations are expected to occur in a seven-county area in Tennessee that includes the counties where the majority of WBN employees reside: Rhea (in which WBN is located), Hamilton, Knox, Loudon, Meigs, McMinn, and Roane (NRC 2013a). In addition, NRC Regulatory Guide 4.2 requires that information on the population within a 50-mile radius be identified. Consequently, while general demographic characteristics are described for the region encompassed by the 50-mile radius, all other aspects of the socioeconomic analysis are limited to the defined seven-county ROI. All data tables referenced throughout this section are located in **Appendix J**.

3.9.1.1 Demographics

Demographics consider population characteristics, such as population density, population growth or decline, the presence of minority populations and Indian Tribes, transient populations, and migrant workers. Approximately 70 percent of WBN employees live in the ROI. Of those, an estimated 30 percent reside in either Knox or Hamilton County, where the cities of Knoxville and Chattanooga are located, respectively. Of the remaining employees outside the ROI, about 16 percent live within a 50-mile radius from the WBN site, and 14 percent live outside the 50-mile radius.

The population density of the area surrounding the WBN site is relatively low. The two nearest cities with populations exceeding 100,000 people are Chattanooga, approximately 77.4 km (48 miles) to the southwest, with a population of 191,496 people; and Knoxville, approximately 85.3 km (53 miles) northeast, with a population of 198,722 people (USCB 2024a).

There are 33 counties within a 50-mile radius of the WBN site, located in Tennessee, North Carolina, and Georgia (**Figure 3-8**). Of these, three counties are located in North Carolina, four in Georgia, and the remainder in Tennessee. Population estimates for the counties within the 50-mile radius based on the U.S. Census Bureau (USCB) American Community Survey 5-Year Estimates from 2024 are presented in **Appendix J** Error! Reference source not found. (USCB 2024b). Population change between 2014 and 2024 is also shown in **Appendix J** as a metric of how the population in the region has either grown or declined over the past decade, which may be an indicator of underlying socioeconomic characteristics (USCB 2014).

According to the 2024 American Community Survey 5-Year Survey, an estimated 2,867,184 people lived in the counties within a 50-mile radius of WBN. A total of 1,758,464 people live within the ROI. The population in the ROI has increased in all counties at a slow to moderate pace, with the most growth occurring in Loudon County, at 17.8 percent (USCB 2014, USCB 2024b).

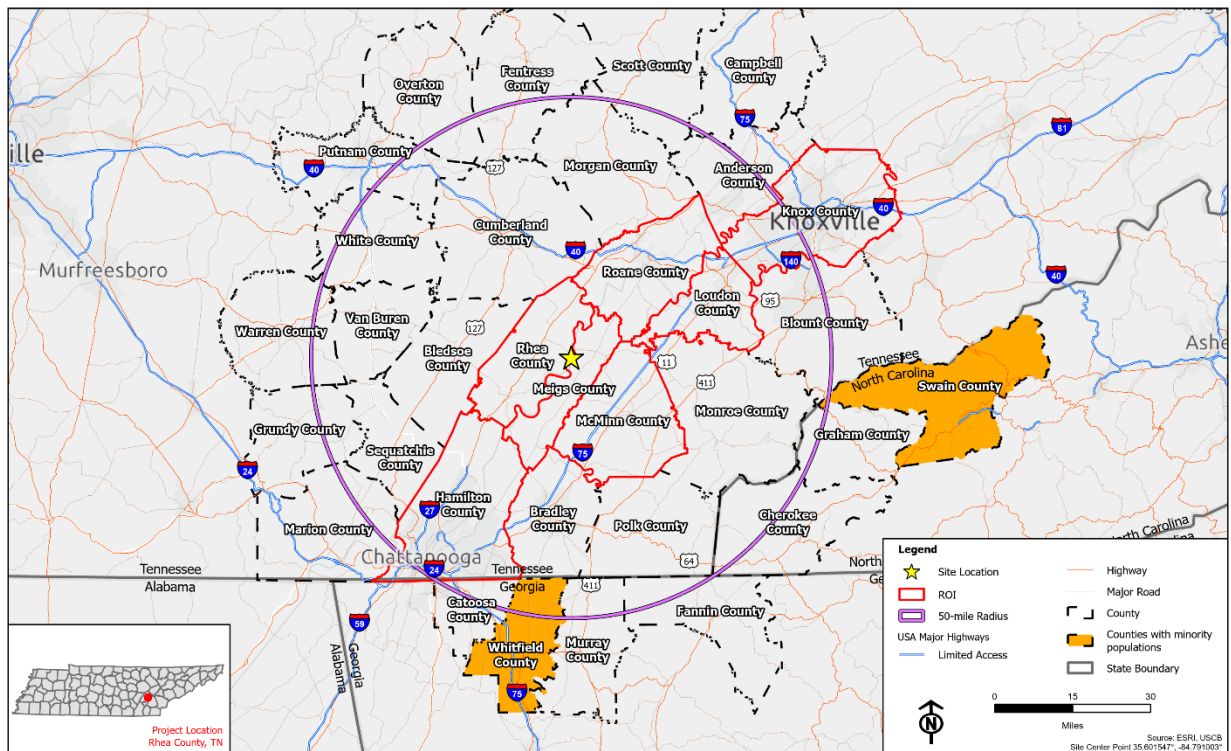


Figure 3-8. Counties, cities, towns, major roadways and minority populations within a 50-mile Radius of WBN

The overall demographic profile of the counties within the 50-mile radius is presented in **Appendix J**, with detail on demographic groups living in the area. “Minority Population” refers to the population that identifies as Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, Some Other Race, or Two or More Races; or who identifies as having Hispanic or Latino ethnicity. “Low-income” refers to the population that is living below the poverty line, which has been defined as \$15,060 for an individual in 2024 by the Department of Health and Human Services (HHS 2024).

Minorities comprised approximately 13.8 percent of the total regional population (i.e., within the 50-mile radius), and approximately 16.4 percent of the ROI population. Of the counties within a 50-mile radius, only two had aggregate minority populations that exceeded the regional average by 20 percent or more: Swain County, NC (40.8 percent); and Whitfield County, GA (44.5 percent). No counties had minority populations greater than 50 percent (USCB 2024b).

Low-income populations comprised approximately 15.1 percent of the 50-mile radius population, and approximately 13.3 percent of the ROI population. Of the counties within a 50-mile radius, none had a low-income population that exceeded the regional average by 20 percent or more, and none had a low-income population greater than 50 percent (USCB 2024c).

As shown in **Appendix J**, only two counties within the ROI have minority populations that comprise more than 20 percent of the total population: Hamilton County (31.7 percent) and Knox County (20.9 percent). The population identifying as “Two or More Races” comprises the largest minority population across Loudon, McMinn, Meigs, and Roane County; the population identifying as “Black or African-American” comprises the largest minority population across Hamilton and Knox County; and those with a Hispanic or Latino ethnicity are the largest minority group in Rhea County (USCB 2024b). No Tribal Nations are present within the seven-county ROI nor within the 50-mile radius around the WBN site (BIA 2016).

3.9.1.2 Employment and Income

TVA employs 1,171 workers at WBN, with approximately 85 percent residing in Hamilton, Knox, Loudon, Megis, McMinn, Rhea, and Roane counties in Tennessee. The remaining TVA workers live within a 50-mile radius of the WBN site (NRC 2013b). Refueling and maintenance outages for WBN are on a 18-month cycle. Refueling outages last approximately 28–45 days and an additional 900 contract workers are onsite during an outage. Various employment industries are present within the ROI counties in addition to employment offered by the WBN site. **Table J-4 in Appendix J** presents comparative labor, employment, and income characteristics for the ROI.

Economic trends across the ROI are similar. Unemployment rates are comparable, ranging from 2.8 percent (Loudon County) to 5.8 percent (Rhea County). Incomes are also similar, although there is a sizable discrepancy between the highest and lowest median household incomes, in Loudon County (\$84,185) and Rhea County (\$55,033), respectively. Per capita incomes range from \$30,273 (Rhea County) to \$45,341 (Hamilton County) (USCB 2024d). The Manufacturing industry is the largest employment sector for McMinn (26.4 percent), Meigs (25.2 percent), and Rhea (30.1 percent) counties. The Educational Services, Health Care, and Social Assistance industry is the largest employment sector by percentage in Hamilton (22.2), Knox (24.7), Loudon (17.6), and Roane (20.1) counties (USCB 2024d).

Migrant workers are farm workers whose employment required travel that prevented the worker from returning to their permanent residence the same day. The Census of Agriculture (conducted every 5 years) provides a comprehensive compilation of agricultural production data for every county in the U.S. including the number of farms hiring migrant and temporary farm labor (i.e., working less than 150 days) (USDA 2022a). **Appendix J** contains detailed information on migrant and temporary farm labor in the ROI.

According to the 2022 Census of Agriculture, 1,467 farm workers were hired to work for fewer than 150 days and were employed across 539 farms in the ROI (USDA 2022b).

3.9.1.3 Recreation and Tourism

The area around the WBN site consists of wooded rolling hills. The WBN site is visible from the Tennessee River and Watts Bar Reservoir, including from two public boat ramps across the river from the WBN site and a designated fishing WBN site adjacent to Watts Bar Dam (TWRA 2026). It is also visible from the Watts Bar Dam and other locations of TN-68. The forested land and terrain provide barriers to viewing the containment, turbine buildings, and support structures from most nearby areas (NRC 2013b).

A number of recreational facilities and resources exist in the area, including the Watts Bar Reservoir. More than 30 developed recreational facilities and campgrounds are present on the Watts Bar Reservoir, including the Pinhook Ferry Campground on the eastern shore of the river across from WBN. The Tennessee Wildlife Resources Agency annually stocks several fish species in the Watts Bar Reservoir for recreational fishers (TWRA 2026). Three scenic areas and trails are also located around Watts Bar Dam, which may have visibility to the WBN site: Whites Creek Small Wild Area, Fooshee Small Wild Area Trail, and Forrest City Trail (Tennessee River Valley 2026). The surrounding counties may experience seasonal transient population growth as a result of local tourism or recreational activities.

3.9.1.4 Tax Revenue

In accordance with federal law, Section 13 of the TVA Act (16 U.S.C. 8311), TVA does not pay property taxes but instead makes payments in lieu of taxation (PILOT) to the State of Tennessee. The amount is determined by the book value of the TVA property in the state and the value of TVA power sales in the state (NRC 2013b).

In fiscal year 2025, TVA made PILOT payments to the State of Tennessee in the amount of \$401,408,227. Total PILOT payments made by TVA over the past 5 years are presented in **Table 3-19**. This amount is not specific to the WBN site or any other TVA site within the state. The State of Tennessee then distributes these funds to local governments based on relative population, total acreage in a county, and TVA-owned acreage in a county (NRC 2013b). In addition to the PILOT payments, TVA paid \$5,000 to Rhea County United Way in 2025 as part of the WBN community outreach program. TVA is not aware of any other financial benefit contributions or assistance programs to state or local governments or organizations.

Table 3-19. Total PILOT Payments by TVA to the State of Tennessee, 2021-2025

Parameter	2021	2022	2023	2024	2025
Tennessee Revenues	\$336,145,561	\$341,689,664	\$93,033,906	\$390,402,385	\$401,408,227

Source: (NRC 2025b)

3.9.1.5 Community Services and Education

The Watts Bar Utility District in Roane County handles the WBN site's potable water needs and the Spring City Sewage Plant handles the wastewater needs (NRC 2013b). The Watts Bar Utility District also provides water service to portions of five counties within the ROI: Loudon, McMinn, Meigs, Rhea, and Rhone (Watts Bar Utility District 2025).

The WBN site is located in the Rhea County School District across the Tennessee River from the Meigs County School District. Eleven schools across the two districts – seven in Rhea County and four in Meigs County – provide elementary and secondary education to students living within these districts. A total of 3,890 students are enrolled in Rhea County schools (IES 2025a), and 1,797 students are enrolled in Meigs County Schools (IES 2025b).

In addition to these two districts, the Hamilton, Knox, Loudon, McMinn and Roane County School Districts also provide education to school-aged children associated with the WBN workforce. A total of 45,981 students are enrolled across 82 schools in the Hamilton County School District (IES 2025c). A total of 60,185 students are enrolled across 95 schools in the Knox County School District (IES 2025d). A total of 5,085 students are enrolled across nine schools in the Loudon County School District (IES 2025e). A total of 5,051 students are enrolled across nine schools in the McMinn County School District (IES 2025f). A total of 6,178 students are enrolled across 18 schools in the Roane County School District (IES 2025g).

3.9.1.6 Housing

Appendix J provides housing data for the ROI, any of which would provide a reasonable commuting distance from the WBN site. In McMinn, Meigs, Rhea, and Roane counties, over 10 percent of all housing units are vacant and may be available for occupancy (USCB 2024e). Although not all vacant units may be suitable for occupancy, there is sufficient supply available for the current population within the ROI, as well as to satisfy population growth in the short-term.

3.9.1.7 Transportation

Figure 3-8 shows the location of counties, cities, and towns within an 80-km (50-mile) radius of the WBN site. The workforce and a portion of the materials needed for plant operations, as well as solid waste and radwaste, enter and exit the WBN site via roadways. The nearest land transportation route, Tennessee State Route 68 (TN-68), is located about 1.6 km (1 mile) north of the WBN site.

Interstate Highway (I)-75 passes within 29 km (18 miles) to the east of the WBN site, and I-40 passes within 45 km (28 miles) to the north of the WBN site. Workers and visitors access the WBN site from TN-68, which connects with U.S. Highway 27 (US-27) and TN-304 to the west, and TN-302, TN-58, and I-75 to the east. TN-68 is the roadway that crosses over Watts Bar Dam. TN-68, TN-302, and TN-58 are all two-lane highways in good condition (NRC 2013a). US-27 is a four-lane highway. Access to the WBN site is from a three-way intersection with a turning lane off TN-68.

The Tennessee Department of Transportation (TDOT) maintains average annual daily traffic (AADT) statistics. On TN-68 where it crosses Watts Bar Dam, the AADT in 2024 was about 4,700 vehicles. In 2024, TN-302 west of WBN had an AADT of 913 vehicles, and TN-304 east WBN had an AADT of 1,061 vehicles (TDOT 2026). TDOT considers this level of traffic to be well below the capacity of a two-lane highway in this part of the county.

As WBN is located at the northern end of the Chickamauga Reservoir, TVA's sixth-largest reservoir, there is also water transportation in the area. The reservoir is 59 miles long on the Tennessee River and 32 miles long on the Hiwassee River, with the navigation channel extending up the Hiwassee approximately 21 miles. Barge transportation on this stretch of the Tennessee River past WBN is significantly less than further downstream. Total tonnage of commodities past WBN ranges from 0.5 - 0.75 million tons annually with salt, non-ferrous ores, and petroleum being the prime commodities transported. Of the 1,500 – 2,000 vessels passing through Watts Bar lock each year (and therefore by WBN), approximately 75 percent are recreation vessels with commercial tows and federal tows comprising the remainder (TVA 2017).

Barges have been used to deliver replacement steam generators to the WBN site (TVA 2017). TVA unloaded these units at a docking area north of the coal-unloading facility for WBF that was located north of WBN Units 1 and 2. TVA biennially inspects the river channel for silt formation in the forebay with results used to determine if dredging is required and if there should be an increase in monitoring. Based on the results of a review TVA completed in October 2008, no dredging is required or planned (TVA 2010).

3.9.2 Environmental Consequences

Table 3-20 lists the socioeconomic issues and findings identified in the 2024 NRC GEIS. Each of these issues was reviewed with respect to impacts associated with the WBN license renewal.

Table 3-20. Socioeconomic Issues, 2024 NRC GEIS Findings, and Environmental Impacts

Issue	GEIS Finding	Impact
Impacts on minority populations, low-income populations, and Indian Tribes	(Category 2). Impacts on minority populations, low-income populations, Indian Tribes, and subsistence consumption resulting from continued operations and refurbishment associated with license renewal will be addressed in nuclear plant-specific reviews.	SMALL
Employment and income, recreation and tourism	SMALL (Category 1). Although most nuclear plants have large numbers of employees with higher than average wages and salaries, employment, income, recreation, and tourism impacts from continued operations and refurbishment associated with license renewal are expected to be small.	SMALL
Tax revenue	SMALL (Category 1). Nuclear plants provide tax revenue to local jurisdictions in the form of property tax payments, payments in lieu of tax (PILOT), or tax payments on energy production. The amount of tax revenue paid during the license renewal term as a result of continued operations and refurbishment associated with license renewal is not expected to change.	SMALL
Community services and education	SMALL (Category 1). Changes resulting from continued operations and refurbishment associated with license renewal to local community and educational services would be small. With little or no change in employment at the licensee's plant, value of the power plant, payments on energy production, and PILOT payments expected during the license renewal term, community and educational services would not be affected by continued power plant operations.	SMALL
Population and housing	SMALL (Category 1). Changes resulting from continued operations and refurbishment associated with license renewal to regional population and housing availability and value would be small. With little or no change in employment at the licensee's plant expected during the license renewal term, population and housing availability and values would not be affected by continued power plant operations.	SMALL
Transportation	SMALL (Category 1). Changes resulting from continued operations and refurbishment associated with license renewal to traffic volumes would be small.	SMALL

Source: (NRC 2024b)

3.9.2.1 Alternative A – The No Action Alternative

Under the No Action Alternative, operational impacts would not change, as there would be no change in the operational status or activities occurring at the WBN site that could affect socioeconomic conditions such as employment, housing, taxes, recreation, or other community features. Decommissioning impacts at the WBN site would likely be SMALL; however, overall impacts from the closure of the WBN site would be SMALL to MODERATE. Closure activities would result in a loss of operational and temporary refueling jobs which could result in adverse impacts to various regional socioeconomic characteristics, including employment, taxes, housing, offsite land use, economic structure, and public services. These impacts would be partially offset on an individual level if some WBN workers were retrained and employed for the operation of the replacement generation assets and/or at other locations within the TVA system. Impacts may be offset at a regional level if TVA pursued siting new generation assets at or near the WBN site.

3.9.2.2 Alternative B – WBN License Renewal

TVA evaluated each Category 1 issue related to socioeconomics listed in **Table 3-20** for N&SI. No N&SI was identified.

Demographics

TVA evaluated the applicable Category 2 issue for N&SI. No N&SI was identified. License renewal of WBN would not be expected to result in any changes to regional demographics within the 50-mile radius of WBN or within the socioeconomics ROI. Therefore, TVA has determined that Category 2 issues impacts of continued operation under license renewal to demographically distinct populations would be SMALL.

Employment and Income

Employment at WBN is not expected to change during the proposed period of extended operation, and no impacts to the regional population would be anticipated as a result of the proposed license renewal. Wages would be expected to remain consistent or rise in accordance with cost of living. Income received by WBN employees would be spent within the local economy, thereby contributing to additional employment opportunities and income within the community. Therefore, TVA characterizes the impacts to employment and income under license renewal as SMALL, in agreement with 2024 NRC GEIS findings.

Recreation and Tourism

Recreational opportunities would be presumed to remain unchanged in terms of seasonal tourism contributing to the local economy, and unhindered by the visual element of the nuclear power plant. Therefore, TVA characterizes impacts to recreation and tourism under license renewal as SMALL, in agreement with 2024 NRC GEIS findings.

Tax Revenues

Population growth within the ROI may affect how PILOT payments from TVA are distributed by the State of Tennessee to local governments. However, TVA does not determine how these payments are distributed and would not be responsible for any changes. Since operating employment levels are not anticipated to change, PILOT payments to the state would not be expected to change. Therefore, TVA characterizes impacts to tax revenue under license renewal as SMALL, in agreement with 2024 NRC GEIS findings.

Community Services and Education

Public utilities needs would not change from current conditions with continued operation in terms of water and wastewater. The utility services have been able to meet the demand of the WBN site and would be expected to continue to have sufficient capacity. As there would also be no change in employment levels at the nuclear power plant, there would be no effect on overall enrollment, school capacity, or the number of schools that could impact educational systems. Therefore, TVA characterizes impacts to community services and education under license renewal as SMALL, in agreement with 2024 NRC GEIS findings.

Population and Housing

With no additional employment, regional population growth is not expected to occur as a result of the WBN license renewal. Population growth is still expected to occur given historic trends, but this would be unrelated to WBN. However, short-term population increases, as well as temporary demand for housing or rental units, may occur to support regularly scheduled refueling and maintenance outages. There are sufficient housing units within the ROI to accommodate any transient workers, consistent with current conditions, and these temporary changes in housing demand would not have long-term implications on housing availability or price. Therefore, TVA characterizes impacts to population and housing under license renewal as SMALL, in agreement with 2024 NRC GEIS findings.

Transportation

There are currently no capacity issues with the access road being able to handle personnel employed at the WBN site, and since the license renewal would not increase the number of workers, the amount of traffic on this access road would remain unchanged. Similarly, there would not be an increase in traffic on

other nearby roadways, including TN-68, or for barge traffic. Therefore, TVA characterizes impacts to transportation under license renewal as SMALL, in agreement with 2024 NRC GEIS findings.

3.10 HUMAN HEALTH

3.10.1 Affected Environment

The conditions at WBN which result in an occupational risk, but do not affect the safety of licensed radioactive materials, are under the statutory authority of Occupational Safety and Health Administration (OSHA). WBN adheres to OSHA standard 29 CFR Part 1960 and has a comprehensive occupational safety program for WBN workers and activities. No incidents involving plant workers have been entered into the WBN Corrective Action Program, as they would be reported as applicable for OSHA compliance.

3.10.1.1 Radiological Hazards

Depending on work assignments, occupational radiation exposure is possible for workers who have received radiation safety training and are classified as radiological workers. NRC regulations in 10 CFR Part 20 require that occupational radiation exposures be kept ALARA with a limit on the annual total effective dose equivalent (TEDE) for individual radiation workers of 0.05 Sieverts (Sv) (5 rem) per year. For the general public, federal environmental radiation standards, 10 CFR Part 20, limit TEDE to 1 millisieverts (mSv) (100 millirem [mrem]) per year.

To evaluate WBN's impacts on the surrounding environment, TVA established the WBN Radiological Environmental Monitoring Program (REMP) prior to the station becoming operational to provide information on background radiation present in the area. Environmental samples from different media are monitored as part of the program in accordance with specifications detailed in the Offsite Dose Calculation Manual (ODCM) at the site boundaries. Dosimeters at the site boundary are processed in accordance with 0-ODI-999-02, Quarterly Direct Radiation Dosimeter Collection. The ODCM also stipulates effluent (liquid and gaseous) monitoring requirements and RCTP – 105 Rev. 0015, Personnel Inprocessing and Dosimetry Administrative Processes govern personnel radiation monitoring. The program compares data from indicator locations near WBN to control locations farther away to assess operation impacts.

The NRC used data from WBN REMP reports between 2002-2010 to be representative of a broad range of activities at the plant and to determine average radiological exposures. These data show exposures or concentrations in air, water, and vegetation and have average annual direct radiation exposure ranging from 0.44 mSv (44 mrem) to 0.66 mSv (66 mrem) near the plant perimeter (i.e., indicator stations), and from 0.37 mSv (37 mrem) to 0.61 mSv (61 mrem), at distances greater than 10 miles (i.e., background control locations). The indicator and control location results are similarly comparable for drinking water, vegetation, and fish (NRC 2013a). For those same 9 years reviewed, the maximum annual dose to a member of the public was less than 0.374 mSv (3.74 mrem) from operating WBN Unit 1. These data show that doses to the maximally exposed individual around the WBN site were below the federal limits.

The Annual Radiological Environmental Operating Report provides data obtained through analyses of environmental samples collected at WBN for the reporting period of January 1st through December 31st. A major change that has occurred since the initial license is that WBN produces tritium using TPBARs. Unit 1 began irradiating TPBARs in 2003, and Unit 2 began irradiating TPBARs in 2020. Onsite dose from tritium is measured through bioassay with negligible dose accrued with most individual readings of 1 mrem or less.

During the most recent sampling period, 2024, 1,997 analyses were performed on 1,519 samples. Tritium was identified in some water and atmospheric moisture samples, which was known previously and is tracked and managed by TVA. No other samples identified any positive plant-related radionuclides that are not naturally occurring. After assessment of data gathered for the 2024 report and comparison of those

results with preoperational data and/or 10-year average values, it was concluded that the operation of WBN, did not result in detection of plant-related radionuclides in the environment (TVA 2025d).

Radiation exposure to plant workers at WBN is well beneath both regulatory and site administrative limits. The highest exposed individual at WBN for 2024 was 520 mrem and for 2023 it was 657 mrem.

3.10.1.2 Microbiological Hazards

Thermal discharges at the WBN site into the cooling-tower basins and then into the Tennessee River have the potential to increase the growth of disease-causing microorganisms that thrive on warmer water, which could compromise public and occupational health. The types of organisms that could cause serious health concerns from water exposures (swimming, recreation, ingestion, etc.), particularly at high exposure levels, include pathogens such as *Salmonella* spp. and *Pseudomonas aeruginosa*, fungi, bacteria such as *Legionella* spp., free-living amoeba such as *Naegleria fowleri* and *Acanthamoeba* spp., and microorganisms that release toxins such as dinoflagellates and blue-green algae (NRC 2024b). The potential impacts usually through ingestion may cause fever, diarrhea, and potentially a variety of more serious effects. Each of these species, their thermal tolerances, and their impacts are thoroughly discussed in Section 3.9.2.2 of the 2024 NRC GEIS, as well as in the NRC 2013 Final Environmental Statement Related to the Operation of WBN, Unit 2, Supplement 2, Final Report (NRC 2013a).

The NPDES temperature limits for WBN outfalls to the Tennessee River are at or below 95°F, which is below the optimal growth temperatures for the above-mentioned organisms (TDEC 2022). Although the thermal discharge changes the temperature of the receiving waters, the change in temperature especially after mixing would still be within the organisms' range of tolerance. Since the organisms are ubiquitous in the aquatic environment, it is unlikely the minor change in temperature would increase the numbers by a significant amount. Therefore, the public with access to the Tennessee River are not likely to be impacted due to changes in temperature from WBN outfalls. TVA additionally sent a letter to the Tennessee Department of Health (TDH) on March 5, 2026, to consult TDH on any known outbreaks due to the presence of thermophilic organisms in the vicinity of WBN, in accordance with NRC guidance. TVA received a response on April 17, 2026 indicating there have been no legionellosis outbreaks in Meigs or Rhea Counties (the areas surrounding the plant and reservoir) in the last 12 months. These letters and any other agency correspondence can be found in **Appendix I**.

TVA is not aware of any incidents at WBN related to microbiological hazards to plant workers. If an incident was to occur, TVA/WBN would take immediate actions to protect the work force, enter the issue into the corrective action program, and thoroughly investigate the issue and potential causes. To date, no such incidents related to microbiological organisms with the potential to affect plant workers has been documented. WBN complies with all applicable federal, state, and local environmental laws, regulations and permits to minimize the potential for microbiological hazards to impact plant workers. WBN practices good industrial hygiene practices in accordance with all requirements.

3.10.1.3 Electric Shock Hazards

TVA contracted EPRI to perform electric field surveys on the in-scope transmission lines to verify that the short-circuit current to ground produced from the largest anticipated vehicle or object is limited to less than 5 mA. This complies with the national electric safety code (NESC) requirements. The highest recorded value would limit the shock to 0.02 mA.

The 500 kV and 161 kV switchyards at WBN would remain in place and energized regardless of license renewal. The 500 kV and 161 kV switchyard are located entirely on the WBN site and in-scope transmission lines are located completely within the WBN site boundary. If WBN was decommissioned, the 161 kV transmission lines would effectively bypass (pass through) the WBN site. Thus, the in-scope

transmission lines are located entirely within the WBN site and are not accessible to the public. All in-scope transmission lines meet NESC standards. The electric shock hazards associated with these lines are controlled in accordance with applicable industrial safety standards.

3.10.1.4 Electric and Magnetic Fields

Electric and magnetic fields, collectively referred to as the EMF, are produced by operating transmission lines and generated by electrical equipment. Electric fields are produced by voltage, and their strength increases with increases in voltage. Occupational workers or members of the public near transmission lines may be exposed to the EMFs produced by transmission lines. The EMF varies in time as the current and voltage change. Electrical fields can be shielded by objects such as trees, buildings, and vehicles. Magnetic fields, however, penetrate most materials, but their strength decreases with increasing distance from the source. EMF strength at ground-level varies greatly under these lines, generally being stronger for higher-voltage lines, a flat configuration of conductors, relatively flat terrain, terrain with no shielding obstructions.

No consistent evidence linking harmful effects with 60-Hertz (Hz) exposures, what most of the public is exposed to in overhead powerlines, have been identified. Additionally, many studies have been conducted on the exposure to EMF sources and have concluded that current evidence does not support the existence of any health consequences from EMFs resulting from 60-Hz power transmission lines (WHO 2016, NIOSH 1996, NIEHS 2002). There are no U.S. federal standards limiting residential or occupational exposure to EMFs from power lines. This issue is not categorized and is not addressed further.

3.10.2 Environmental Consequences

Table 3-21 lists the human health issues and findings identified in the 2024 NRC GEIS. Each of these issues was reviewed with respect to impacts associated with the WBN license renewal.

Table 3-21. Human Health Issues, 2024 NRC GEIS Findings, and Environmental Impacts

Issue	GEIS Finding	Impact
Radiation exposures to plant workers	SMALL (Category 1). Occupational doses from continued operations and refurbishment associated with license renewal are expected to be within the range of doses experienced during the current license term and would continue to be well below regulatory limits.	SMALL
Radiation exposures to the public	SMALL (Category 1). Radiation doses to the public from continued operations and refurbishment associated with license renewal are expected to continue at current levels and would be well below regulatory limits.	SMALL
Chemical hazards	SMALL (Category 1). Chemical hazards to plant workers resulting from continued operations and refurbishment associated with license renewal are expected to be minimized by the licensee implementing good industrial hygiene practices as required by permits and Federal and State regulations. Chemical releases to the environment and the potential for impacts to the public are expected to be minimized by adherence to discharge limitations of NPDES and other permits.	SMALL
Microbiological hazards to plant workers	SMALL (Category 1). Occupational health impacts are expected to be controlled by continued application of accepted industrial hygiene practices to minimize worker exposures as required by permits and Federal and State regulations.	SMALL
Microbiological hazards to the public	(Category 2). These microorganisms are not expected to be a problem at most operating plants except possibly at plants using cooling ponds, lakes, canals, or that discharge to publicly accessible surface waters. Impacts would depend on site-specific characteristics.	SMALL
Electromagnetic fields (EMFs)*	Uncertain impact (Uncategorized). Studies of 60-Hz EMFs have not uncovered consistent evidence linking harmful effects with field exposures. EMFs are unlike other agents that have a toxic effect (e.g., toxic chemicals and ionizing radiation) in that dramatic acute effects cannot be forced and longer-term effects, if real, are subtle. Because the state of the science is currently inadequate, no generic conclusion on human health impacts is possible.	UNCERTAIN

Issue	GEIS Finding	Impact
Physical occupational hazards	SMALL (Category 1). Occupational safety and health hazards are generic to all types of electrical generating stations, including nuclear power plants, and are of small significance if the workers adhere to safety standards and use protective equipment as required by Federal and State regulations.	SMALL
Electric shock hazards	(Category 2). Electrical shock potential is of small significance for transmission lines that are operated in adherence with the National Electrical Safety Code (NESC). Without a review of conformance with NESC criteria of each nuclear power plant's in-scope transmission lines, it is not possible to determine the significance of the electrical shock potential.	SMALL

Source: (NRC 2024b)

3.10.2.1 Alternative A – The No Action Alternative

Under Alternative A, operations would continue as they are and no changes to impacts on human health would occur. Once decommissioning begins, overall impacts to human health would be SMALL, as most operational exposures to radiological materials and those as a result of thermal effluent would no longer be active. Transmission lines would continue to be in operation, with adequate security so as not to increase risk of electric shock.

Due to safety standards and regulations, impacts to human health associated with construction and operation of a new generation facilities would be SMALL and dependent on the type of energy production and location of said facility.

3.10.2.2 Alternative B – WBN License Renewal

TVA evaluated each Category 1 issue related to human health listed in **Table 3-21** for N&SI. No N&SI was identified. Impacts related to operation of WBN would not change due to license renewal. Radiation doses to the public and employees from continued operations and refurbishment associated with license renewal are expected to continue at current levels, well below regulatory limits. Therefore, TVA characterizes impacts to human health under license renewal as SMALL, in agreement with 2024 NRC GEIS findings.

TVA also evaluated the applicable Category 2 issues for N&SI. No N&SI was identified. TVA has no record of microbiological issues ever having been a concern at WBN or in the vicinity and would continue to follow regulatory guidance and adherence to permitting rules and monitoring. TVA contacted the Tennessee Department of Public Health regarding thermophilic organisms. TDH responded on April 17, 2026, indicating there have been no legionellosis outbreaks in Meigs or Rhea Counties (the areas surrounding the plant and reservoir) in the last 12 months. Correspondence for this exchange can be found in **Appendix I**. As noted above, the EPRI field survey demonstrates compliance with NESC requirements (i.e. potential shock hazard <5mA). Therefore, TVA has determined that Category 2 issue impacts of continued operation under license renewal for human health and electric shock would be SMALL.

3.11 WASTE MANAGEMENT

3.11.1 Affected Environment

Waste management at WBN is described generally in Section 1.3.1.3 and 1.3.1.4 and is detailed further in the following sections. Pollution prevention and waste minimization measures in place are described throughout as well as in Section 2.3 and TVA's Hazardous Waste Minimization Plan. WBN has measures in place to minimize the likelihood of mixing radioactive and hazardous wastes. WBN is a small-quantity generator of Hazardous and Universal Waste.

There is currently no mixed waste stored at WBN, however, WBN has two satellite accumulation drums in the Auxiliary building for waste that could potentially be Mixed Waste. One drum is for Waste Paint and the other drum is for Waste Pre-Tox/Peel Away. Once full those drums are tested and categorized as

appropriate. Also located in the Auxiliary Building, there is a Temporary Hazardous Waste Storage area for drums that are full, have been tested, and are ready for shipment. A list of approved vendors for WBN can be found on the Environmental Restricted Awards List. This list is maintained by the Waste Specialists.

3.11.1.1 Radioactive Waste Management

Radioactive waste management is extensively described in the WBN UFSAR, Section 11 (TVA 2021). It is split into liquid, gaseous, and solid waste management systems. There are also various onsite and offsite radiological monitoring systems that ensure compliance and efficiency of these systems.

Radioactive waste is generated as part of normal plant operations at WBN. These wastes are managed in accordance with TDEC, Division of Radiological Health, under license number T-TN014-L26 and Utah Department of Environmental Quality Division of Waste Management and Radiation Control Generator Site Access Permit Accessing A Land Disposal Facility In Utah, Permit number 1505009348. The solid waste shipped offsite to licensed disposal sites measures approximately 31.5 Curies (Ci) of radioactivity for Class A waste, 203 Ci for Class B waste, and 216.6 Ci for total combined waste. The total amount of hazardous waste disposed over the past 10 years is 43,050 pounds (lbs), or 4,305 lbs per year.

There are varieties of compaction and incineration methods used to reduce the volumes of LLRW for disposal. These methods result in an average reduction of dry solid waste greater than a 10 to 1 ratio. Processing of wet waste is accomplished through mobile demineralizers located in the radwaste packaging area. TVA is not aware of any pending limitations of these facilities.

Liquid Waste

The Liquid Waste Processing System (WPS) is designed to receive, segregate, process, and discharge liquid waste. The system design considers potential personnel exposure and assures that quantities of radioactive releases to the environment are ALARA. Under normal plant operation, the activity from radionuclides leaving the cooling tower blowdown line is a fraction of the limits in 10 CFR Parts 20 and 50 (TVA 2021). The plant is designed to stay within 10 CFR 20 radiological criteria during normal operation, even assuming equipment faults which could occur with moderate frequency, including fuel cladding defects in combination with other leaks or malfunctions.

The liquid WPS collects and processes potentially radioactive wastes for release to the river. Provisions are made to sample and analyze fluids before they are discharged. Based on the laboratory analysis, these wastes are either released under controlled conditions via the cooling tower blowdown or retained for further processing. A permanent record of liquid releases is provided by analyses of known volumes of waste. The radioactive liquids discharged from the Reactor Coolant System are processed by either the Chemical and Volume Control System holdup tanks or Tritiated Drain Collector Tank.

The liquid WPS consists of two main sub-systems processing tritiated and non-tritiated water. A system is provided for handling laboratory samples which may be tritiated and may contain chemicals. Much of the system is controlled or monitored from a central panel in the Auxiliary Building, with most equipment located in or near the building. Malfunction of the system actuates an alarm in the Auxiliary Building and a common alarm in the main control room. Other equipment, including drains and pumps, are located in the Reactor Building. A mobile demineralizer system is located and operated in the waste packaging area. The Tritiated Water Storage Tank subsystem is composed of a 500,000-gal storage tank located in the Unit 1 West yard and its transfer pumps with controls are located in the Unit 1 Additional Equipment Building.

Fluid is sampled and analyzed to determine quantities of radioactivity, with an isotopic breakdown, if necessary, before processing or disposal is attempted. At least two valves must be manually opened to permit discharge of liquid to the environment. One of these valves is normally locked closed. A control

valve trips closed on a high effluent radioactivity level signal. Controls are provided to prevent discharge without adequate dilution.

The liquid WPS is partly shared by the two units. However, except for its containment isolation function, the system serves no primary safety function, and the safety of either unit is not affected by such sharing. Liquid waste is processed, as necessary, through a mobile demineralizer. The liquid WPS components that are not shared are located inside the containment of each unit.

Gaseous Waste

Fission product gases are the major source of gaseous radioactive waste at WBN. Specific isotopes are given in UFSAR Table 11.1-7 (SPECIFIC ACTIVITIES IN PRINCIPAL FLUID STREAMS REALISTIC BASIS uci/gm). The GWPS is designed to remove fission product gases from the Nuclear Steam Supply System and to permit operation with periodic discharges of small quantities of fission gases through the monitored plant vent. This is accomplished by internal recirculation of radioactive gases and holdup in the nine waste gas decay tanks to reduce the concentration of radioisotopes in the released gases (TVA 2021).

The plant gaseous effluent releases during normal operation of the plant are limited at the WBN site boundary not to exceed 10 CFR 50 Appendix I and 40 CFR 190 limits as specified in the ODCM. The complete description of the GWPS is given in UFSAR Section 11.3.

Although plant operating procedures, equipment inspection, and preventive maintenance are performed during plant operations to minimize equipment malfunction, overall radioactive release limits have been established as a basis for controlling plant discharges during operation with the occurrence of a combination of equipment faults. A combination of equipment faults which include operation with fuel defects in combination with possible leakages. The radioactive releases from the plant resulting from equipment faults of moderate frequency are within 10 CFR 50 Appendix I and 40 CFR 190 limits as specified in the ODCM.

The GWPS consists of two waste gas compressor packages, nine waste gas decay tanks, auxiliary services, and the associated piping, valves and instrumentation, which serves both units. The auxiliary services portion of the GWPS consists of two automatic gas analyzers and its instrumentation, valves, and tubing, a nitrogen and a hydrogen supply manifold and the necessary instrumentation, valves, and piping.

Gaseous wastes are received from the following: degassing of the reactor coolant and purging of the volume control tank prior to a cold shutdown, displacing of cover gases caused by liquid accumulation in the tanks connected to the vent header, purging of some equipment, sampling and gas analyzer operation.

Solid Waste

Solid waste inputs are divided into two categories: (1) dry active waste and (2) wet active waste. Dry active waste and wet active waste are products of plant operation and maintenance. Dry active wastes are further subdivided into compactible and non-compactible wastes. Solid compactible wastes include paper, clothing, rags, mop heads, rubber boots, and plastic. Non-compactible wastes include tools, mop handles, lumber, glassware, pumps, motors, valves, and piping. Wet active wastes are primarily composed of spent resins. The sources for spent resins are the spent resin storage tank, the mobile demineralizer, and Condensate Polisher Demineralizer System. The complete description of the solid waste processing system is provided in UFSAR Section 11.5.

Spent Fuel

Spent fuel is removed from the reactor vessel by the refueling machine and placed in the fuel transfer system. In the spent fuel pool, the fuel is removed from the transfer system and placed in the spent fuel storage racks. After a suitable decay period, the fuel may be removed from storage and loaded in a

shipping cask for interim storage at WBN ISFSI until a long-term repository is licensed for cask shipping. Spent fuel is handled entirely underwater from the time it leaves the reactor vessel until it is placed in a cask. Underwater transfer of spent fuel provides an effective, economic and transparent shield, as well as a reliable cooling medium for removal of decay heat. The ISFSI complies with the General License issued under 10 CFR Part 72, Subpart K (General License for Storage of Spent Fuel at Power Reactor Sites) and the conditions contained in the Certificate of Compliance for the cask system. Each dry spent fuel storage cask can accommodate 37 fuel assemblies. TVA is currently using 18-month refueling cycles.

Spent Fuel Storage is described in detail in UFSAR Section 9.1.2. The spent fuel storage pool is a reinforced concrete structure with a stainless-steel liner for leak tightness. This storage pool is a part of the Seismic Category I Auxiliary Building and is shared between Units 1 and 2. Both the liner and pool walls are designed to withstand the effects of an operating basis earthquake and safe shutdown earthquake. The spent fuel storage racks were designed for storage of 1,386 fuel assemblies.

Dry cask storage operations are provided in UFSAR Section 9.1.6. TVA selected HOLTEC International's HI-STORM FW storage system for use at WBN's ISFSI to maintain adequate on-site spent fuel storage capacity. The HI-STORM FW system used at WBN is comprised of stainless steel multi-purpose canister (MPC-37), a transfer cask (HI-TRAC VW), and a HI-STORM FW XL metal / concrete overpack.

TVA may consider pursuing extended operating cycles (24-month cycles) and potential power uprates at WBN in the future. These changes could necessitate the use of high burn-up fuel, or fuel enriched above 5 percent U-235, which exceeds the current licensing basis. Such changes, if pursued, would be subject to a separate and appropriate NRC licensing process, including all required safety and environmental reviews, in accordance with applicable regulatory requirements.

Expansion of the onsite spent fuel dry storage capacity is required in the future if a national storage solution for the permanent storage of spent fuel does not become available during the period of extended operation. The current ISFSI storage pad is projected to be filled on or before the year 2039. Under the existing licenses and assuming decommissioning at the end of the current license periods, an additional 99 dry fuel storage casks would be needed to support operations and decommissioning. The current ISFSI capacity of 80 is thus already accounted for even without license renewal. Accordingly, WBN has plans to expand the ISFSI capacity with a second ISFSI pad by 2039, regardless of license renewal, unless the offsite shipment of spent fuel to an interim or permanent storage facility becomes available. In addition, a third ISFSI pad would be required due to license renewal to accommodate the additional projected 64 dry cask systems required. These calculations account for the available space in the spent fuel pool and the projected spent fuel discharge schedule, as well as projected dry cask loadings required to maintain sufficient space in the spent fuel pool to ensure continued operations through the extended operating period for both units. The addition of a second and eventually third ISFSI storage is under consideration, but plans are in the conceptual stage, and no installation schedule has been established. The WBN site has adequate space onsite to accommodate the construction of additional ISFSI pads as necessary and there is sufficient time for planning, review, license application and construction before new pad(s) are needed.

There is sufficient spent fuel storage capacity to support operations at WBN for both units throughout the license renewal term. The existing spent fuel pool has adequate capacity for projected fuel discharges, and dry cask storage systems are available and licensed for use as needed. TVA maintains compliance with NRC regulations governing spent fuel management.

3.11.1.2 Non-radioactive Waste Management

Currently, solid and hazardous waste generated at WBN is from plant operation and maintenance activities. WBN is a small quantity generator of hazardous waste. The USEPA Generator Identification Number for

WBN is TN 2640030035. All waste generated at WBN is managed in accordance with applicable state and federal regulations (TVA 2017). The nonradioactive waste management system receives and processes non-radiological wastes, including hazardous, non-hazardous, universal, and sanitary wastes. All permits for waste are included in **Appendix E**. Hazardous waste goes to Emelle, Alabama via the vendor Chemical Waste Management and Capital Waste Services does the solid waste pickup. Solid waste is disposed at the Meadow Branch and/or Rhea County Landfills. A general list of containers and oil/chemical contents for buildings and locations on the WBN site is included in **Appendix K (Table K-1)**.

The amount of hazardous, non-hazardous, and recycled waste for WBN Unit 1 over the previous 10 years includes: disposal of ~254,037 lbs non-hazardous waste and 3,175 lbs polychlorinated biphenyl waste; and recycling of ~40,000 gal used oil, ~13,150 lbs universal waste bulk batteries, and ~8,000 lbs universal waste lamps.

Effluent Systems

TVA controls water chemistry for various plant water uses by adding biocides, algacides, corrosion inhibitors, pH buffering chemicals, scale inhibitors, and dispersants. The NPDES permit for these activities is discussed in Section 3.6.1.

TVA discharges water containing chemical and biocidal additives for the condenser cooling system and the CCW system to the Chickamauga Reservoir through Outfalls 101 and 113, respectively. Chemical and biocidal additives and waste streams from various other water-treatment processes and drains are returned to the Yard Holding Pond where they are subjected to dilution, aeration, vaporization, and chemical reactions. The plant then discharges the Yard Holding Pond water to Chickamauga Reservoir through Outfall 101 or 102, subject to the limitations of the WBN site's existing NPDES permit (TVA 2011b).

In addition to the chemicals added as biocide and for corrosion treatment, other chemical additives are used in a variety of plant processes. These chemicals may occur in trace quantities at Outfall 101 or Outfall 102. The potential discharge of these chemicals is through the cooling-tower blowdown line to Outfall 101 and Outfall 102 so Outfall 113 would not receive these discharges.

For WBN Unit 2, TVA discharges wastewater from the potable water supply system to the sanitary drainage system, which discharges offsite to the Spring City Wastewater Treatment Facility (PNNL 2009). TVA has an agreement with the Spring City Wastewater Treatment Plant to treat up to 380,000 L/d (100,000 gal/d) of water (TVA 2009b).

The WBN site's nonradioactive gaseous emissions result primarily from its diesel generators and the CT generator. The emissions are subject to air quality permits that the Council on Environmental Quality issues. USEPA oversees the WBN site's nonradioactive, hazardous waste management through its Resource Conservation and Recovery Act.

3.11.2 Environmental Consequences

Table 3-22 lists the waste management issues and findings identified in the 2024 NRC GEIS. Each of these issues was reviewed with respect to impacts associated with the WBN license renewal. There is no mixed waste storage and therefore, it is not discussed further.

Table 3-22. Waste Management Issues, 2024 NRC GEIS Findings, and Environmental Impacts

Issue	GEIS Finding	Impact
Low-level waste storage and disposal	SMALL (Category 1). The comprehensive regulatory controls that are in place and the low public doses being achieved at reactors ensure that the radiological impacts on the environment would remain small during the license renewal term.	SMALL

Issue	GEIS Finding	Impact
Onsite storage of spent nuclear fuel	During the license renewal term, SMALL (Category 1). The expected increase in the volume of spent fuel from an additional 20 years of operation can be safely accommodated onsite during the license renewal term with small environmental impacts through dry or pool storage at all plants. For the period after the licensed life for reactor operations, the impacts of onsite storage of spent nuclear fuel during the continued storage period are discussed in NUREG-2157 and as stated in § 51.23(b), shall be deemed incorporated into this issue.	SMALL
Offsite radiological impacts of spent nuclear fuel and high-level waste disposal	(Category 1). For the high-level waste and spent-fuel disposal component of the fuel cycle, the EPA established a dose limit of 0.15 mSv (15 millirem) per year for the first 10,000 years and 1.0 mSv (100 millirem) per year between 10,000 years and 1 million years for offsite releases of radionuclides at the proposed repository at Yucca Mountain, Nevada. The Commission concludes that the impacts would not be sufficiently large to require the NEPA conclusion, for any plant, that the option of extended operation under 10 CFR part 54 should be eliminated. Accordingly, while the Commission has not assigned a single level of significance for the impacts of spent fuel and high-level waste disposal, this issue is considered Category 1.	SMALL
Mixed waste storage and disposal	SMALL (Category 1). The comprehensive regulatory controls and the facilities and procedures that are in place ensure proper handling and storage, as well as negligible doses and exposure to toxic materials for the public and the environment at all plants. License renewal would not increase the small, continuing risk to human health and the environment posed by mixed waste at all plants. The radiological and nonradiological environmental impacts of long-term disposal of mixed waste from any individual plant at licensed sites are small.	SMALL
Nonradioactive waste storage and disposal	SMALL (Category 1). No changes to systems that generate nonradioactive waste are anticipated during the license renewal term. Facilities and procedures are in place to ensure continued proper handling, storage, and disposal, as well as negligible exposure to toxic materials for the public and the environment at all plants.	SMALL

Source: (NRC 2024b)

3.11.2.1 Alternative A – The No Action Alternative

Under the No Action Alternative, there would be no additional waste, radioactive or not, than is currently generated. Therefore, there would be no additional impacts to waste generation than were bounded in the WBN UFSAR (TVA 2021). Decommissioning impacts would be SMALL to MODERATE as the quantities and types of solid waste generated by the construction and operation of replacement generation resources would be determined primarily by the number of acres, the initial condition of the selected site(s), and the location and type of technology chosen. All waste would be properly managed onsite and disposed of at approved treatment or disposal facilities in accordance with applicable regulations.

3.11.2.2 Alternative B – WBN License Renewal

TVA evaluated each Category 1 issue related to waste management listed in **Table 3-22** for N&SI. No N&SI was identified. Therefore, the environmental impacts regarding waste management during the continued operation of WBN remain SMALL which is consistent with the determination in the 2024 NRC GEIS and NUREG-2157.

3.12 GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

3.12.1 Affected Environment

3.12.1.1 Greenhouse Gases

Certain gases in the atmosphere absorb heat that is radiated from the surface of the Earth that would otherwise have escaped the atmosphere. These gases, referred to as “greenhouse gases” (GHGs), are primarily CO₂, methane, NO_x, perfluorocarbons, sulfur hexafluoride, and hydrofluorocarbons.

The southeast region where WBN is located is predominantly powered by coal, natural gas, and nuclear power plants and contains extensive oil and gas infrastructure that is essential to the nation's energy supply. The majority of these generation sources, with the exception of nuclear energy, are significant producers of GHGs.

According to the USEPA GHG Inventory, the U.S. energy industry was estimated to emit 5,200 million metric tons CO₂e during 2022, roughly 95 percent of the U.S. net total GHG emissions (USEPA 2026b). The air pollutant emission sources at WBN and permit status are discussed in Section 3.3, Air Quality.

3.12.1.2 Climate Change

The WBN site is in the Southeast Region of the U.S., where annual average temperatures have not increased as much as the rest of the U.S., averaging increases of less than 1°F (USGCRP 2023). Currently, Rhea County and the area surrounding WBN has a moderate climate, with an average yearly temperature since of 57.8°F, which has overall increased since 1970 (NOAA 2026a). TVA is not aware of any elevation of local heat-index days that is directly attributable to climate change. TVA has rigorous procedures to protect health and safety of workers in all conditions.

Average precipitation in the central and eastern U.S. from 2002-2021 was 5 to 15 percent higher relative to the 1901-1960 average (USGCRP 2023). Precipitation in Rhea County averages about 58.2 inches per year, which fluctuates (NOAA 2026b). Prevailing winds tend to be aligned with the valley, which is oriented generally from northeast-southwest. Changes in median annual runoff in the region are predicted to be less than ±2 percent (NRC 2013a).

TVA is not aware of any altered precipitation patterns or changes to hydrology that are directly attributable to climate change. TVA maintains reservoir levels through controlled releases at Watts Bar (upstream) and Chickamauga (downstream) Dams, and at this time there is no need to change reservoir operating policies due to climate change. The reservoir system is already capable of handling an extreme range of precipitation conditions and has successfully managed numerous floods and droughts over many decades. Additionally, TVA has evaluated lake level management requirements due to climate change.

The WBN site is located in the Tennessee Valley, nestled between the Appalachian Mountains and Great Smoky Mountains to the east, and Cumberland Plateau to the west. These geographic features can tend to protect the region from severe weather approaching from the east or northwest (NRC 2013a).

General climate trends show an increase in the intensity and frequency of extreme weather events, such as storms or heat-related events (USGCRP 2023). In the area near and surrounding WBN, winter storms occasionally bring snow, but the accumulation of snow generally totals only a few inches and remains on the ground for only a few days (NRC 2013a). Thunderstorms may occur during any month but are most frequent from April through September. Tornadoes occur infrequently. Based on regional tornado statistics from 1950 through 2008, and the approach described in NUREG/CR-4461, Rev. 2 (Ramsdell Jr. and Rishel 2007), the NRC estimates the probability of a tornado striking the WBN site is about 5×10^{-4} per year (NRC 2013a). However, the Units have been designed to withstand direct tornado strikes. TVA has not directly attributed any infrastructure resilience or operations issues to climate change and is not aware of any local environmental resources changes that can be directly attributable to climate change.

As discussed in Section 3.3.1.2, Air Quality, WBN includes multiple air emission sources associated with plant operations, including auxiliary boilers, emergency diesel generators, and other support equipment. These sources are regulated under the facility's air permitting program. WBN is not considered a major source of emissions subject to New Source Review (NSR) or Prevention of Significant Deterioration (PSD) requirements and is therefore not required to obtain a Title V operating permit.

WBN operates under a synthetic minor air permit that establishes limits on emissions and operating conditions for regulated sources. Facility operations are tracked to maintain compliance with permit conditions. Annual emissions of criteria pollutants, hazardous air pollutants (HAPs), and greenhouse gases (GHGs) are summarized below in **Table 3-23**, and also in Section 3.3.1.2. Refrigerant releases are included in **Appendix K (Table K-2)**.

Based on anticipated operating conditions, GHG emissions from WBN remain well below applicable regulatory reporting thresholds and are small relative to state and regional emission inventories. WBN has not received any notices of violation or noncompliance related to its air permitting program in recent years.

Table 3-23. WBN Annual Emissions (tons per year)

Year	PM (PM ₁₀ or PM _{2.5})	SO ₂	NO _x	VOC	CO	HAPs	GHG (CO ₂ e)
2021	---	2.68E	17.32	0.60	4.70	0.10	---
2022	---	1.97	12.78	0.29	3.46	0.08	---
2023	---	2.18	14.09	0.24	3.82	0.04	---
2024	---	2.57	16.45	0.50	4.40	0.10	---
2025	0.32*	0.44	2.89	0.15	0.79	0.03	747.64*

*Average annual emissions based on average hours of operation of auxiliary boilers and generators for years 2021 to 2025.

3.12.2 Environmental Consequences

Table 3-24 lists the GHG emissions and climate changes issues and findings identified in the 2024 NRC GEIS. Each of these issues was reviewed with respect to impacts associated with the WBN license renewal.

Table 3-24. Greenhouse Gas Emissions and Climate Change Issues, 2024 NRC GEIS Findings, and Environmental Impacts

Issue	GEIS Finding	Impact
Greenhouse gas impacts on climate change	SMALL (Category 1). Greenhouse gas impacts on climate change from continued operations and refurbishment associated with license renewal are expected to be small at all plants. Greenhouse gas emissions from routine operations of nuclear power plants are typically very minor, because such plants, by their very nature, do not normally combust fossil fuels to generate electricity. Greenhouse gas emissions from construction vehicles and other motorized equipment for refurbishment activities would be intermittent and temporary, restricted to the refurbishment period. Worker vehicle greenhouse gas emissions for refurbishment would be similar to worker vehicle emissions from normal nuclear power plant operations.	SMALL
Climate change impacts on environmental resources	(Category 2). Climate change can have additive effects on environmental resource conditions that may also be directly impacted by continued operations and refurbishment during the license renewal term. The effects of climate change can vary regionally and climate change information at the regional and local scale is necessary to assess trends and the impacts on the human environment for a specific location. The impacts of climate change on environmental resources during the license renewal term are location-specific and cannot be evaluated generically.	SMALL

Source: (NRC 2024b)

3.12.2.1 Alternative A – The No Action Alternative

Under Alternative A, there would be no change in GHG emissions which could directly or indirectly impact climate change. Any changes in climate are not expected to impact operation either. Decommissioning may have a SMALL impact through use of equipment, and general increases in GHG emissions for a short period of time. Through the process of creating replacement generation assets, impacts would also be

expected to be SMALL to MODERATE. All replacement technologies would have very little GHG emissions, and therefore GHG-related impacts on climate change in association with construction and operation would be SMALL for all generation assets.

3.12.2.2 Alternative B – WBN License Renewal

TVA evaluated the Category 1 issue related to GHG listed for N&SI. No N&SI was identified. Therefore, TVA characterizes the environmental impacts relating to GHG under license renewal as SMALL, in agreement with 2024 NRC GEIS finding.

TVA also evaluated the applicable Category 2 issues for N&SI; none was identified. Impacts on climate change during normal operations at nuclear power plants can result from the release of GHGs from stationary combustion sources (e.g., diesel generators or engines, pumps, oilers), refrigeration systems, electrical transmission and distribution systems, and mobile sources (worker or delivery vehicles). The GHG emissions from WBN are very minor because the plant does not normally combust fossil fuels to generate electricity. As discussed in Section 3.12.1, direct GHG emissions from operations at WBN do not exceed the reporting threshold established by USEPA. Therefore, TVA has determined that Category 2 issue impacts of continued operation under license renewal on climate change would be SMALL.

3.13 URANIUM FUEL CYCLE AND TRANSPORTATION

3.13.1 Affected Environment

3.13.1.1 Offsite Radiological Impacts

Offsite radiological impacts include those impacts, both individual and collective, from actions other than the disposal of spent fuel and high-level waste. These include impact on individuals, human and biota, who live near uranium fuel cycle facilities, and the direct collective impacts from facilities involved in supplying nuclear fuel to nuclear power plants. Exposure to radiological material could occur via the liquid effluent, gaseous effluent, or direct radiation pathways. Many of these impacts are discussed in Section 3.10.1.1 (Radiological Hazards). TVA previously calculated dose values in its original EIS (TVA 1972) and recalculated them in its FSEIS for WBN in 2008 (TVA 2008), finding the values did not differ materially. In general, NRC independent evaluations on these pathways agreed with TVA conclusions that there is no indication that WBN activities increased the background radiation levels normally observed in the areas surrounding the plant (NRC 2013a).

3.13.1.2 Non-radiological impacts of the uranium fuel cycle

Non-radiological impacts of the uranium fuel cycle include impacts from facilities involved in supplying nuclear fuel to nuclear power plants, which may include changes in land use, water use, fossil fuel use, and chemical effluents. Most non-radiological impacts are addressed previously in the sections above.

There have been no changes, nor are any anticipated, in the sources or quantities of nonradioactive gaseous, liquid, or solid waste materials generated as part of the uranium fuel cycle activities that support the operation of the WBN facility. TVA does not expect any changes that would result in increased non-radiological environmental impacts beyond those previously evaluated in Table S-3 of NUREG-1437, Revision 2 (August 2024).

TVA does not anticipate any refurbishment activities or modifications beyond normal maintenance at the WBN facility associated with the license renewal. There are no planned changes that would result in additional non-radiological impacts related to the uranium fuel cycle. TVA is not aware of any new information that would raise concerns related to the non-radiological impacts of the uranium fuel cycle in the context of the license renewal for WBN.

3.13.1.3 Transportation

New nuclear fuel is typically shipped to WBN from licensed fabrication facilities located in states such as Washington or South Carolina. These shipments are conducted in accordance with NRC and U.S. Department of Transportation regulations and represent standard industry practices, usually via truck in specialized shipping containers (TVA 2008). Spent fuel, once discharged from the reactor, is stored in the spent fuel pool for a required cooling period. Afterward, it is transferred a short distance onsite to the ISFSI pad for dry cask storage. This movement occurs entirely within the controlled boundaries of the WBN site.

A main line of the Cincinnati, New Orleans, and Texas Pacific Railway (Norfolk Southern Corporation) is located approximately 11 km (7 mile) west of the WBN site and could be used to move materials directly to and from the site, as a TVA railroad spur track connects with this main line and extends to the WBN site. However, the spur is not currently in use and would need to be repaired prior to use (NRC 2013a).

3.13.2 Environmental Consequences

Table 3-25 lists the uranium fuel cycle issues and findings identified in the 2024 NRC GEIS. Each of these issues was reviewed with respect to impacts associated with the WBN license renewal.

Table 3-25. Uranium Fuel Cycle Issues, 2024 NRC GEIS Findings, and Environmental Impacts

Issue	GEIS Finding	Impact
Offsite radiological impacts—individual impacts from other than the disposal of spent fuel and high-level waste	SMALL (Category 1). The impacts to the public from radiological exposures have been considered by the Commission in Table S-3 of this part. Based on information in the GEIS, impacts to individuals from radioactive gaseous and liquid releases, including radon-222 and technetium-99, would remain at or below the NRC’s regulatory limits.	SMALL
Offsite radiological impacts—collective impacts from other than the disposal of spent fuel and high-level waste	(Category 1). There are no regulatory limits applicable to collective doses to the general public from fuel-cycle facilities. The practice of estimating health effects on the basis of collective doses may not be meaningful. All fuel-cycle facilities are designed and operated to meet the applicable regulatory limits and standards. The Commission concludes that the collective impacts are acceptable. The Commission concludes that the impacts would not be sufficiently large to require the NEPA conclusion, for any plant, that the option of extended operation under 10 CFR Part 54 should be eliminated. Accordingly, while the Commission has not assigned a single level of significance for the collective impacts of the uranium fuel cycle, this issue is considered Category 1.	SMALL
Non-radiological impacts of the uranium fuel cycle	SMALL (Category 1). The nonradiological impacts of the uranium fuel cycle resulting from the renewal of an operating license for any plant would be small.	SMALL
Transportation	SMALL (Category 1). The impacts of transporting materials to and from uranium-fuel-cycle facilities on workers, the public, and the environment are expected to be small.	SMALL

Source: (NRC 2024b)

3.13.2.1 Alternative A – The No Action Alternative

The No Action Alternative would result in no changes during operation, but decommissioning would temporarily increase impacts as fuel is removed from the WBN site. There would be no impacts associated with most replacement energy resources. Any replacement nuclear sources would require a license and a separate environmental review. Therefore, impacts should be SMALL.

3.13.2.2 Alternative B – WBN License Renewal

TVA evaluated the Category 1 issues listed for N&SI. No N&SI was identified. All fuel-cycle-related activities are expected to continue operating within applicable regulatory limits and standards. There are no

known similar offsite activities that could contribute to radiological or non-radiological cumulative impacts. TVA notes that WBN produces tritium for DOE and any impact from the production of tritium would be included in subsequent LRAs and Environmental Reviews. The non-radiological impacts of the uranium fuel cycle would be classified as minimal to small, as there are no WBN site-specific factors that would alter the NRC conclusion. Therefore, TVA characterizes the collective impacts of the uranium fuel cycle, including offsite radiological impacts and non-radiological impacts, under license renewal as SMALL, in agreement with 2024 NRC GEIS findings.

Given that new fuel is transported over long distances from offsite facilities and spent fuel is only moved a short distance onsite, TVA staff do not consider there to be any significant differences in transportation distances that would alter the NRC 2024 GEIS findings. Therefore, TVA characterizes the environmental impact of transportation under license renewal as SMALL, in agreement with 2024 NRC GEIS findings.

3.14 POSTULATED ACCIDENTS

3.14.1 Affected Environment

This section assesses the environmental impacts of postulated accidents involving radioactive materials at WBN. The term “accident” refers to any unintentional event (i.e., outside the normal or expected plant operation envelope) that results in a release or the potential for a release of radioactive material to the environment. The NRC categorizes accidents as either design basis or severe. For design basis accidents (DBAs) all available core damage frequency and large early release frequency values for all hazards and reactor power uprates are covered extensively in the WBN UFSAR (TVA 2021). There are no known accidents that exceed the design basis.

3.14.1.1 Design Basis Accidents (DBAs)

The potential consequences of postulated accidents are determined based on a set of DBAs representative of the reactor designs. DBAs are those accidents that both the licensee and the NRC evaluate to ensure that the plant can withstand normal and abnormal transients, and a broad spectrum of postulated accidents without undue hazard to the health and safety of the public. The environmental impacts of DBAs are evaluated during the initial licensing process, and the ability of the plant to withstand these accidents is demonstrated to be acceptable before issuance of the operating license. The licensee is required to maintain the acceptable design and performance criteria throughout the life of the plant, including any extended-life operation. The consequences for these events are evaluated for the hypothetical maximally exposed individual; as such, changes in the plant environment would not affect these evaluations.

3.14.1.2 Severe Accidents

Severe accidents are defined as accidents with substantial damage to the reactor core and degradation of containment systems. Severe accident analyses consider both the frequency of a severe accident and the offsite consequences to determine the public risk. The risk of severe accidents is determined by a plant-specific probabilistic risk assessment. At WBN, the probabilistic risk analysis for severe accidents is documented in Severe Accident Mitigation Design Alternatives (SAMDA) analysis. The WBN Unit 1 SAMDA analysis was submitted to the NRC in 1994. The WBN Unit 1 SAMDA was reviewed by NRC, as noted in NUREG 0498 Supplement 1. The WBN Unit 2 SAMDA was submitted to NRC in 2008. The WBN Unit 2 SAMDA was reviewed by NRC as documented in NUREG 0498 Supplement 2. TVA performed a N&SI review using the guidance in NEI 17-04, Model SLR New and Significant Assessment Approach for Severe Accident Mitigation Alternatives (SAMA). TVA has concluded that no N&SI information relevant to the 1994 WBN Unit 1 SAMDA analysis and 2008 WBN Unit 2 SAMDA analysis exists. Therefore, a SAMA or SAMDA is not required for either of the WBN units and no further analysis is needed.

3.14.2 Environmental Consequences

Table 3-26 lists the postulated accident issue and finding identified in the 2024 NRC GEIS. Each of these issues was reviewed with respect to impacts associated with the WBN license renewal.

Table 3-26. Postulated Accident Issue, 2024 NRC GEIS Finding, and Environmental Impact

Issue	GEIS Finding	Impact
Design-basis accidents	SMALL (Category 1). The NRC staff has concluded that the environmental impacts of design-basis accidents are of small significance for all plants.	SMALL
Severe accidents*	(Category 2). The probability-weighted consequences of atmospheric releases, fallout onto open bodies of water, releases to groundwater, and societal and economic impacts from severe accidents are small for all plants. Severe accident mitigation alternatives do not warrant further plant-specific analysis because the demonstrated reductions in population dose risk and continued severe accident regulatory improvements substantially reduce the likelihood of finding cost-effective significant plant improvements.	SMALL

Source: (NRC 2024b)

3.14.2.1 Alternative A – The No Action Alternative

If Alternative A were adopted and the operating license was not extended, TVA would continue to properly maintain all equipment and facilities at WBN and ensure the high integrity of the reactor system and associated safety systems until they are no longer needed through decommissioning as appropriate. Emergency plans would continue to be maintained and implemented as needed, and personnel would continue to receive training and participate in drills and exercises until those are no longer necessary at the appropriate point in decommissioning. The potential impacts from postulated severe accidents would no longer be applicable.

For any non-nuclear electrical power generation facility, there would be no applicable environmental impact related to DBAs or severe radiological accidents. Potential effects from construction and operation of any replacement generation resource would be evaluated in separate analyses once the new generation construction project locations and technologies are specifically identified.

3.14.2.2 Alternative B – WBN License Renewal

TVA evaluated each Category 1 issue related to postulated accidents listed in **Table 3-26** for N&SI. No N&SI was identified. Most aspects related to impacts related to postulated accidents are unchanged and have potentially even improved since initial licensing. Analyses of DBAs have been updated with improvements to both computer codes and analytical methods, with more realistic/accurate methods resulting in margin improvements to design basis limits of the fission product barriers. Plant abnormal/emergency operating procedures continue to be improved via incorporation of the Westinghouse Owner's Group Emergency Response Guideline revisions, while the installation of onsite FLEX equipment provides additional versatility in response to DBAs and beyond DBAs alike. TVA does not anticipate any changes that would impact postulated accidents. Therefore, TVA characterizes the environmental impact associated with postulated accidents, both DBAs under license renewal as SMALL, in agreement with 2024 NRC GEIS findings.

Applicants for license renewal of plants that have not already had a SAMA analysis considered by NRC as part of an EIS, supplement to an EIS, or an EA, must perform a SAMA analysis for license renewal. TVA evaluated the applicable Category 2 issue for N&SI using guidance provided in NEI 17-04, Model SLR New and Significant Assessment Approach for SAMDA, regarding severe accidents. No N&SI relevant to the 1994 WBN Unit 1 SAMDA analysis and 2008 WBN Unit 2 SAMDA analysis was identified. Therefore, TVA has determined that Category 2 issue impacts of continued operation under license renewal to severe accidents would be SMALL.

3.15 DECOMMISSIONING

The impacts from decommissioning a nuclear power plant are evaluated in the 2002 NRC Decommissioning GEIS (NRC 2002).

3.15.1 Regulatory Environment for Decommissioning

Under both alternatives, TVA is required to begin decommissioning each WBN unit no later than the expiration of its operating license. The same decommissioning options apply to each alternative. When TVA proposes a decommissioning option, appropriate environmental reviews would be conducted as decommissioning is a separate licensing action.

The decommissioning process begins when the licensee informs NRC that it has permanently ceased reactor operation, defueled, and intends to decommission the nuclear plant. This may occur prior to the end of the license term while still operating, with the licensee notifying NRC of the permanent cessation of reactor operations. Regulations in 10 CFR 50.82(a)(4)(i) require operating reactor licensees to submit a post-shutdown decommissioning activities report (PSDAR) to the NRC, with a copy forwarded to the affected state(s), no later than 2 years after the cessation of reactor operations. The licensee documents the evaluation of the environmental impacts of planned decommissioning activities at the nuclear plant, providing a basis for why impacts are bounded by previously issued environmental review documents (e.g., 2002 NRC Decommissioning GEIS (NRC 2002). The licensee must also describe any additional impacts from decommissioning activities not previously evaluated and how the impacts would be addressed prior to conducting these activities at the nuclear plant.

At least 2 years before the operating license can be terminated, the licensee submits a License Termination Plan with a final status survey strategy to NRC that demonstrates compliance with site release criteria established. NRC then verifies the survey results. When the NRC confirms the criteria in the License Termination Plan and all other NRC regulatory requirements have been met, the NRC either terminates or amends the operating license, depending on plans the licensed area. The nuclear plant and any remaining structures on the site can then be released for restricted or unrestricted use.

During decommissioning, nuclear plant activities dedicated to reactor operations would cease. However, some activities essential to decommissioning, such as security and spent fuel management, would continue, while others may be reduced or eliminated. A plant with multiple units such as WBN would continue to operate but at reduced capacity until all units cease operation. The cessation of activities would not lead to the immediate dismantlement of the reactor or its infrastructure.

To decommission a nuclear power plant, radioactive material on the site must be reduced to levels that would permit termination of the NRC license. This involves removing the spent fuel from the reactor and spent fuel pools, dismantling any systems or components containing activated materials (such as the reactor vessel and primary loop piping), and cleaning up or dismantling contaminated materials.

3.15.2 Environmental Consequences

Table 3-27 lists the decommissioning issue and finding identified in the 2024 NRC GEIS. Each of these issues was reviewed with respect to impacts associated with the WBN license renewal.

Table 3-27. Termination of Nuclear Plant Operations and Decommissioning Issue, 2024 NRC GEIS Finding, and Environmental Impact

Issue	GEIS Finding	Impact
Termination of plant operations and decommissioning	SMALL (Category 1). License renewal is expected to have a negligible effect on the impacts of terminating operations and decommissioning on all resources.	SMALL

Source: (NRC 2024b)

Decommissioning decisions and actions would be the same under both the No Action and the WBN license renewal Alternatives, they would just occur sooner under the No Action Alternative. TVA currently has no preference among decommissioning options and is not proposing one now. However, the base assumption is that relicensing would not unreasonably increase the amount of radioactive or non-radioactive equipment to be disposed of at decommissioning.

TVA is not aware of any pending updates to the decommissioning cost estimates. TVA submitted form 10-K to the U.S. Securities and Exchange Commission for fiscal year 2025 and specifically addressed decommissioning of the nuclear facilities (TVA 2025a). TVA maintains a Nuclear Decommissioning Trust for the purpose of providing funds to decommission its nuclear facilities.

Neither of the alternatives would result in eliminating any decommissioning option or result in any environmentally unacceptable conditions. Delaying decommissioning of the WBN as a result of license renewal would have small beneficial and negative impacts when compared to the alternative. However, the net impact of either alternative would be similarly small.

TVA is not aware of any pending capacity limitations of the facilities it uses for LLRW disposal that would impact decommissioning. TVA evaluated each Category 1 issue related to postulated accidents listed in **Table 3-27** for N&SI. No N&SI was identified. Therefore, TVA characterizes the environmental impact associated with decommissioning as SMALL, in agreement with 2024 NRC GEIS findings.

3.16 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

This section describes principal unavoidable adverse environmental impacts associated with the WBN license renewal, for which mitigation and minimization measures are considered either impracticable, do not exist, or cannot entirely eliminate the impact. Specifically, this section considers unavoidable adverse impacts that would occur for the Proposed Action, Alternative B, WBN license renewal.

Unavoidable adverse impacts of continued operation may include those to water quality, though they would be SMALL. Consumption of surface water from the Tennessee River would increase with the operation of WBN due to increased evaporation in the cooling towers, but the rate of consumptive water loss would be small compared to the flow of the Tennessee River. Discharge of chemicals and heat due to operation would continue to meet the requirements of the NPDES permit, so that the impact on surface-water quality would be minimal. Potential physical impacts of the discharge would be mitigated by a diffuser system and by a concrete incline at the SCCW discharge, and the physical effects of the discharge on surface-water quality would also be SMALL. Changes in groundwater withdrawal and groundwater quality due to operation of WBN would also be SMALL.

Changes in air quality due to operation would be minimal, as air pollution is not a consideration outside of construction activities. Operation of the plant would not change present land use on the WBN site or in transmission corridors and thus would not result in additional unavoidable adverse environmental impacts.

The unavoidable impacts of operating WBN on terrestrial resources, including federally and state-listed species, would be SMALL. Some loss of surface water through evaporation is unavoidable, but the total withdrawal and the consumptive withdrawal would have a very minor impact, if any, on the aquatic biota in Watts Bar Reservoir, Chickamauga Reservoir, and downstream. Although some entrainment and impingement of fish is unavoidable, the adverse effects of entrainment and impingement would be minor and would not destabilize or noticeably alter the aquatic biota of the Chickamauga Reservoir. Mitigation measures and the requirements of the NPDES permits would minimize the physical and thermal effects of the heated discharge on aquatic resources.

There would be no observable health impacts on the public that would result from normal operation of WBN. Therefore, TVA characterizes unavoidable adverse environmental impacts for all resource areas as SMALL, in agreement with 2024 NRC GEIS findings.

3.17 RELATIONSHIP OF SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

One of NEPA's basic requirements is to describe "the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (42 U.S.C. § 4332(2)(C)(iv)). With respect to the Proposed Action, WBN license renewal, short-term is defined as the 20-year period of continued operations, whereas long-term is defined as the period beyond that.

In the short-term, operation of WBN would continue with updates and inspections to ensure operating efficiency and environmental compliance. The main short-term benefit of WBN is the production of electrical energy. The WBN site structures occupying the land preclude the land from other productive uses. Most of the short-term uses of the WBN site would result in no significant effect on the long-term productivity of the land, and the operation of WBN would not result in any significant long-term environmental degradation. All effluents discharged to the air, water, and land would be within levels allowed by permits so they are considered acceptable by regulatory agencies for short-term uses of the environment. Continued monitoring would decrease long-term effects, as timely corrective action could be taken. The presence of WBN in Rhea County, Tennessee, would continue to influence the future use of nearby land.

Once the units are shutdown, the plant would be decommissioned according to NRC regulations. After decommissioning and once the NRC license is terminated, the land would be available for other uses. Long-term impacts would result if the plant is not immediately dismantled at the end of the period of plant operation, as the land occupied by WBN structures would continue to not be available for other use. These impacts would be eliminated by removing WBN structures or by converting them to other productive uses.

3.18 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

For the purposes of this analysis, the term "irreversible" applies to the commitment of environmental resources (e.g. permanent use of land) that cannot by practical means be reversed to restore the environmental resources to their former state. In contrast, the term "irretrievable" applies to the commitment of material resources that, once used, cannot by practical means be recycled or restored for other uses.

Land and construction materials were irreversibly and irretrievably committed for the foreseeable future in the initial construction of WBN. The additional resources required to operate the plant are small in comparison. Uranium is the principal natural resource irretrievably committed by operating the WBN facility. It is assumed the costs for uranium would increase over the period of continued operations in concert with inflation and market changes resulting. Other materials consumed, for practical purposes, include fuel-cladding materials, reactor control elements, other replaceable reactor core components, chemicals used in water treatment, ion-exchange resins, and minor quantities of materials used in maintenance and operation. The resource commitment for both WBN units is not particularly large when compared to the consumption of these resources worldwide. Cooling water from the Tennessee River would be lost through consumptive use (i.e., evaporation) through operation, however, this would be minimal in relation to the body of water. In addition, some aquatic biota would be lost through entrainment or impingement; however, the losses would not destabilize populations. During operations, vehicles would emit exhaust due to use of fuel driving to and around the WBN site.

Appendix A – Symbols, Acronyms, and Abbreviations

SYMBOLS, ACRONYMS, AND ABBREVIATIONS

°F	degrees Fahrenheit
AADT	average annual daily traffic
ALARA	as low as reasonably achievable
APE	area of potential effects
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practice
BTA	Best Technology Available
CAA	Clean Air Act
CC	combined-cycle
CCW	condenser circulating water
CFR	Code of Federal Regulations
cfs	cubic feet per second
Ci	Curies
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
CT	combustion turbine
CWA	Clean Water Act
CY	Calendar year
dB	Decibels
dBA	decibels in A-weighted scale
DOE	U.S. Department of Energy
EIS	Environmental Impact Statement
EMF	electromagnetic field
EO	Executive Order
EPRI	Electric Power Research Institute
ERCW	Essential Raw Cooling Water
ESA	Endangered Species Act
FR	Federal Register
ft	foot/feet
ft ²	square feet
g	gravitational acceleration
gal	Gallons
GEIS	Generic Environmental Impact Statement
GHG	greenhouse gas
gpm	gallons per minute
GPP	Groundwater Protection Program
GWD	gigawatt days
GWPS	Gaseous waste processing system
HAP	hazardous air pollutant
hr	Hour
Hz	Hertz
IPaC	Information for Planning and Consultation
IPPP	Integrated Pollution Prevention Plan

IPS	Intake Pumping Station
IRP	Integrated Resource Plan
ISFSI	independent spent fuel storage installation
kV	Kilovolt
kW	Kilowatt
kWh	kilowatt hour
lbs	Pounds
Ldn	day/night sound level
LLRW	Low-level radioactive waste
LRA	License renewal application
MBTA	Migratory Bird Treaty Act
mgd	million gallons per day
mph	miles per hour
mrem	Millirem
mSv	Millisievert
MTU	metric tons of uranium
MW	Megawatt
MWe	megawatts electric
MWt	megawatt thermal
N/A	not applicable
N&SI	new and significant information
NAAQS	National Ambient Air Quality Standards
NEI	Nuclear Energy Institute
NEPA	National Environmental Policy Act
NESC	National Electric Safety Code
NHPA	National Historic Preservation Act
NLCD	National Land Cover Database
NOx	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NPG	Nuclear Power Group
NRC	Nuclear Regulatory Commission
NRHP	National Register of Historic Places
ODCM	Off-site Dose Calculation Manual
OSHA	Occupational Safety and Health Administration
PILOT	payments in lieu of taxation
PM	particulate matter
PM10	particulate matter with aerodynamic diameters of 10 microns or less
PM2.5	particulate matter with aerodynamic diameters of 2.5 microns or less
PWR	Pressurized Water Reactor
RCW	Raw Cooling Water
REMP	Radiological Environmental Monitoring Program
RFFA	Reasonably foreseeable future action
ROI	Region of Interest
ROW	right-of-way
SAMA	Severe Accident Mitigation Alternatives
SAMDA	Severe Accident Mitigation Design Alternatives
SCCW	supplemental condenser cooling water

SEA	Supplemental Environmental Assessment
SHPO	state historic preservation officer
SO ₂	sulfur dioxide
spp.	species (plural)
Sv	Sieverts
TDEC	Tennessee Department of Environment and Conservation
TDH	Tennessee Department of Health
TDOT	Tennessee Department of Transportation
TPBARs	tritium-producing burnable absorber rods
TEDE	total effective dose equivalent
THC	Tennessee Historical Commission
TL	transmission line
TRM	Tennessee River Mile
TVA	Tennessee Valley Authority
U-235	Uranium-235
U.S.	United States
U.S.C.	United States Code
UFSAR	Updated Final Safety Analysis Report
USACE	U.S. Army Corps of Engineers
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	Volatile organic compound
WBF	Watts Bar Fossil (Plant)
WBH	Watts Bar Hydroelectric Dam
WBN	Watts Bar Nuclear (Plant)
WPS	Waste Processing System

Appendix B – Related Environmental Reviews and Literature Cited

Related Environmental Reviews

Related environmental documents and materials were reviewed concerning this assessment and are listed below. The contents of these documents help describe the affected properties and are incorporated by reference as appropriate.

- Environmental Impact Statement for Watts Bar Nuclear Plant Units 1 and 2 (TVA 1972)
- Environmental Report for Watts Bar Nuclear Plant Units 1 and 2 (TVA 1976)
- Final Environmental Impact Statement Repleated to the Operation of Watts Bar Nuclear Plants Units 1 and 2 (TVA 1978)
- Final Supplemental Environmental Review Relating to the Operation of Watts Bar Nuclear Plant (TVA 1994)
- Final Environmental Impact Statement Related to the Operation of Watts Bar Nuclear Plan Units 1 and 2 (NRC 1995)
- Low-Level Radioactive Waste Transport and Storage: Watts Bar and Sequoyah Nuclear Plants (TVA 1999)
- Final Environmental Impact Statement for the Production of Tritium in a Commercial Light Water Reactor (DOE 1999)
- Record of Decision, Production of Tritium for the U.S. Department of Energy, Rhea and Hamilton Counties, TN and Adoption of Final Environmental Impact Statement for the Production of Tritium in a Commercial Light Water Reactor (TVA 2000)
- Final Environmental Assessment for Watts Bar Nuclear Plant Unit 1 Replacement of Steam Generators (TVA 2005)
- Draft Environmental Assessment Spring City to Watts Bar Nuclear Plant Sewer Line Extension (TVA 2005)
- Final Supplemental Environmental Impact Statement of Completion and Operation of Watts Bar Nuclear Plant Unit 2 (TVA 2007)
- Reevaluation of Finding of No Significant Impact for Low-Level Radioactive Waste Transport and Storage, Watts Bar and Sequoyah Nuclear Plants Change in Storage Procedure (TVA 2011)
- Final Environmental Statement Related to the Operation of Watts Bar Nuclear Plant, Unit 2, Supplement 2 (NRC 2013a)
- Final Environmental Assessment for Independent Spent Fuel Storage Installation Watts Bar Nuclear Plant (TVA 2014)
- Final Supplemental Environmental Impact Statement for the Production of Tritium in a Commercial Light Water Reactor (DOE 2016)
- Record of Decision for Production of Tritium in Commercial Light Water Reactors (TVA 2017)
- Final Environmental Assessment Watts Bar Nuclear Plant Unit 2 Replacement of Steam Generators (TVA 2017)
- Determination of NEPA Adequacy for Production of Tritium in a Commercial Light Water Nuclear Reactor (Watts Bar Nuclear Plant) (TVA 2023)
- Amended Record of Decision Production of Tritium in Commercial Light Water Reactors (TVA 2024)

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Appendix D – New and Significant Information

New and Significant Information

The NRC licenses operation of domestic nuclear power plants and provides for license renewal, requiring a license renewal application that includes an environmental report (10 CFR 54.23). NRC regulations, 10 CFR Part 51, prescribe the environmental report content and identify the specific analyses the applicant must perform.

In 2024, the Subsequent License Environmental Directorate of the NRC updated both the 2024 NRC GEIS, or NUREG-1437, (NRC 2024b), from the 2013 edition, and the regulatory guidance for preparing reports for license renewal applications (NRC 2024a). The 2024 NRC GEIS provides the technical and regulatory basis for Table B-1, “Summary of Findings on Environmental Issues for Initial and One Term of Subsequent License Renewal of Nuclear Power Plants,” in Appendix B, “Environmental Effect of Renewing the Operating License of a Nuclear Power Plant,” to Subpart A, “National Environmental Policy Act—Regulations Implementing Section 102(2),” of 10 CFR Part 51 (NRC 2024b).

NRC regulations require an applicant to identify any new and significant information (N&SI) of which the applicant is aware that relates to Category 1 issues which previously were generically evaluated in the 2024 NRC GEIS [10 CFR 51.53(c)(3)(iv)]. The N&SI process was designed to evaluate whether new information for the previously identified GEIS Category 1 issues exists. The N&SI process was then used to inform the evaluation of Category 1 issues in Chapter 3 of this SEA.

TVA conducted a new and significant review to identify which resources are adequately addressed and do not need to be carried forward for analysis in this SEA. Information from the 2024 NRC GEIS is incorporated by reference as appropriate for resources for which additional analysis is not necessary, and the previous analysis for the Proposed Action is incorporated for those resources by reference as appropriate.

NRC Guidance

The NRC provides guidance on N&SI in Regulatory Guide 4.2, Supplement 1, Revision 2 (NRC 2024a). Based on this guidance, N&SI would include:

- Information that identifies a significant environmental issue that was not considered or addressed in the 2024 NRC GEIS and, consequently, not codified in Table B-1 in Appendix B to Subpart A of 10 CFR Part 51, “Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plant;”
- Information not considered in the assessment of impacts evaluated in the 2024 NRC GEIS leading to a seriously different picture of the environmental consequences of the action than previously considered, such as an environmental impact finding different from that codified in Table B-1; or
- Any new activity or aspect associated with the nuclear power plant that can act upon the affected environment in a manner or an intensity and/or scope (context) not previously recognized.

Additionally, based on the definitions of SMALL, MODERATE, and LARGE impacts provided by NRC in 10 CFR Part 51, Appendix B, Table B-1, Footnote 3, MODERATE or LARGE impacts would be significant. Therefore, only new information that would suggest a change from SMALL impacts to either MODERATE or LARGE impacts for a Category 1 issue considered in the 2024 NRC GEIS, or an issue not considered in the 2024 NRC GEIS with MODERATE or LARGE impacts, would be considered “significant.” Chapter 3 presents the definitions of SMALL, MODERATE, and LARGE impacts used in the evaluation.

Review Process

TVA's N&SI assessment process is collectively carried out through its ongoing environmental planning, assessment, monitoring, and compliance activities performed by TVA and WBN management and staff and environmental resource-specific reviews. TVA's team for the review of N&SI has collective knowledge of the license renewal process, the WBN site, licensing and permitting, environmental issues, the NEPA process, and nuclear industry activities. This team has implemented the in-house process for reviewing and evaluating environmental issues which could potentially be N&SI.

TVA's new and significant review included establishment of applicable and non-applicable Category 1 issues through:

- Review of the TVA initial license application (TVA 1972) and related NRC EIS documents (NRC 2024b, NRC 1995, NRC 2013a).
- Review of publicly available information, or information held by TVA, related to the resource area and each applicable Category 1 impact issue, as summarized in the appropriate section of Chapter 3.
- Identification and review of past or potential modifications to WBN since its initial licensing, and if any, those anticipated during the period of extended operation, including refurbishment. However, the WBN license renewal does not require any new construction or modifications beyond normal maintenance and TVA has no plans for refurbishment activities, outside of normal maintenance at WBN associated with license renewal.
- Identification and assessment of equipment and operations with the potential to result in changes in emissions, releases, discharge points, land use, noise levels, etc. considering environmental reviews since initial license renewal, and those anticipated during the period of extended operations.

In preparation of this LRA, TVA implemented an investigative process to seek N&SI related to Category 1 environmental issues through:

- Input from TVA subject matter experts on the Category 1 issues and the validity of the conclusions in the 2024 NRC GEIS as they relate to WBN;
- Review of permits and reference documents related to the regulatory compliance status of the plant, environmental issues at WBN, and the environmental resource areas related to Category 1 issues;
- Review of WBN environmental monitoring and reporting required by regulations;
- Review of WBN environmental programs and procedures;
- Review of correspondence and permitting documentation as relating to oversight of WBN facilities and operations by state and federal regulatory agencies (activities that would bring significant issues to the plant's attention), to identify WBN site-specific environmental concerns;
- Review of recent LRAs for issues relevant to this WBN LRA;
- Review of previous licensing actions at WBN including the tritium review and others (see literature cited); and

- Consultation with state and federal agencies about potential BFN effects on resources within their specific jurisdictions.

In addition, TVA is made aware of and stays informed of new and emerging environmental issues and concerns on an ongoing basis through the following:

- Review of nuclear industry publications, operational experience, and participation in nuclear industry organizations such as EPRI and NEI;
- Review of correspondence and permitting documentation and discussions related to oversight of WBN facilities and operations by state and federal regulatory agencies in their role in identifying WBN site-specific environmental concerns;
- Contact with state and federal resource agencies with regulatory jurisdiction over environmental regulation; and
- Development and periodic review of regulatory guidance procedures that address ongoing and emergent issues.

Information resulting from the information-seeking process was assessed to determine if it is new and significant, applying the following considerations:

- Was the information included in or available for the 2024 NRC GEIS analysis of the Category 1 issue?
- Does the information identify an environmental issue not generically considered in the 2024 NRC GEIS and, consequently, not codified in 10 CFR Part 51, Appendix B, Table B-1?
- Does the information present a seriously different picture of the environmental consequences of the action than previously considered, leading to an impact finding different (i.e., MODERATE or LARGE) from that included in the 2024 NRC GEIS or codified in regulation?
- Does the information involve a new activity or aspect associated with the nuclear power plant that can act upon the environment in a manner or an intensity (MODERATE or LARGE impact) and/or scope (context) not previously recognized?

As a result of this review, TVA did not identify any N&SI regarding the WBN environment or operations that would alter the SMALL, MODERATE, or LARGE impact findings for Category 1 issues. Each resource section in Chapter 3 contains a table that lists each applicable Category 1 issue and indicates sections of this SEA that contain WBN information relevant to the assessment for N&SI about each issue. The findings in NUREG-1437, Revision 2, for the applicable Category 1 issues, are incorporated in the respective tables.

Appendix E – Necessary Permits, Licenses, or Consultations

Necessary Permits, Licenses, or Consultations

Table E-1. Current Contracts and Permits

Contract or Permit Type	Authority	Current Authorization/ Permit Number	Notes
Operating License – Unit 1	NRC – Atomic Energy Act (42 USC 2011, et seq.), 10 CFR 50.10	NPF-90	Expires (Exp.) Feb 7, 2036
Operating License – Unit 1	NRC – Atomic Energy Act (42 USC 2011, et seq.), 10 CFR 50.10	NPF-96	Exp. Oct 21, 2055
National Pollutant Discharge Elimination System (NPDES) Permit	CWA (33 U.S.C. Section 1251 et. seq); 40 CFR 122.26; TDEC	TN0020168	Issued Jan 10, 2022; Effective Feb 1, 2022; Exp. Jan 31, 2027
Tennessee Stormwater Multi-Sector General Permit for Industrial Activities	Stormwater Pollution Prevention Plan (SWPPP); TDEC	TNR051343	---
Regulated Waste Permit	Resource Conservation and Recovery Act); TDEC	8640015410	Regulated waste (Hazardous waste, used oil, universal waste permit)
Conditional Major Operating Permit	Tennessee Air Quality Act; Technical Secretary, Tennessee Air Pollution Control Board, TDEC; Tennessee Air Pollution Control Regulations	482013	Iss. Apr 5, 2024; Exp. Sept 1, 2033 (amended permit)
License to ship radioactive material	State of Tennessee and TDEC, Division of Radiological Health	T-TN014-L26	Renewed annually (Exp: Dec 31, 2026)
Radioactive material shipment	Utah Department of Environmental Quality, Division of Waste Management And Radiation Control – Generator Site Access Permit Accessing A Land Disposal Facility In Utah (UT Administrative Codes R313-26 and R313-19)	1505009348	Renewed annually (Exp: Aug 26, 2026)
Radiological Waste Disposal Contracts	EPA Hazardous Waste Generator Identification	TN2640030035	Contracts exist with ETI, Waste Control Specialist (WCS Texas), Energy Solutions (processing), and UNITECH (processing)
Tennessee River Management	TVA Act of 1933; TVA	Not Applicable	Use of Reservoir

TDEC = Tennessee Department of Environment and Conservation

Table E-2. Relevant Federal Environmental Regulations and Guidance

Statute / Agency / Executive Order (EO)	Authority	Activity Covered
NRC	10 CFR Parts 50, 51, and 54	Operation of commercial nuclear plants and license renewal.
NRC	Atomic Energy Act (42 USC 2011 <i>et seq.</i>)	License renewal; Applicant for federal license must submit an Environmental Report in support of license renewal application.
ESA Section 7 – USFWS	16 U.S.C. §1531 <i>et seq.</i>	Consultation with USFWS in the event that proposed activities at WBN have potential to affect federally listed species.
BGEPA – USFWS	16 U.S.C. 668-668d	Federal statute that protects two species of eagles.
MBTA – USFWS	16 U.S.C. 703-712	Prohibits the take (killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by USFWS.
NHPA of 1966 – Tennessee Historical Commission	16 U.S.C. 470 <i>et seq.</i> ; NHPA Section 106 (54 USC 306108)	Consultation with state and tribal historical preservation officers in the event that proposed activities at WBN have potential to impact historic properties and cultural traditions, and historical properties listed, or eligible for listing, on the National Registry of Historical Places.
CAA	42 U.S.C. 7401 <i>et seq.</i>	Federal law that regulates air emissions from stationary and mobile sources.
CWA	33 U.S.C. 1344 (Section 404)	Actions involving dredge or fill activities in federally jurisdictional wetlands and/or stream features would be subject to federal CWA Section 404 permit requirements. Section 401 Water Quality Certification. TDEC Aquatic Resource Alteration Permit (ARAP) may be required for any alterations to the streams and wetlands. Section 402 covers the NPDES program. Section 316(a) covers Thermal Variances in NPDES Permits, and Section 316(b) covers fish protection, including thermal limits, impingement and entrainment.
	33 U.S.C. 1341 (Section 401)	
	33 U.S.C. 1251 <i>et seq.</i> (Section 402)	
	33 U.S.C. 1326 (Section 316(a)(b))	
Rivers and Harbors Act of 1899	Section 10	Requires authorization from the Secretary of the Army, acting through the USACE, for the construction of any structure in or over any navigable water of the U.S.
EO 11988*	18 CFR Part 1319; 44 CFR Part 60; FR Vol. 91, No. 13, p. 2470-2486 [01-21-2026]	Requires federal agencies to avoid floodplain impacts to the extent possible.
EO 11990*	42 U.S.C. 4321 <i>et seq.</i> ; 42 U.S.C. 4331(b)(3)	Requires federal agencies to avoid direct or indirect support of new construction in wetlands whenever there is a practicable alternative.

*TVA is a wholly-owned corporate agency and instrumentality of the U.S. Federal EOs may create binding legal obligations for TVA only to the extent that Congress or the Constitution give the President the authority to bind TVA in the relevant area of law or guidance. Many EOs expressly recognize that they do not “impair or otherwise affect ... the authority granted by law to an executive agency or the head thereof” and that they “shall be implemented consistent with applicable law and subject to the availability of appropriations.” TVA considers relevant EOs in applicable NEPA documents, consistent with applicable court opinion and relevant Council on Environmental Quality guidance, but is not required to comply with or adhere to EOs that otherwise are inconsistent with the authorities granted to TVA through the TVA Act.

Table E-3. Correspondence between License Renewal Regulatory Requirements and SEA Sections

Regulatory Requirement	Responsive Supplemental Environmental Assessment Section(s)	
10 CFR 51.53(c)(1)	Entire Document	
10 CFR 51.53(c)(2)	Chapter 2	Proposed Action and Description of Alternatives
	2.1.2	The Proposed Action
	1.3.2	Refurbishment Activities
	1.3.3	Programs and Activities for Managing the Effects of Aging
	2.1.1, 2.1.3	Alternatives to the Proposed Action
	Chapter 3	Affected Environment
	Chapter 3	Environmental Consequences of the Proposed Action and Mitigating Actions
	2.3	Mitigation
	3.17	Unavoidable Adverse Impacts
	3.19	Irreversible or Irretrievable Resource Commitments
	3.18	Short-Term Use Versus Long-Term Productivity of the Environment
	2.2	Comparison of Environmental Impact of Subsequent License Renewal to the Alternatives
	1.6	Status of Compliance
10 CFR 51.53(c)(3)(ii)	1.3.2	Refurbishment Activities
	Chapter 3	Environmental Consequences of the Proposed Action and Mitigating Actions
10 CFR 51.53(c)(3)(ii)(A)	3.6.1	Surface Water Use Conflicts (Plants with Cooling Ponds or Cooling Towers Using Makeup Water from a River)
	3.6.2	Groundwater Use Conflicts (Plants with Closed- Cycle Cooling Systems that Withdraw Makeup Water from a River)
	3.7.1	Water Use Conflicts with Terrestrial Resources (Plants with Cooling Ponds or Cooling Towers Using Makeup Water from a River)
	3.7.2	Water Use Conflicts with Aquatic Resources (Plants with Cooling Ponds or Cooling Towers Using Makeup Water from a River)
10 CFR 51.53(c)(3)(ii)(B)	3.7.2	Impingement and Entrainment of Aquatic Organisms (Plants with Once-through Cooling Systems or Cooling Ponds)
	3.7.2	Thermal Impacts on Aquatic Organisms (Plants with Once-through Cooling Systems or Cooling Ponds)
10 CFR 51.53(c)(3)(ii)(C)	3.6.2	Groundwater Use Conflicts (Plants that Withdraw greater than 100 gpm)
10 CFR 51.53(c)(3)(ii)(D)	3.6.2	Groundwater Quality Degradation (Plants with Cooling Ponds at Inland Sites)
10 CFR 51.53(c)(3)(ii)(E)	3.7.1	Effects on Terrestrial Resources (Non-Cooling System Impacts)
	3.7.3	Special Status Species and Habitats
10 CFR 51.53(c)(3)(ii)(G)	3.10	Microbiological Hazards to the Public (Plants with Cooling Ponds or Canals or Cooling Towers that Discharge to a River)
10 CFR 51.53(c)(3)(ii)(H)	3.10	Electric Shock Hazards
10 CFR 51.53(c)(3)(ii)(K)	3.8	Historic and Cultural Resources
10 CFR 51.53(c)(3)(ii)(L)	3.15	Severe Accidents
10 CFR 51.53(c)(3)(ii)(N)	3.9, 3.11	Environmental Justice
10 CFR 51.53(c)(3)(ii)(O)	3.1	Cumulative Impacts
10 CFR 51.53(c)(3)(ii)(P)	3.6.2	Radionuclides Released to Groundwater
10 CFR 51.53(c)(3)(iii)	Chapter 3	Environmental Consequences of the Proposed Action and Mitigating Actions
	2.3	Mitigation
10 CFR 51.53(c)(3)(iv)	Chapter 3	Environmental Consequences of the Proposed Action and Mitigating Actions
	1.5.1	Assessment of New and Significant Information

Regulatory Requirement	Responsive Supplemental Environmental Assessment Section(s)	
10 CFR 51.45(b)(1)	Chapter 3	Environmental Consequences of the Proposed Action and Mitigating Actions
10 CFR 51.45(b)(2)	3.17	Unavoidable Adverse Impacts
10 CFR 51.45(b)(3)	2.1.1, 2.1.3	Alternatives to the Proposed Action
	2.2	Comparison of Environmental Impact of Subsequent License Renewal to the Alternatives
10 CFR 51.45(b)(4)	3.18	Short-Term Use Versus Long-Term Productivity of the Environment
10 CFR 51.45(b)(5)	3.19	Irreversible or Irretrievable Resource Commitments
10 CFR 51.45(c)	Chapter 3	Environmental Consequences of the Proposed Action and Mitigating Actions
	2.3	Mitigation
	3.17	Unavoidable Adverse Impacts
	2.1.1, 2.1.3	Alternatives to the Proposed Action
	2.2	Comparison of Environmental Impact of Subsequent License Renewal to the Alternatives
10 CFR 51.45(d)	1.6	Status of Compliance
	2.1.2	Proposed Action
	2.1.1, 2.1.3	Alternatives
10 CFR 51.45(e)	Chapter 3	Environmental Consequences of the Proposed Action and Mitigating Actions
NUREG 1437, Revision 1	1.3.2	Refurbishment Activities
	2.1.1, 2.1.3	Alternatives to the Proposed Action



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES

William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102

January 10, 2022

Mr. Paul Pearman
Senior Manager, Water Permitting, Compliance and Monitoring
e-copy: pjpearman@tn.gov
Tennessee Valley Authority (TVA)
1101 Market St, BR 2C-2 Chattanooga, TN 37402

Subject: **NPDES Permit No. TN0020168**
Tennessee Valley Authority (TVA)
Spring City, Rhea County, Tennessee

Dear Mr. Pearman:

In accordance with the provisions of the Tennessee Water Quality Control Act, Tennessee Code Annotated (T.C.A.), Sections 69-3-101 through 69-3-120, the Division of Water Resources hereby issues the enclosed NPDES Permit. The continuance and/or reissuance of this NPDES Permit is contingent upon your meeting the conditions and requirements as stated therein.

Please be advised that a petition for permit appeal may be filed, pursuant to T.C.A. Section 69-3-105, subsection (i), by the permit applicant or by any aggrieved person who participated in the public comment period or gave testimony at a formal public hearing whose appeal is based upon any of the issues that were provided to the commissioner in writing during the public comment period or in testimony at a formal public hearing on the permit application.

Additionally, for those permits for which the department gives public notice of a draft permit, any permit applicant or aggrieved person may base a permit appeal on any material change to conditions in the final permit from those in the draft, unless the material change has been subject to additional opportunity for public comment.

Any petition for permit appeal under this subsection (i) shall be filed with the Technical Secretary of the Water Quality, Oil and Gas Board within thirty (30) days after public notice of the commissioner's decision to issue or deny the permit. A copy of the filing should also be sent to TDEC's Office of General Counsel.

TDEC has activated a new email address to accept appeals electronically. If you wish to file an appeal, you may do so by emailing the appeal and any attachments to TDEC.Appeals@tn.gov. If you file an appeal electronically, you do not have to send a paper copy. If you have questions

about your electronic filing, you can call (615) 532-0131. Electronic filing is encouraged, but not required.

If you have questions, please contact the Chattanooga Environmental Field Office at 1-888-891-TDEC; or, at this office, please contact Ms. Shannon McClellan at (615) 532-0485 or by E-mail at Shannon.McClellan@tn.gov.

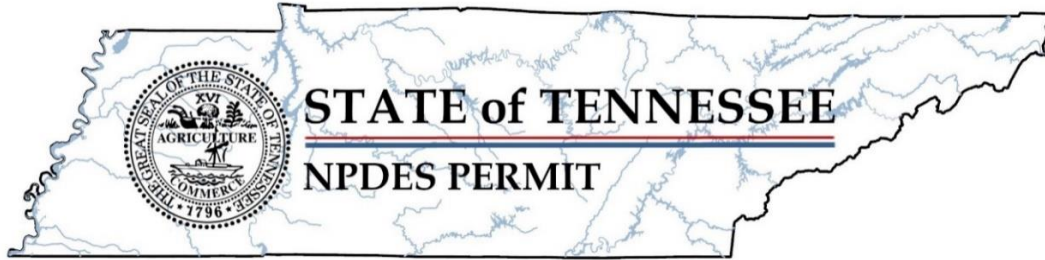
Sincerely,

A handwritten signature in blue ink that reads "Wade Murphy" followed by a stylized flourish.

Vojin Janjić
Manager, Water-Based Systems

Enclosure

cc: Permit Section File & Chattanooga Environmental Field Office
Mr. Steven R. Alexander, Ecologist, U.S. Fish and Wildlife Service (USFWS), steven_alexander@fws.gov
Ms. Crystal Bishop, Water Specialist, Tennessee Valley Authority (TVA), clbishop0@tva.gov
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Mr. Brian Watson, Chemistry/Environmental Technical Support Manager, Tennessee Valley Authority (TVA), bwwatson0@tva.gov
Ms. Beth Ann Jenkins, Plant Manager, Watts Bar Nuclear Plant, Tennessee Valley Authority (TVA), bajenkins@tva.gov



**Authorization to Discharge Under the
National Pollutant Discharge Elimination System (NPDES)
Permit Number TN0020168**

Issued by
**Department of Environment and Conservation
Division of Water Resources
William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102**

Under authority of the Tennessee Water Quality Control Act of 1977 (T.C.A. 69-3-101 et seq.) and the delegation of authority from the United States Environmental Protection Agency under the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 (33 U.S.C. 1251, et seq.)

Discharger: **Tennessee Valley Authority (TVA)
Watts Bar Nuclear (WBN) Plant**

is authorized to discharge: process wastewater, cooling water, noncontact cooling water, and stormwater runoff from Outfalls OSN 101 and OSN 102; turbine building sump water, alum sludge supernatant, reverse osmosis reject water, drum dewatering water, water purification plant water, and supplemental condenser cooling water (noncontact) from Outfall OSN 113; and the operation of a cooling water intake structure

from a facility located at: 1270 Highway 68, Spring City, Rhea County, Tennessee

to receiving waters named: Tennessee River at mile 527.9 (OSN 101), Tennessee River at mile 527.2 (OSN 102), Tennessee River at mile 529.2 (OSN 113), and OSN 114 at Tennessee River at mile 529.8

in accordance with effluent limitations, monitoring requirements & other conditions set forth herein.

This permit shall become effective on: **2/1/2022**
This permit shall expire on: **1/31/2027**
Issuance date: **1/10/2022**

for Jennifer Dodd
Director

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PART 1

1. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1.1. NUMERIC AND NARRATIVE EFFLUENT LIMITATIONS

Tennessee Valley Authority (TVA) is authorized to discharge process wastewater, cooling water and storm water runoff from Outfalls OSN 101 and OSN 102; turbine building sump water, alum sludge supernatant, reverse osmosis reject water, drum dewatering water, water purification plant water, and supplemental condenser cooling water (noncontact) from Outfall OSN 113, and the operation of a cooling water intake structure to Tennessee River at mile 527.9. OSN 101 discharges to the Tennessee River at mile 527.9, OSN 102 discharges to 527.2, OSN113 discharges to river mile 527.2, and OSN 114 at river mile 529.8. These discharges along with two Internal Monitoring Point (IMP) discharge locations (IMP 103 and IMP 107) and Virtual Outfall V001 shall be limited and monitored by the permittee.

This TN-NPDES permit also constitutes the State's certification under Section 401 of the Clean Water Act for the purpose of obtaining any federal license for activities resulting in the discharges covered under the TN-NPDES permit.

1.1.1. Numeric Effluent Limitations

Authorized discharges shall be limited and monitored by the permittee as specified below:

Description: External Outfall, Number: OSN101 & OSN102, Monitoring: Effluent Gross, Season: All Year							
<u>Code</u>	<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Monitoring Frequency</u>	<u>Statistical Base</u>
00010	Temperature, water deg. C (4)	<=	35.0	deg C	Recorder	Continuous	Daily Maximum
00400	pH (2)	>=	6.0	SU	Grab	Monthly	Minimum
00400	pH (2)	<=	9.0	SU	Grab	Monthly	Maximum
00530	Total Suspended Solids (TSS)*	<=	100	mg/L	Grab	Monthly	Daily Maximum
00530	Total Suspended Solids (TSS)*	<=	30	mg/L	Grab	Monthly	Monthly Average
00556	Oil & Grease*	<=	20	mg/L	Grab	Monthly	Daily Maximum
00556	Oil & Grease*	<=	15	mg/L	Grab	Monthly	Monthly Average



01034	Chromium, total (as Cr)	<=	0.2	mg/L	Grab	See Permit	Daily Maximum
01092	Zinc, total (as Zn)	<=	1.0	mg/L	Grab	Monthly	Daily Maximum
50050	Flow (1)	Report	-	MGD	Instantaneous	Weekly	Daily Maximum
50050	Flow (1)	Report	-	MGD	Instantaneous	Weekly	Monthly Average
50060	Chlorine, total residual (TRC) (2) (3)	<=	.2	mg/L	Grab	Weekly	Daily Maximum
84165	Certification of instream flow 3,500cfs or greater when required (7)	Report	-	Y=1; N=0	Recorder	Monthly	Total
TRP3B	IC25 Static Renewal 7 Day Chronic Ceriodaphnia (5)	>	4.0	%	Composite	Semiannual	Minimum
TRP6C	IC25 Static Renewal 7 Day Chronic Pimephales promelas (5)	>	4.0	%	Composite	Semiannual	Minimum

Notes:

- (1) Flow shall be reported in Million Gallons per Day (MGD). If the primary flow measurement device is out of service, flow may be calculated or estimated by alternate or secondary flow measurement devices.
- (2) pH and TRC analyses shall be performed within fifteen (15) minutes of sample collection.
- (3) The acceptable methods for analysis of TRC are any methods specified in Title 40 CFR, Part 136 as amended. The method detection level (MDL) for TRC shall not exceed 0.05 mg/l unless the permittee demonstrates that its MDL is higher. The permittee shall retain the documentation that justifies the higher MDL and have it available for review upon request. In cases where the permit limit is less than the MDL, reporting of TRC at less than the MDL shall be interpreted to constitute compliance with the permit limit. The acceptable methods for detection and reporting of total residual chlorine are referenced in Part 1.2.3 Test Procedures, paragraph b.

-This permit implements ELG and water-quality based TRC limits. Water-quality based limits for OSN 101 and OSN 113 are implemented in virtual outfall V001.
- (4) If the primary temperature monitoring equipment fails, monitoring will be done once per day. Reasonable and timely effort will be made to restore a temperature recorder to operation as soon as possible. See Part 3.5 for further temperature requirements. Secondary temperature measurement devices may be installed and calibrated for continuous use.
- (5) Sampling and analysis required only if discharge is operated 30 days or more during the semi-annual periods January through June or July through December and if all toxicity testing requirements have not already been completed for Outfalls OSN 101 and OSN 102. See Part 3 for methodology. The toxicity percentage has increased from 2.8% to 4% due to change in flow. See rationale for further details.

- (6) Priority Pollutants, other than chromium and zinc, will not be discharged in cooling tower blowdown in amounts that are detectable by analytical methods in 40 CFR Part 136. Monitoring for the priority pollutants, including chromium and zinc, will not be required unless it has been added to industrial processes and will be present in the discharge effluent. See Rationale for further details.
- (7) Certification shall be made during any month that a discharge occurs from this outfall.
- (8) If there is discharge during 1 or more days from Outfall OSN 102, sampling is required to comply with the maximum daily limit. If there are two or more separate days of discharge, or a continuous discharge during 5 or more consecutive days from this outfall then one sample is required from that "batch" discharge in order to report the monthly average limit.

Notes:

-Monitoring and limits for pH, total suspended solids, and oil and grease apply only when the turbine building sump is aligned to bypass Internal Monitoring Points IMP103 and IMP 107 where monitoring these parameters is required.

- No discharge of polychlorinated biphenyl compounds (PCBs) such as those commonly used for transformer fluid is allowed under this permit at any outfall.

-For any plant with a total rated electric generating capacity of 25 or more megawatts, the quantity of pollutants discharged in once through cooling water from each discharge point shall not exceed the quantity determined by multiplying the flow of once through cooling water from each discharge point times the daily maximum concentration of 0.2mg/L.

-Discharges through Outfall OSN 102 (emergency overflow) is permitted only under emergency situations. This includes times when the diffuser pipe system is isolated as a result of diffuser maintenance and other emergency situations to preserve the integrity of the yard holding pond dikes such as in the event of a catastrophic storm event. All reasonable efforts shall be taken to resume normal discharge through Outfall OSN 101 as soon as possible.

-See **Part 1.2.3** for test procedures.

-See **Part 3.2** for biomonitoring test and reporting requirements.

Description: External Outfall, Number: IMP103, Monitoring: Effluent Gross, Season: All Year							
<u>Code</u>	<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Monitoring Frequency</u>	<u>Statistical Base</u>
00400	pH (2)(3)	>=	6.0	SU	Grab	Monthly	Minimum
00400	pH (2)(3)	<=	9.0	SU	Grab	Monthly	Maximum
00530	Total Suspended Solids (TSS) (3)	<=	100	mg/L	Grab	Monthly	Daily Maximum
00530	Total Suspended Solids (TSS) (3)	<=	30	mg/L	Grab	Monthly	Monthly Average
00556	Oil & Grease (3)	<=	20	mg/L	Grab	Monthly	Daily Maximum

00556	Oil & Grease (3)	<=	15	mg/L	Grab	Monthly	Monthly Average
50050	Flow (1)	Report	-	MGD	Instantaneous	Monthly	Daily Maximum
50050	Flow (1)	Report	-	MGD	Instantaneous	Monthly	Monthly Average

Notes:

(1) Flow shall be reported in Million Gallons per Day (MGD). In the event that the flow monitor is out of service, flow measurement shall be estimated or calculated.

(2) pH analyses shall be performed within fifteen (15) minutes of sample collection.

(3) In the event that turbine building station sump is discharged directly to the Yard Holding Pond, then TSS, Oil & Grease, and pH shall be monitored 1/Week and reported with the Discharge Monitoring Report (DMR) for the applicable reporting period.

Description: External Outfall, Number: IMP107, Monitoring: Effluent Gross, Season: All Year							
<u>Code</u>	<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Monitoring Frequency</u>	<u>Statistical Base</u>
00400	pH (2)	Report	-	SU	Grab	Once Per Batch	Maximum
00400	pH (2)	Report	-	SU	Grab	Once Per Batch	Minimum
00530	Total Suspended Solids (TSS)	<=	100	mg/L	Grab	Once Per Batch	Daily Maximum
00530	Total Suspended Solids (TSS)	<=	30	mg/L	Grab	Once Per Batch	Monthly Average
00556	Oil & Grease	<=	20	mg/L	Grab	Once Per Batch	Daily Maximum
00556	Oil & Grease	<=	15	mg/L	Grab	Once Per Batch	Monthly Average
00665	Phosphorus, total (as P) (3)(5)	<=	1.0	mg/L	Grab	Once Per Batch	Daily Maximum
00665	Phosphorus, total (as P) (3)(5)	<=	1.0	mg/L	Grab	Once Per Batch	Monthly Average
01042	Copper, total (as Cu) (4)	<=	1.0	mg/L	Grab	Once Per Batch	Daily Maximum
01042	Copper, total (as Cu) (4)	<=	1.0	mg/L	Grab	Once Per Batch	Monthly Average
01045	Iron, total (as Fe) (4)	<=	1.0	mg/L	Grab	Once Per Batch	Daily Maximum
01045	Iron, total (as Fe) (4)	<=	1.0	mg/L	Grab	Once Per Batch	Monthly Average
50050	Flow (1)	Report	-	MGD	Calculated	Once Per Batch	Daily Maximum
50050	Flow (1)	Report	-	MGD	Calculated	Once Per Batch	Monthly Average



Notes:

- (1) Flow shall be reported in Million Gallons per Day (MGD) for each batch discharge. If a batch discharge extends for more than a 24-hour period, flow measurement shall be obtained and reported for each 24-hour period.
- (2) pH analyses shall be performed within fifteen (15) minutes of sample collection.
- (3) Sampling for phosphorus is required only when metal cleaning chemicals containing phosphorus are being used.
- (4) Sampling for copper, iron, and phosphorus are required only when metal cleaning activities have occurred within the Lined/Unlined Ponds since the last batch discharge from this outfall. Non-metal cleaning wastewaters from the Lined/Unlined ponds may be routed to the LVWTP without compliance monitoring.
- (5) For the monitoring and reporting of measurements of Flow, the Monthly Average shall be the total flow volume during the reporting period divided by the number of calendar days in that period. The Daily Maximum shall be the total flow volume for the day with the greatest amount of discharge during the reporting period. *Example:* 3 discharges of 15,000 gallons/day and 1 discharge of 20,000 gallons/day during a 1-month period would result in a Monthly Average of 65,000 gallons/30 days or 2,166 gallons/day (to be reported as 0.002166 MGD). The Daily Maximum to be reported for this example would be 20,000 gallons/day or 0.020 MGD.

Description: External Outfall, Number: OSN113, Monitoring: Effluent Gross, Season: All Year							
<u>Code</u>	<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Monitoring Frequency</u>	<u>Statistical Base</u>
00010	Temperature, water deg. C	Report	-	deg C	Recorder	Hourly	Daily Maximum
00400	pH (2)	>=	6.0	SU	Grab	Monthly	Minimum
00400	pH (2)	<=	9.0	SU	Grab	Monthly	Maximum
00530	Total Suspended Solids (TSS)	<=	100	mg/L	Grab	Monthly	Daily Maximum
00530	Total Suspended Solids (TSS)	<=	30	mg/L	Grab	Monthly	Monthly Average
00556	Oil & Grease	<=	20	mg/L	Grab	Monthly	Daily Maximum
00556	Oil & Grease	<=	15	mg/L	Grab	Monthly	Monthly Average
01034	Chromium, total (as Cr)	<=	0.2	mg/L	Grab	See Permit	Daily Maximum
01092	Zinc, total (as Zn)	<=	1.0	mg/L	Grab	See Permit	Daily Maximum
50050	Flow	Report	-	MGD	Recorder	Continuous	Daily Maximum
50050	Flow	Report	-	MGD	Recorder	Continuous	Monthly Average



50060	Chlorine, total residual (TRC) (2)(3)	Report	-	mg/L	Grab	Weekly	Daily Maximum
50060	Chlorine, total residual (TRC) (2)(3)	Report	-	mg/L	Grab	Weekly	Monthly Average
84165	Certification of instream flow 3,500cfs or greater when required	Report	-	Y=1; N=0	Recorder	Monthly	Total
TRP3B	IC25 Static Renewal 7 Day Chronic Ceriodaphnia (4)	>	12.7	%	Composite	Semiannual	Minimum
TRP6C	IC25 Static Renewal 7 Day Chronic Pimephales promelas (4)	>	12.7	%	Composite	Semiannual	Minimum
Description: External Outfall, Number: OSN113, Monitoring: Instream Monitoring, Season: All Year							
Code	Parameter	Qualifier	Value	Unit	Sample Type	Monitoring Frequency	Statistical Base
00010	Temperature, water deg. C	<=	30.5	deg C	Recorder	Hourly	Daily Maximum
00016	Temp. diff., effluent & upstream deg. C	<=	3.0	deg C	Calculated	Hourly	Daily Maximum
82234	Temperature rate of change deg. C/hr	<=	2.0	deg C/hr	Calculated	Hourly	Daily Maximum
Description: External Outfall, Number: OSN113, Monitoring: See Comments - Tier II, Season: All Year							
Code	Parameter	Qualifier	Value	Unit	Sample Type	Monitoring Frequency	Statistical Base
00010	Temperature, water deg. C (5)	<=	33.5	deg C	Recorder	Hourly	Daily Maximum

Notes:

- (1) Flow shall be reported in Million Gallons per Day (MGD).
- (2) pH and TRC analyses shall be performed within fifteen (15) minutes of sample collection.
- (3) The acceptable methods for analysis of TRC are any methods specified in Title 40 CFR, Part 136 as amended. The method detection level (MDL) for TRC shall not exceed 0.05 mg/l unless the permittee demonstrates that its MDL is higher. The permittee shall retain the documentation that justifies the higher MDL and have it available for review upon request. In cases where the permit limit is less than the MDL, the reporting of TRC at less than the MDL shall be interpreted to constitute compliance with the permit limit. The acceptable methods for detection and reporting of total residual chlorine are referenced in Part 1.2.3 Test Procedures, paragraph b.
- (4) See Part 3.2 for methodology for WET testing. Percentage has increased from 6.7% to 12.7% due to change in flow. See rationale for further details.
- (5) See Rationale, Part 5.8 Outfall OSN 113, Temperature and Area of Mixing Zone.

-No discharge of PCBs such as those commonly used for transformer fluid is allowed under this permit at any outfall.

- Priority Pollutants, other than chromium and zinc, will not be discharged in cooling tower blowdown in amounts that are detectable by analytical methods in 40 CFR Part



136. Monitoring for the priority pollutants, including chromium and zinc, will not be required unless it has been added to industrial processes and will be present in the discharge effluent. See Rationale for further details.

-This permit implements ELG and water-quality based TRC limits. Water-quality based limits for OSN 101 and OSN 113 are implemented in virtual outfall V001.

The combined treated effluent from Outfall OSN 101/OSN 102 and Outfall OSN 113 shall be quantified and reported as Outfall V001. These discharges shall be limited and monitored by the permittee as specified below:

Description: External Outfall, Number: V001, Monitoring: Effluent Gross, Season: All Year							
<u>Code</u>	<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Monitoring Frequency</u>	<u>Statistical Base</u>
50050	Flow	Report	-	MGD	Calculated	Weekly	Daily Maximum
50050	Flow	Report	-	MGD	Calculated	Weekly	Monthly Average
50060	Chlorine, total residual (TRC)	<=	.12	mg/L	Calculated	Weekly	Daily Maximum
50060	Chlorine, total residual (TRC)	<=	.07	mg/L	Calculated	Weekly	Monthly Average

Notes:

-Flow and TRC will be calculated from summing flow weighted averages of the effluent of OSN 101/102 and OSN 113. See Rationale for further details.

TVA-WBN Plant is authorized to discharge Supplemental Condenser Cooling Water (SCCW) intake screen backwash to surface water through OSN 114 as described in the rationale. **These discharges are backwash only and therefore there are no limits or monitoring requirements for these discharges.**



The Division has determined that the cooling water intake structure used by the permittee represents the best available technology (BAT) to minimize adverse environmental impact in accordance with Section 316(b) of the federal Clean Water Act (33 U.S.C. section 1326).

PERMIT LIMITS FOR OSN 114

TVA-Watts Bar Nuclear

Supplemental Condenser Cooling Water Intake Screen Backwash water

Note: No numerical monitoring limitations are applied to this outfall.

1.1.2. Narrative Conditions

Additional monitoring and reporting requirements and conditions include:

<u>TN0020168</u>	Active - Permit Requirement	January 31, Annually	The permittee shall submit an annual Biocide/Corrosion Treatment Plan (B/CTP) report by January 31st of each year for the previous calendar year.
<u>TN0020168</u>	Active - Permit Requirement	90 Days After Permit Effective Date	Within 90 days of the permit effective date, the permittee shall submit an updated Biocide/Corrosion Treatment Plan (B/CTP) reflecting the new TRC limits included in the permit and any other necessary changes.
<u>TN0020168</u>	Active - Permit Requirement	180 Days After Permit Effective Date	submit to the Director for review the information required under 40 CFR §122.21 (r)(2) through (8) per EPA rules for cooling water intake structure under CWA Section 316b.

The authorized discharge(s) shall not:

- Result in distinctly visible solids, scum, foam, oily slick, or the formation of slimes, bottom deposits, or sludge banks of such size or character as may be detrimental to fish and aquatic life.
- Result in total suspended solids, turbidity, or color in such amounts or character that will result in any objectionable appearance to the water, considering the nature and location of the water.
- Contain pollutants in quantities that will be hazardous or otherwise detrimental to humans, livestock, wildlife, plant life, or fish and aquatic life in the receiving stream.

Sludge or any other material removed by any treatment works must be disposed of in a manner that prevents its entrance into or pollution of any surface or subsurface waters. Additionally, the disposal of such sludge or other material must be in compliance with the Tennessee Solid Waste Disposal Act, Tennessee Code Annotated (Tenn. Code Ann.) §68-31-101 et seq. and the Tennessee Hazardous Waste Management Act, Tenn. Code Ann. §68-46-101 et. seq.

Nothing in this permit authorizes take for the purposes of a facility's compliance with the Endangered Species Act, in accordance with 40 CFR 125.98(b)(1).

Batch Discharge: For the monitoring and reporting of measurements of FLOW, the "Monthly Avg." shall be the total flow volume during the reporting period divided by the number of calendar days in that period. The "Daily Max." shall be the total flow volume for the day with the greatest amount of discharge during the reporting period. Example: 3 discharges of 15,000 gallons/day and 1 discharge of 20,000 gallons/day during a 1-month period results in a Monthly Avg. of 65,000



gallons/30 days, or 2,166 gallons/day (to be reported as 0.002166 MGD). The Daily Maximum to be reported for this example is 20,000 gallons/day or 0.020 MGD.

Priority Pollutants contained in chemicals added for cooling tower maintenance except for zinc, shall not be discharged in cooling tower blowdown in amounts that are detectable by analytical methods in 40 CFR Part 136.

To ensure compliance with Total Suspended Solids (TSS) limits, polymers and/or coagulants may be utilized in the Lined/Unlined Ponds, Low Volume Waste Treatment Pond, or Yard Holding Pond on an as-needed basis in a way that does not cause or contribute to toxicity at Outfall OSN 101 discharge.

The limit of 0.2 mg/L will apply to this permit. Priority pollutants, with the exception of chromium and zinc, will not be discharged in cooling tower blowdown in amounts that are detectable by analytical methods in 40 CFR Part 136. Monitoring for the priority pollutants, including chromium and zinc, will not be required unless it has been added to industrial processes and will be present in the discharge effluent.

Any substance, including radioactive materials, is of interest to our agency if it has reasonable potential to exceed applicable water quality criteria. However, radioactive releases to the environment, notwithstanding point source discharges authorized via this permit, are not regulated under the Clean Water Act, but are instead regulated under the Nuclear Regulatory Commission (NRC) by issuance of an Operating License. Pertinent regulations are found in 10 CFR Part 20 and 10 CFR Part 50. Facility effluents that may contain radioactive material are not addressed as part of the NPDES permitting process.

Cooling Water

Outfall OSN 101/102

The temperature requirements for Outfall OSN 101 remain unchanged from the previous permit. The numeric effluent limitation of 35°C shall continue as the daily maximum that can be discharged. Measurement frequency shall be continuous and sample type shall be by recorder.

Discharges are authorized for Outfall OSN 101 only during periods when flow in the receiving stream is at a minimum of 3,500 cfs. All changes to the flow rate of the SCCW discharge (Outfall OSN 113) shall be done during periods when flow in the receiving waters is at a minimum of 3,500 cfs. This includes periods of start-up, shutdown as well as other similar abrupt flow rate changes of the SCCW. When thermally loaded effluent is discharged through Outfall OSN 102, all reasonable



efforts shall be made to keep flow to a minimum of 3500 cfs in the receiving waters. If such flow is absent, the permittee shall verify protection of water quality by taking instream temperature measurements. Compliance with flow requirements for 3,500 cfs flow instream for Outfalls OSN 101, OSN 102 and OSN 113 discharges shall be certified monthly with the submission of Discharge Monitoring Reports submitted to the Division for these outfalls. Records concerning the instream flow shall be maintained and available upon request.

Temperature will be limited according to the State of Tennessee Water Quality Standards for the protection of Fish & Aquatic Life [Chapter 0400-40-03-.03(3)(e)]. It is recognized that the temperature of the cooling water discharge will be greater than the temperature of the water prior to its use for cooling or other purposes. This discharge must not cause the temperature change in receiving stream to exceed 3°C relative to an upstream control point. Also, this discharge must not cause the temperature of receiving stream to exceed 30.5°C (except as a result of natural causes), and this discharge must not cause the maximum rate of temperature change in receiving stream to exceed 2°C per hour (except as a result of natural causes).

The elevated temperature water of outfall OSN 101 is mixed with the Tennessee River receiving water by being discharged through a diffuser. Instream temperature criteria must be met at the edge of the mixing zone. The mixing zone is defined for this discharge as being a maximum width of 240 feet (the width of the diffuser) and extending 240 feet downstream. An operational requirement of the plant is that the diffuser is only operated when 3500 cubic feet per second (CFS) flow is present from the dam. A continuous discharge at the temperature maximum of 35°C will not exceed water quality outside of the mixing zone based on past modeling. The Division approved a one-hour averaging period for evaluating compliance with temperature criteria in the receiving stream.

Outfall OSN 113

The thermal mixing zones for Outfall OSN 113 remain unchanged from the previous permit (see Figure 1-2 in Section 5.5.7). The frequency has been reduced to biennial (once every two years) per the permittee's request. The discharge from Outfall OSN 113 shall be limited and monitored by the permittee as specified below:

- In recognition of the dynamic behavior of the thermal effluent in the river, monitoring shall be required for an active mixing zone and a passive mixing zone as described in the permit rationale.



- The passive mixing zone includes the following dimensions: (1) a maximum width from bank to bank in the river, and (2) a maximum length of 1000 feet downstream of the outfall. It has been documented that there is a zone of (cool water) refuge in the bottom layer to allow for fish and other species to pass below the thermal plume.

- Compliance for the passive mixing zone shall be documented by two in-stream temperature surveys, one conducted during winter ambient conditions and one during summer ambient conditions. The surveys shall be performed while the SCCW system is thermally loaded with low river flow conditions and shall include temperature profiles at a sufficient number of locations across the downstream edge of the passive mixing zone to locate the effluent plume. The measurements shall be compared with the results from the thermal plume model and shall be summarized in a report to the division semiannually. Survey requirements for the passive mixing zone shall be waived if unexpected events do not safely allow the establishment of a zero-flow condition in the river (e.g., flood operation).

- The active mixing zone includes the following dimensions: (1) a maximum width of from the right-bank to the approximate middle of the river (facing downstream), and (2) a maximum length of 2000 feet downstream of the outfall. It has been documented that there is a zone of (cool water) refuge in the bottom layer and left hand-side of the river to allow for fish and other species to pass beyond the thermal plume.

- Compliance for the active mixing zone is given by the following requirements:

- Compliance with temperature, edge of mixing zone; temperature, rise upstream to downstream; and temperature, rate of change shall be applicable at the downstream edge of the active mixing zone.

- Daily maximum temperatures for the temperature, effluent; temperature, edge of mixing zone; temperature, rise upstream to downstream; and temperature, rate of change shall be determined from 1-hour average values. The average values shall be calculated every 15 minutes using the current and previous four 15-minute values, thus creating a rolling average. As demonstrated by monitoring at the edge of the active mixing zone, the maximum temperature shall not exceed 30.5°C (except as a result of natural causes), the maximum change in temperature relative to the upstream control point shall not exceed 3°C (except as a result of natural causes), and the maximum temperature rate of change shall not exceed 2°C per hour (except as a result of natural causes).



-The upstream ambient river temperature (control point) for determining the temperature, rise upstream to downstream for the active mixing zone shall be determined by sensors positioned in the discharge from the powerhouse at Watts Bar Dam. The upstream ambient river temperature shall be determined by the first sensor at or below a depth of 5 feet. This monitor shall also be used for ambient river temperature for the passive mixing zone surveys.

-The river temperature for determining the temperature, edge of mixing zone and temperature, rate-of-change shall be by two floating water temperature stations at the downstream edge of the active mixing zone. One station shall be located near the right-hand shoreline of the river (facing downstream) and one station shall be located near the center of the river. At each station, the water temperature at the 5-foot depth shall be determined as the average of sensors at three depths-3 feet, 5 feet, and 7 feet. The downstream river temperature and temperature rate of change shall be determined by the average temperature of the two floating water temperature stations.

-Compliance with temperature, receiving stream bottom shall be applicable at the edge of a square mussel relocation zone located on the bottom of the river at the outfall and having a side dimension not less than 150 feet. The temperature shall be determined by a sensor located along the edge of the mussel relocation zone.

-The daily maximum value for the temperature, receiving stream bottom shall be determined from 15-minute values. The 1-hour average value shall be calculated every 15 minutes using the current and previous four 15-minute values, thus creating a rolling average. The temperature shall be reported on the Discharge Monitoring Reports as the daily maximum (highest value for a day) and monthly average value.

1.2. MONITORING PROCEDURES

1.2.1. Representative Sampling

Samples and measurements taken in compliance with the monitoring requirements specified herein shall be representative of the volume and nature of the monitored discharge and shall be taken after treatment and prior to mixing with uncontaminated stormwater runoff or the receiving stream. Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed and calibrated by a qualified source (biennially at a minimum), and maintained to ensure that the accuracy of the measurements is consistent with



accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of plus or minus 10% from the true discharge rates throughout the range of expected discharge volumes.

Composite samples must be proportioned by flow at the time of sampling. Aliquots may be collected manually or automatically. The sample aliquots must be maintained at $\leq 6^{\circ}\text{C}$ during the compositing period, or as otherwise specified in 40 CFR §136 or in the method.

Samples and measurements taken in compliance with the monitoring requirements specified above shall be representative of the volume and nature of the monitored discharge. Samples must be representative of the effluent being discharged and collected prior to mixing with any other discharge or the receiving stream. This can be at a different point for different parameters but must be after all treatment for that parameter or all expected changes. Biomonitoring tests, if required, must be conducted on final effluent.

1.2.2. Sampling Frequency

The permittee should report "No Discharge" on Discharge Monitoring Reports (DMRs) only if a permitted outfall does not discharge at any time during the monitoring period. If the outfall discharges effluent at any time during the monitoring period, the permittee must provide at least one sampling result from the effluent of that outfall.

If the required monitoring frequency is once per month or 1/month, the monitoring period is one month. If the discharge occurs during only one day in that period, the permittee must sample on that day and report the results of analyses accordingly.

1.2.3. Test Procedures

- a) Test procedures for the analysis of pollutants shall conform to regulations published pursuant to Section 304 (h) of the Clean Water Act (the "Act"), as amended, under which such procedures may be required.
- b) Unless otherwise noted in the permit, all pollutant parameters shall be determined using sufficiently sensitive methods in Title 40 CFR § 136, as amended, and promulgated pursuant to Section 304 (h) of the Act. The chosen methods must be sufficiently sensitive as required in state rule 0400-40-03-.05(8).



- c) If the ML for all methods available in accordance with 40 CFR § 136 are above the stated permit limit or applicable water quality criteria for that parameter, then the method with the lowest ML shall be used.
- d) Where the analytical results are below the method detection limit (MDL), the permittee shall report the actual laboratory MDL and ML values. See **Section 1.3.4.** for instructions regarding reporting less than detection.
- e) When there is no analytical method that has been approved under 40 CFR §136 or required under 40 CFR chapter I, subchapter N or O, and a specific method is not otherwise required by the Director, the permittee may use any suitable method but shall provide a description of the method. When selecting a suitable method, factors such as a method's precision, accuracy, or resolution must be considered when assessing the performance of the method.
- f) All sampling for total mercury shall use Methods 1631, 245.7, or any additional method in 40 CFR § 136 with a maximum detection limit of 5 ng/L.
- g) Since sufficiently sensitive portable testing is now available, this permit implements ELG and water-quality based TRC limits.

1.2.4. Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

- i. The date, exact place, and time of sampling or measurements;
- ii. The individual(s) who performed the sampling or measurements;
- iii. The date analyses were performed;
- iv. The individual(s) who performed the analyses;
- v. The laboratory where the analyses were performed;
- vi. The analytical techniques or methods used; and
- vii. The results of such analyses.

1.2.5. Records Retention

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time.



1.3. REPORTING

1.3.1. Monitoring Results

Monitoring results shall be recorded monthly and submitted monthly on Discharge Monitoring Reports (DMRs) using EPA's [NetDMR](#) website. The first DMR is due on the 15th of the month following permit effectiveness. Subsequent DMRs shall be submitted through NetDMR no later than 15 days after the completion of the reporting period. In compliance with the Federal NPDES Electronic Reporting Rule, DMRs may not be submitted via email under any circumstances.

Discharge Monitoring Reports and any other information or report must be signed and certified by a responsible corporate officer as defined in Tennessee Rules, Chapter [0400-40-05-.07\(2\)\(i\)](#), a general partner or proprietor, a principal municipal executive officer or ranking elected official, or his or her duly authorized representative. Such authorization must be submitted in writing and must explain the duties and responsibilities of the authorized representative.

In the event that electronic reporting is unavailable, the permittee shall comply with reporting conditions provided in **Section 1.7.**

1.3.2. Additional Monitoring by Permittee

If the permittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR § 136, or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or other reporting form specified by the Commissioner. Such increased frequency shall also be indicated.

1.3.3. Falsifying Results and/or Reports

Knowingly making any false statement on any report required by this permit or falsifying any result may result in the imposition of criminal penalties as provided for in Section 309 of the Federal Water Pollution Control Act, as amended, and in § 69-3-115 of the Tennessee Water Quality Control Act.

1.3.4. Reporting Less Than Detection; Reporting Significant Figures

For the purpose of evaluating compliance with the permit limits established herein, where certain limits are below the minimum level (ML) of 40 CFR § 136 approved analytical methods, compliance will be demonstrated when a non-detect result is obtained using the most sensitive method available. The results of



non-detect analyses, in this case, shall be reported as Below Detection Limit (BDL) or "NODI = B" in NetDMR. Reporting examples are provided below.

Reporting Example 1: If the permit limit is 0.02 mg/L with a method detection limit (MDL) of 0.05 mg/L and no detection is shown, the permittee must report "BDL" or "NODI = B" on DMRs in NetDMR. Whenever "BDL" or "NODI = B" is reported, the actual MDL must be reported in the DMR comments or in an attachment submitted in NetDMR.

Reporting Example 2: If the permit limit is 0.02 mg/L with an MDL of 0.05 mg/L and detection is shown, the actual detected value must be reported.

Reporting Example 3: If the permit limit is 0.02 mg/L with an MDL of 0.01 mg/L and no detection is shown, the permittee must report less than MDL (<0.01 mg/L in this case).

In instances where an average must be calculated with a mix of numerical and BDL results, the permittee shall calculate the average using the MDL value for BDL results.

Reported results are to correspond to the number of significant figures (decimal places) set forth in the permit conditions. The permittee shall round values, if allowed by the method of sample analysis, using a uniform rounding convention adopted by the permittee.

1.3.5. Outlier Data

Outlier data include analytical results that are probably false. The validity of results is based on operational knowledge and a properly implemented quality assurance program. False results may include laboratory artifacts, potential sample tampering, broken or suspect sample containers, sample contamination or similar demonstrated quality control flaw.

Outlier data are identified through a properly implemented quality assurance program, and according to ASTM standards (e.g. Grubbs Test, 'h' and 'k' statistics). Furthermore, outliers should be verified, corrected, or removed based on further inquiries into the matter. If an outlier was verified (through repeated testing and/or analysis), it should remain in the preliminary data set. If an outlier resulted from a transcription or similar clerical error, it should be corrected and subsequently reported.



Therefore, only if an outlier was associated with problems in the collection or analysis of the samples and as such does not conform with the Guidelines Establishing Test Procedures for the Analysis of Pollutants (40 CFR §136), can it be removed from the data set and not reported on DMRs. Otherwise, all results (including monitoring of pollutants more frequently than required at the location(s) designated, using approved analytical methods as specified in the permit) should be included in the calculation and reporting of the values required in the DMR form. The permittee should use the "comment" section in NetDMR to explain any potential outliers or dubious results.

1.4. COMPLIANCE WITH SECTION 208

The limits and conditions in this permit shall require compliance with an area-wide waste treatment plan (208 Water Quality Management Plan) where such approved plan is applicable.

1.5. REOPENER CLAUSE

This permit shall be modified, or alternatively revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 307(a)(2), and 304(b)(2) of the Clean Water Act, as amended, if the effluent standard or limitation so issued or approved:

- a) Contains different conditions or is otherwise more stringent than any condition in the permit; or
- b) Controls any pollutant or disposal method not addressed in the permit.

The permit as modified or reissued under this paragraph shall also contain any other requirements of the Act then applicable.

1.6. SCHEDULE OF COMPLIANCE

Full compliance and operational levels shall be attained from the effective date of this permit. TVA must submit to the Director for review the information required under 40 CFR §122.21 (r)(2) through (8) paragraphs:

- (r)(2) Source water physical data and (r)(3) Cooling water intake structure data, and applicable provisions of the paragraphs below:
- (r)(4) Source water baseline biological characterization data
- (r)(5) Cooling water system data
- (r)(6) Method of compliance with impingement mortality standards
- (r)(7) Existing entrainment performance studies
- (r)(8) Operational status



Upon review and consideration of the submitted information, the Director will determine whether to grant TVA's request for a waiver of information requirements of § 122.21(r)(9) through (13).

- (r)(9) Entrainment characterization study
- (r)(10) Comprehensive technical feasibility and cost evaluation study
- (r)(11) Benefits valuation study
- (r)(12) Non-water quality and other environmental impacts study
- (r)(13) Peer review of (r)(10), (r)(11), and (r)(12)

Should the Director deny waiver of information requirements of § 122.21(r)(9) through (13) above, the permittee shall submit this information by 180 days prior to the date of expiration of this permit.

1.7. ELECTRONIC REPORTING

This permit requires the submission of forms developed by the Director in order for a person to comply with certain requirements, including, but not limited to, making reports, submitting monitoring results, and applying for permits. The Director may make these forms available electronically and, if submitted electronically, then that electronic submission shall comply with the requirements of Chapter [0400-01-40](#).

In the event of large-scale emergencies and/or prolonged electronic reporting system outages, an episodic electronic reporting waiver may be granted by the Commissioner in accordance with 40 CFR § 127.15. A request for a deadline extension or episodic electronic reporting waiver should be submitted to DWRWater.Compliance@tn.gov, in compliance with the Federal NPDES Electronic Reporting Rule.

If an episodic electronic reporting waiver is granted, reports with wet-ink original signatures shall be mailed to the following address:

*STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
COMPLIANCE & ENFORCEMENT UNIT
William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102*



For purposes of determining compliance with this permit, data provided to the Division electronically is legally equivalent to data submitted on signed and certified forms. A copy must be retained for the permittee's files.



PART 2

2. GENERAL PERMIT REQUIREMENTS

2.1. GENERAL PROVISIONS

2.1.1. Duty to Comply

The permittee shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Water Quality Control Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

2.1.2. Duty to Reapply

The permittee is not authorized to discharge after the expiration date of this permit. In order to receive authorization to discharge beyond the expiration date, the permittee shall submit such information and forms as are required to the Division Director no later than 180 days prior to the expiration date. Such forms shall be properly signed and certified.

2.1.3. Proper Operation and Maintenance

- a) The permittee shall at all times properly operate and maintain all facilities and systems (and related appurtenances) for collection and treatment which are installed or used by the permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance also includes adequate laboratory and process controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems, which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit. Backup continuous pH and flow monitoring equipment are not required.
- b) Dilution water shall not be added to comply with effluent requirements to achieve BCT, BPT, BAT, or other technology based effluent limitations such as those established in Tennessee Rule [0400-40-05-.09](#).

2.1.4. Duty to Provide Information

The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.



2.1.5. Right of Entry

The permittee shall allow the Director, the Regional Administrator of the U.S. Environmental Protection Agency, or their authorized representatives, upon the presentation of credentials, to:

- a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records shall be kept under the conditions of this permit;
- b) Have access to and copy, at reasonable times, any records that shall be kept under the conditions of this permit;
- c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
- d) Sample or monitor at reasonable times for the purposes of assuring permit compliance or as otherwise authorized by the Director.

2.1.6. Availability of Reports

Except for data determined to be confidential under Section 308 of the Federal Water Pollution Control Act, as amended, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the Division's offices or via the Department's [dataviewer webpage](#). As required by the Federal Act, effluent data shall not be considered confidential.

2.1.7. Treatment Facility Failure (Industrial Sources)

The permittee, in order to maintain compliance with this permit, shall control production, all discharges, or both, upon reduction, loss, or failure of the treatment facility until the facility is restored or an alternative method of treatment is provided. This requirement applies in such situations as the reduction, loss, or failure of the primary source of power.

2.1.8. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.



2.1.9. Severability

The provisions of this permit are severable. If any provision of this permit due to any circumstance is held invalid, then the application of such provision to other circumstances and to the remainder of this permit shall not be affected thereby.

2.1.10. Other Information

If the permittee becomes aware of failure to submit any relevant facts in a permit application, or of submission of incorrect information in a permit application or in any report to the Director, then the permittee shall promptly submit such facts or information.

2.2. CHANGES AFFECTING THE PERMIT

2.2.1. Planned Changes

The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

- a) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source as defined in Rule [0400-40-05-.02](#);
- b) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit nor to notification requirements under 40 CFR § 122.42(a)(1); or
- c) The alteration or addition results in a significant change in the permittee's sludge use or disposal practices.

2.2.2. Permit Modification, Revocation, or Termination

- a) This permit may be modified, revoked and reissued, or terminated for cause as described in 40 CFR § 122.62 and § 122.64, Federal Register, Volume 49, No. 188 (Wednesday, September 26, 1984), as amended. Causes for such permit action include but are not limited to the following:
 - i. Violation of any terms or conditions of the permit;
 - ii. Obtaining a permit by misrepresentation or failure to disclose fully all relevant facts; and
 - iii. A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge.



- b) The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit.
- c) If any applicable effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established for any toxic pollutant under Section 307(a) of the Federal Water Pollution Control Act, as amended, the Director shall modify or revoke and reissue the permit to conform to the prohibition or to the effluent standard, providing that the effluent standard is more stringent than the limitation in the permit for the toxic pollutant. The permittee shall comply with these effluent standards or prohibitions within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified or revoked and reissued to incorporate the requirement.
- d) The filing of a request by the permittee for a modification, revocation, reissuance, termination, or notification of planned changes or anticipated noncompliance does not halt any permit condition.

2.2.3. Change of Ownership

Except as provided in Tennessee Rule Chapter [0400-40-05-.06\(5\)](#)(a) or (b), this permit may be transferred to another party (provided there are neither modifications to the facility or its operations, nor any other changes which might affect permit limits and conditions contained in the permit) by the permittee if:

- a) The permittee notifies the Director of the proposed transfer at least 30 days in advance of the proposed transfer date;
- b) The notice includes a written agreement between the existing and new permittees containing a specified date for transfer of permit responsibility, coverage, and liability between them; and
- c) The permittee shall provide the following information to the Director in their formal notice of intent to transfer ownership:
 - i. The permit number of the subject permit;
 - ii. The effective date of the proposed transfer;
 - iii. The name, address, and contact information of the transferor;
 - iv. The name, address, and contact information of the transferee;



- v. The names of the responsible parties for both the transferor and transferee;
- vi. A statement that the transferee assumes responsibility for the subject permit;
- vii. A statement that the transferor relinquishes responsibility for the subject permit;
- viii. The signatures of the responsible parties for both the transferor and transferee pursuant to the signatory requirements of subparagraph (i) of Rule [0400-40-05-.07\(2\)](#); and
- ix. A statement regarding any proposed modifications to the facility, its operations, or any other changes, which might affect the permit, limits and conditions contained in the permit.

2.2.4. Change of Mailing Address

The permittee shall promptly provide to the Director written notice of any change of mailing address. In the absence of such notice, the original address of the permittee will be assumed to be correct.

2.3. NONCOMPLIANCE

2.3.1. Reporting of Noncompliance

a) 24-hour Reporting:

In the case of any noncompliance which could cause a threat to public drinking supplies or any other discharge which could constitute a threat to human health or the environment, the required notice of non-compliance shall be provided to the Division of Water Resources in the appropriate EFO within 24 hours from the time the permittee becomes aware of the circumstances. The EFO should be contacted for names and phone numbers of the environmental response team.

A written submission must be provided via [MyTDEC Forms](#) within five days of the time the permittee becomes aware of the circumstances unless the Director on a case-by-case basis waives this requirement. The permittee shall provide the Director with the following information:

- i. A description of the discharge and cause of noncompliance;
- ii. The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue; and
- iii. The steps being taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.



b) **Scheduled Reporting:**

For instances of noncompliance which do not cause a threat to public drinking supplies, or any other discharge which could constitute a threat to human health or the environment, the permittee shall report the noncompliance on the DMR. The report shall contain all information concerning the steps taken, or planned, to reduce, eliminate, and prevent recurrence of the violation and the anticipated time the violation is expected to continue.

2.3.2. Overflows and Releases

- a) Sanitary sewer overflows, including dry-weather overflows, are prohibited.
- b) The permittee shall operate the collection, transmission, and treatment system so as to avoid sanitary sewer overflows and releases due to improper operation or maintenance. A “release” may be due to improper operation or maintenance of the collection system or may be due to other cause(s). Releases caused by improper operation or maintenance of the permittee’s collection, transmission, and treatment system are prohibited.
- c) The permittee shall take all reasonable steps to minimize any adverse impact associated with overflows and releases.
- d) No new or additional flows shall be added upstream of any point in the collection, transmission, or treatment system that experiences greater than 5 sanitary sewer overflows and/or releases per year¹ or would otherwise overload any portion of the system. Unless there is specific enforcement action to the contrary, the permittee is relieved of this requirement after:
 - 1) An authorized representative of the Commissioner of the Department of Environment and Conservation has approved an engineering report and construction plans and specifications prepared in accordance with accepted engineering practices for correction of the problem;
 - 2) The correction work is underway; and
 - 3) The cumulative, peak-design flows potentially added from new connections and line extensions upstream of any chronic overflow or release point are less than or proportional to the amount of inflow and infiltration removal documented upstream from that point.

¹ This includes dry weather overflows, wet weather overflows, dry weather releases and wet weather releases.



The inflow and infiltration reduction must be measured by the permittee using practices that are customary in the environmental engineering field and reported in an attachment to the permittee's DMR and uploaded to NetDMR. The data measurement period shall be sufficient to account for seasonal rainfall patterns and seasonal groundwater table elevations.

- e) In the event that chronic sanitary sewer overflows or releases have occurred from a single point in the collection system for reasons that may not warrant the self-imposed moratorium of the actions identified in this paragraph, the permittee may request a meeting with Division EFO staff to petition for a waiver based on mitigating evidence.
- f) Unpermitted discharges from the collection or treatment system of industrial facilities are prohibited.

2.3.3. Upset

- a) *"Upset"* means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based effluent limitations due to factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
- b) An upset shall constitute an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the permittee demonstrates, through properly signed, contemporaneous operating logs, or other relevant evidence that:
 - i. An upset occurred and that the permittee can identify the cause(s) of the upset;
 - ii. The permitted facility was at the time being operated in a prudent and workman-like manner and in compliance with proper operation and maintenance procedures;
 - iii. The permittee submitted information required under "Reporting of Noncompliance" within 24 hours of becoming aware of the upset (if this information is provided orally, a written submission must be provided within five days); and
 - iv. The permittee complied with any remedial measures required under "Adverse Impact".



2.3.4. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to the waters of Tennessee resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge. It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

2.3.5. Bypass

- a) *"Bypass"* means the intentional diversion of waste streams from any portion of a treatment facility. *"Severe property damage"* means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
- b) Bypasses are prohibited unless all the following conditions are met:
 - i. The bypass is unavoidable to prevent loss of life, personal injury, or severe property damage;
 - ii. There are no feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance; and
 - iii. For anticipated bypass, the permittee submits prior notice, if possible at least ten days before the date of the bypass, or for unanticipated bypass, the permittee submits notice of an unanticipated bypass within 24 hours from the time that the permittee becomes aware of the bypass.
- c) Bypasses that do not cause effluent limitations to be exceeded may be allowed only if the bypass is necessary for essential maintenance to assure efficient operation and are not subject to the reporting requirements of part b)iii. above.



2.3.6. Washout

- a) For domestic wastewater plants only, a "*washout*" shall be defined as loss of Mixed Liquor Suspended Solids (MLSS) of 30.00% or more. This refers to the MLSS in the aeration basin(s) only. This does not include MLSS decreases due to solids wasting to the sludge disposal system. A washout can be caused by improper operation or from peak flows due to inflow and infiltration.
- b) A washout is prohibited. If a washout occurs the permittee must report the incident to the Division in the appropriate EFO within 24 hours by telephone. A written submission must be provided within five days. The washout must be noted on that month's DMR. Each day of a washout is a separate violation.

2.4. LIABILITIES

2.4.1. Civil and Criminal Liability

Except as provided in permit conditions for "*Bypass*" (**Section 2.3.5**), "*Overflows and Releases*" (**Section 2.3.2**), and "*Upset*" (**Section 2.3.3**), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Notwithstanding this permit, the permittee shall remain liable for any damages sustained by the State of Tennessee, including, but not limited to, fish kills and losses of aquatic life and/or wildlife as a result of the discharge of wastewater to any surface or subsurface waters. Additionally, notwithstanding this permit, it shall be the responsibility of the permittee to conduct its wastewater treatment and/or discharge activities in a manner such that public or private nuisances or health hazards will not be created.

2.4.2. Liability Under State Law

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or the Federal Water Pollution Control Act, as amended.



PART 3

3. PERMIT SPECIFIC REQUIREMENTS

3.1. TOXIC POLLUTANTS

The permittee shall notify the Division as soon as it knows or has reason to believe that:

- a) Any activity has occurred or will occur which would result in the discharge on a routine or frequent basis of any toxic substance(s) not limited in the permit (listed in 40 CFR 122, Appendix D, Table II and III), if that discharge will exceed the highest of the following “notification levels”:
 - i. One hundred micrograms per liter (100 µg/L);
 - ii. Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
 - iii. Five times the maximum concentration value reported for that pollutant(s) in the permit application in accordance with 40 CFR 122.21(g)(7); or
 - iv. The level established by the Director in accordance with 40 CFR 122.44(f).
- b) Any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following “notification levels”:
 - i. Five hundred micrograms per liter (500 µg/L);
 - ii. One milligram per liter (1 mg/L) for antimony;
 - iii. Ten times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7); or
 - iv. The level established by the Director in accordance with 40 CFR 122.44(f).



3.2. BIOMONITORING REQUIREMENTS, CHRONIC

The permittee shall conduct a 3-Brood *Ceriodaphnia dubia* Survival and Reproduction Test and a 7-Day Fathead Minnow (*Pimephales promelas*) Larval Survival and Growth Test on samples of final effluent from Outfall 001.

The measured endpoint for toxicity will be the inhibition concentration causing 25% reduction in survival, reproduction and growth (IC₂₅) of the test organisms. The IC₂₅ shall be determined based on a 25% reduction as compared to the controls, and as derived from linear interpolation. The average reproduction and growth responses will be determined based on the number of *Ceriodaphnia dubia* or *Pimephales promelas* larvae used to initiate the test.

Tests shall be conducted and results reported based on appropriate replicates of a total of five serial dilutions and a control, using the percent effluent dilutions as presented in the following table:

Outfall OSN101 & OSN102					
Serial Dilutions for Whole Effluent Toxicity (WET) Testing					
4 X PL	2 X PL	Permit Limit (PL)	0.50 X PL	0.25 X PL	Control
% effluent					
16.8	8.4	4.2	2.1	1.05	0

Outfall OSN113					
Serial Dilutions for Whole Effluent Toxicity (WET) Testing					
4 X PL	2 X PL	Permit Limit (PL)	0.50 X PL	0.25 X PL	Control
% effluent					
50.8	25.4	12.7	6.4	3.18	0

The dilution/control water used will be moderately hard water as described in [Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms](#), EPA-821-R-02-013 (or the most current edition). A chronic standard reference toxicant quality assurance test shall be conducted with each species used in the toxicity tests and the results submitted with the discharge monitoring report. Additionally, the analysis of this multi-concentration test shall include review of the concentration-response relationship to ensure that calculated test results are interpreted appropriately.



Toxicity will be demonstrated if the IC_{25} is less than or equal to the permit limit indicated for each outfall in the above table(s).

All tests will be conducted using a minimum of three 24-hour, flow-proportionate composite samples of final effluent (e.g., collected on days 1, 3, and 5). If, in any control more than 20% of the test organisms die in 7 days, the test (control and effluent) is considered invalid and the test shall be repeated within two (2) weeks. Furthermore, if the results do not meet the acceptability criteria in the above-referenced *Short-term Methods* document, or if the required concentration-response review fails to yield a valid relationship per guidance contained in *Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing*, EPA-821-B-00-004 (or the most current edition), that test shall be repeated. Any test initiated but terminated before completion must also be reported along with a complete explanation for the termination.

The toxicity tests specified herein for Outfalls OSN 101, 102, and 113 shall be conducted according to the Biocide/Corrosion Treatment Plan (B/CTP). As outlined in the B/CTP, WET testing shall be performed twice per year at each outfall: once per year when oxidizing biocides are being used, and once per year when non-oxidizing biocides are being used. In months when WET testing is performed, the permittee shall indicate under which conditions WET testing was performed on Discharge Monitoring Reports. In order to effectively track WET monitoring, monthly reporting shall continue. For monitoring periods when WET testing is not required by the B/CTP, the permittee shall report "Monitoring not required" (NODI = 9) for that month in NetDMR.

In the event of a test failure, the permittee must start a follow-up test within 2 weeks and submit results from a follow-up test within 30 days from obtaining initial WET testing results. The follow-up test must be conducted using the same serial dilutions as presented in the corresponding table(s) above. The follow-up test will not negate an initial failed test. In addition, the failure of a follow-up test will constitute a separate permit violation.

In the event of 2 consecutive test failures or 3 test failures within a 12-month period for the same outfall, the permittee must initiate a Toxicity Identification Evaluation/Toxicity Reduction Evaluation (TIE/TRE) study within 30 days and so notify the Division by letter. This notification shall include a schedule of activities for the initial investigation of that outfall. During the term of the TIE/TRE study, the frequency of biomonitoring shall be once every three months. Additionally, the permittee shall submit progress reports once every three months throughout the term of the TIE/TRE study. The toxicity must be reduced to allowable limits for that outfall within 2 years of initiation of the TIE/TRE study. Subsequent to the



results obtained from the TIE/TRE studies, the permittee may request an extension of the TIE/TRE study period if necessary, to conduct further analyses. The final determination of any extension period will be made at the discretion of the Division.

The TIE/TRE study may be terminated at any time upon the completion and submission of 2 consecutive tests (for the same outfall) demonstrating compliance. Following the completion of TIE/TRE study, the frequency of monitoring will return to a regular schedule, as defined previously in this section as well in Part I of the permit. During the course of the TIE/TRE study, the permittee will continue to conduct toxicity testing of the outfall being investigated at the frequency of once every three months but will not be required to perform follow-up tests for that outfall during the period of TIE/TRE study.

Test procedures, quality assurance practices, determinations of effluent survival/reproduction and survival/growth values, and report formats will be made in accordance with [*Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms*](#), EPA-821-R-02-013, or the most current edition. Results of tests, reference toxicant information, copies of raw data sheets, statistical analysis, and chemical analyses shall be compiled in a report also written in accordance with the *Short-term Methods* document above.

A copy of the biomonitoring report (including any follow-up reports) shall be submitted to the Division as an attachment to the monthly DMR in NetDMR.

3.3. PLACEMENT OF SIGNS

Within sixty (60) days of the effective date of this permit, the permittee shall place and maintain a sign at each outfall or the nearest publicly accessible location. The sign(s) should be clearly visible to the public from the bank and the receiving stream. The minimum sign size should be two feet by two feet (2' x 2') with one-inch (1") letters. The sign should be made of durable material and have a white background with black letters.

The sign(s) are to provide notice to the public as to the nature of the discharge and, in the case of the permitted outfalls, that the discharge is regulated by the Tennessee Department of Environment and Conservation, Division of Water Resources. The following are given as examples of the minimal amount of information that must be included on the signs:



Treated Industrial Wastewater:

TREATED INDUSTRIAL WASTEWATER
Tennessee Valley Authority (TVA)
Watts Bar Nuclear (WBN) Plant
(423) 365-8767
NPDES Permit No. TN0020168
TENNESSEE DIVISION OF WATER RESOURCES
1-888-891-8332 ENVIRONMENTAL FIELD OFFICE - Chattanooga

3.4. COMPLIANCE WITH CWA SECTION 316(A)

Compliance requirements for the thermal mixing zone as defined above in Part 1.1.2 are retained in the renewed permit.

3.5. COMPLIANCE WITH CWA SECTION 316(B) – COOLING WATER INTAKE

When a permittee submits an application for permit renewal, the permittee must also submit to the Director the information required under 40 CFR 122.21(r), as outlined below. The permittee may request for the Division to grant a waiver to submit reduced application information in accordance with 40 CFR 125.95(c) at least two years, six months prior to permit expiration.

With each renewal application, the permittee must submit to the Division:

- (r)(2) – Source water physical data;
- (r)(3) – Cooling water intake structure data;

and applicable provisions of the paragraphs below:

- (r)(4) – Source water baseline biological characterization data;
- (r)(5) – Cooling water system data;
- (r)(6) – Chosen method of compliance with impingement mortality standard;
- (r)(7) – Entrainment performance studies; and
- (r)(8) – Operational status.

Through correspondence and subsequent meetings and emails, starting with the September 5, 2017, request, TVA submitted a waiver for the requirement for information requirements of Section (§) 122.21 (r)(9) through (13) for the WBN plant. The rules contemplate the following: *“upon review and consideration of the submitted information, the Director will determine whether to grant TVA's request for a waiver of information requirements of § 122.21(r)(9) through (13).”* The waiver was



based upon information presented by TVA, specifically considering following factors:

- Through the use of a closed-cycle recirculation system in combination with a gravity supplemental source, flow reductions are realized and cooling water withdrawals are being substantially minimized (i.e., from 74% compared to WBN open-cycle operations, or 86.5% compared to typical nuclear power plants);
- WBN withdraws cooling water from two separate waterbodies, lessening any full effects of impingement and entrainment, as compared to a single withdrawal;
- Absence of any federally listed threatened and/or endangered species in biological samples for impingement/entrainment in the vicinity of the WBN intake; and
- Site-specific entrainment data shows no measurable impact on the fisheries of waterbodies in the vicinity of the WBN intake.

The U.S. Fish and Wildlife Service (USFWS) has also reviewed the technical information associated with § 316(b) waiver request of § 122.21(r)(9) - (13) NPDES application information requirements for the WBN Plant. Based on the review of the information submitted and the discussions on our October 19, 2017, conference call, the USFWS informed the division they do not oppose TVA's waiver request.

In accordance with 40 CFR 125.98(b)(6), the above ensures that the Director will have all the information necessary to establish Best Technology Available (BTA) requirements for impingement mortality and entrainment in the subsequent permit. In the interim, based on an evaluation of available information on the facility's cooling water intake structure used by the permittee, the Division has determined, using Best Professional Judgment (BPJ) that the cooling water intake structure represents BTA to minimize adverse environmental impact in accordance with Section 316(b) of the CWA.

Two years, six months before expiration of the permit, the permittee must submit to the Director for review the information required under 40 CFR 122.21:

- (r)(2) Source water physical data and (r)(3) Cooling water intake structure data, and any applicable paragraphs below:
- (r)(4) Source water baseline biological characterization data
- (r)(5) Cooling water system data
- (r)(6) Method of compliance with impingement mortality standards
- (r)(7) Existing entrainment performance studies

- (r)(8) Operational status



PART 4

4. DEFINITIONS AND ACRONYMS

4.1. DEFINITIONS

Actual intake flow (AIF) means the average volume of water withdrawn on an annual basis by the cooling water intake structures over the past three years.

For the purposes of this permit, **annually** is defined as a monitoring frequency of once every 12 months beginning with the effective date of this permit, so long as the following set of measurements for a given 12-month period are made approximately 12 months subsequent to that time.

A **bypass** is defined as the intentional diversion of waste streams from any portion of a treatment facility.

A **calendar day** is defined as the 24-hour period from midnight to midnight or any other 24-hour period that reasonably approximates the midnight-to-midnight time period.

A **composite sample** is a combination of not less than 8 influent or effluent portions, of at least 100 mL, collected over a 24-hour period. Under certain circumstances a lesser time period may be allowed, but in no case less than 8 hours.

Continuous monitoring, for the purposes of this permit, means the measurement of temperature or pH at a frequency that will accurately characterize the nature of discharges from the site and water in the receiving stream. Samples collected continuously shall be at a frequency of not less than once every 15 minutes for temperature.

Cooling water means water used for contact or non-contact cooling, including water used for equipment cooling, evaporative cooling tower makeup, and dilution of effluent heat content. The intended use of the cooling water is to absorb waste heat rejected from the process or processes used, or from auxiliary operations at the facility's premises.

Cooling water intake structure means the total physical structure and any associated constructed waterways used to withdraw cooling water from waters of the United States. The cooling water intake structure extends from the point at



which water is first withdrawn from waters of the United States up to, and including, the intake pumps.

The **daily maximum amount** is a limitation, measured in units of weight per time (e.g. pounds per day), on the total amount of any pollutant in the discharge during any calendar day.

The **daily maximum concentration** is a limitation on the average concentration in units of mass per volume (e.g. milligrams per liter) of the discharge during any calendar day. When a proportional-to-flow composite sampling device is used, the daily concentration is the concentration of that 24-hour composite; when other sampling means are used, the daily concentration is the arithmetic mean of the concentrations of equal volume samples collected during any calendar day or sampling period.

Degradation means the alteration of the properties of waters by the addition of pollutants, withdrawal of water, or removal of habitat, except those alterations of a short duration.

Design intake flow (DIF) means the value assigned during the cooling water intake structure design to the maximum instantaneous rate of flow of water the cooling water intake system is capable of withdrawing from a source waterbody.

De Minimis is degradation of a small magnitude, as provided in this paragraph:

- (a) Discharges and withdrawals:
 - 1. Subject to the limitation in part 3 of this subparagraph, a single discharge other than those from new domestic wastewater sources will be considered de minimis if it uses less than five percent of the available assimilative capacity for the substance being discharged.
 - 2. Subject to the limitation in part 3 of this subparagraph, a single water withdrawal will be considered de minimis if it removes less than five percent of the 7Q10 flow of the stream.
 - 3. If more than one activity described in part 1 or 2 of this subparagraph has been authorized in a segment and the total of the authorized and proposed impacts uses no more than 10% of the assimilative capacity, or 7Q10 low flow, they are presumed to be de minimis. Where the total of the authorized and proposed impacts uses 10% of the assimilative capacity, or 7Q10 low flow, additional degradation may only be treated as de minimis if the Division finds on a scientific basis that the additional degradation has an insignificant effect on the resource.
- (b) Habitat alterations authorized by an Aquatic Resource Alteration Permit (ARAP) are de minimis if the Division finds that the impacts, individually and



cumulatively, are offset by impact minimization and/or in-system mitigation, provided however, in Outstanding National Resource Waters (ONRWs) the mitigation must occur within the ONRW.

Discharge or **discharge of a pollutant** refers to the addition of pollutants to waters from a source.

An **ecoregion** is a relatively homogeneous area defined by similarity of climate, landform, soil, potential natural vegetation, hydrology, or other ecologically relevant variables.

Entrainment means the incorporation of all life stages of fish and shellfish with intake water flow entering and passing through a cooling water intake structure and into a cooling water system.

The **geometric mean** of any set of values is the n^{th} root of the product of the individual values where "n" is equal to the number of individual values. The geometric mean is equivalent to the antilog of the arithmetic mean of the logarithms of the individual values. For the purposes of calculating the geometric mean, values of zero (0) shall be considered to be one (1).

A **grab sample** is a single influent or effluent sample collected at a particular time.

The **instantaneous maximum concentration** is a limitation on the maximum concentration, in units of mass per volume (e.g. milligrams per liter), of any pollutant contained in the wastewater discharge determined from a grab sample taken from the discharge at any point in time.

The **instantaneous minimum concentration** is the minimum allowable concentration, in units of mass per volume (e.g. milligrams per liter), of a pollutant parameter contained in the wastewater discharge determined from a grab sample taken from the discharge at any point in time.

The **monthly average amount** is the arithmetic mean of all the measured daily discharges by weight during the calendar month when the measurements were made.

The **monthly average concentration**, a limitation on the discharge concentration in units of mass per volume, of any pollutant, other than bacteria, is the arithmetic mean of all the composite or grab samples collected in a one calendar-month period.



A **one-week period** (or **calendar-week**) is defined as the period from Sunday through Saturday. For weekly average reporting purposes, a calendar week that contains a change of month shall be considered part of the latter month.

Pollutant means sewage, industrial wastes, or other wastes.

A **qualifying storm event** is a storm event in which greater than 0.1 inches of rainfall occurs after a period of at least 72 hours following any previous storm event with rainfall of 0.1 inches or greater.

A **quarter** is defined as any one of the following three-month periods: January 1 through March 31, April 1 through June 30, July 1 through September 30, and/or October 1 through December 31.

A **rainfall event** is defined as any occurrence of rain preceded by 10 hours without precipitation that results in an accumulation of 0.01 inches or more. Instances of rainfall occurring within 10 hours of each other will be considered a single rainfall event.

A **rationale** (or **fact sheet**) is a document that is prepared when drafting an NPDES permit or permit action. It provides the technical, regulatory and administrative basis for an agency's permit decision.

A **reference site** means the least impacted waters within an ecoregion that have been monitored to establish a baseline to which alterations of other waters can be compared.

A **reference condition** is a parameter-specific set of data from regional reference sites that establish the statistical range of values for that particular substance at least-impacted streams.

The term **semi-annually**, for the purposes of this permit, means the same as once every 6 months. Measurements of the limited effluent parameters may be made any time during a 6 month period beginning from the effective date of this permit, so long as the second set of measurements for a given 12 month period are made approximately 6 months subsequent to that time, if feasible.

Severe property damage, when used to consider the allowance of a bypass, means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the



absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

A **subcoregion** is a smaller, more homogenous area that has been delineated within an ecoregion.

Unpermitted discharge refers to the discharge of pollutants to waters not authorized by this permit.

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

The term **washout** is applicable to domestic wastewater activated sludge plants and is defined as loss of mixed liquor suspended solids (MLSS) of 30.00% or more from the aeration basin(s).

Waters means any and all water, public or private, on or beneath the surface of the ground, which are contained within, flow through, or border upon Tennessee or any portion thereof, except those bodies of water confined to and retained within the limits of private property in single ownership which do not combine or effect a junction with natural surface or underground waters.

The **weekly average amount** is the sum of all the measured daily discharges by weight divided by the number of days during the calendar week when the measurements were made.

The **weekly average concentration** is the highest arithmetic mean of all the composite samples collected in a one-week period in a month.

Wet weather flow shall be construed to represent stormwater runoff which, in combination with all process and/or non-process wastewater discharges, as applicable, is discharged during a qualifying storm event.



4.2. ACRONYMS AND ABBREVIATIONS

1Q10 –	1-day minimum, 10-year recurrence interval
30Q5 –	30-day minimum, 5-year recurrence interval
7Q10 –	7-day minimum, 10-year recurrence interval
BAT –	best available technology economically achievable
BCT –	best conventional pollutant control technology
BDL –	below detection limit
BOD ₅ –	five-day biochemical oxygen demand
BPT –	best practicable control technology currently available
CBOD ₅ –	five-day carbonaceous biochemical oxygen demand
CEI –	compliance evaluation inspection
CFR –	code of federal regulations
CFS –	cubic feet per second
CFU –	colony forming units
CIU –	categorical industrial user
CSO –	combined sewer overflow
DMR –	discharge monitoring report
D.O. –	dissolved oxygen
<i>E. coli</i> –	<i>Escherichia coli</i>
EPA –	Environmental Protection Agency
EFO –	environmental field office
GPM –	gallons per minute
IC ₂₅ –	inhibition concentration causing 25% reduction in survival, reproduction, and growth of the test organisms
IU –	industrial user
IWS –	industrial waste survey
LB (lb) –	pound
LC ₅₀ –	acute test causing 50% lethality
MDL –	method detection limit
MGD –	million gallons per day
mg/L –	milligrams per liter
ML –	minimum level of quantification
mL –	milliliter
MLSS –	mixed liquor suspended solids
MOR –	monthly operating report
NODI –	no discharge code in NetDMR
NPDES –	national pollutant discharge elimination system
PL –	permit limit
POTW –	publicly owned treatment works
SAR –	semi-annual report [pretreatment program]



SIU – significant industrial user
SSO – sanitary sewer overflow
STP – sewage treatment plant
TBEL – technology-based effluent limit
TCA – Tennessee code annotated
TDEC – Tennessee Department of Environment and Conservation
TIE/TRE – toxicity identification evaluation/toxicity reduction evaluation
TMDL – total maximum daily load
TRC – total residual chlorine
TSS – total suspended solids
WQBEL – water quality-based effluent limit



4.3. RESOURCES, HYPERLINKS, AND WEB PAGES

Clean Water Act NPDES Electronic Reporting (eReporting) Information

<https://www.epa.gov/compliance/npdes-ereporting>

Clean Water Act Section 316(b) Cooling Water Intake Existing Facility Final Rule

<https://www.federalregister.gov/documents/2014/08/15/2014-12164/national-pollutant-discharge-elimination-system-final-regulations-to-establish-requirements-for>

Electronic Code of Federal Regulations (eCFR), Title 40 (40 CFR § 1 through § 1099)

<https://www.ecfr.gov/cgi-bin/text-idx?SID=75202eb5d09974cab585afeea981220b&mc=true&tpl=/ecfrbrowse/Title40/40chapter1.tpl>

Electronic Reporting (NetDMR) Waiver Request

https://www.tn.gov/content/dam/tn/environment/water/documents/wr_ereporting_waiver.pdf

Low Flow Statistics Tools: A How-To Handbook for NPDES Permit Writers (EPA)

https://www.epa.gov/sites/production/files/2018-11/documents/low_flow_stats_tools_handbook.pdf

Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms (EPA)

https://www.epa.gov/sites/production/files/2015-08/documents/acute-freshwater-and-marine-wet-manual_2002.pdf

NetDMR Login

<https://cdxnodengn.epa.gov/net-netdmr/>

NetDMR, MyTDEC Forms, & Electronic Reporting Information

<https://www.tn.gov/environment/program-areas/wr-water-resources/netdmr-and-electronic-reporting.html>

NPDES Compliance Inspection Manual (EPA)

<https://www.epa.gov/sites/production/files/2017-01/documents/npdesinspect.pdf>

NPDES Electronic Reporting Rule

<https://www.federalregister.gov/documents/2015/10/22/2015-24954/national-pollutant-discharge-elimination-system-npdes-electronic-reporting-rule>

Quality System Standard Operating Procedure for Macroinvertebrate Stream Surveys (QSSOP)

https://www.tn.gov/content/dam/tn/environment/water/documents/DWR-PAS-P-01-Quality_System_SOP_for_Macroinvertebrate_Stream_Surveys-081117.pdf



Rules of the TN Department of Environment and Conservation, Chapter 0400-40
<https://publications.tnsosfiles.com/rules/0400/0400-40/0400-40.htm>

Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms (EPA)
https://www.epa.gov/sites/production/files/2015-08/documents/short-term-chronic-freshwater-wet-manual_2002.pdf

TDEC Water Quality Rules, Reports, and Publications
<https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-quality-reports---publications.html>

Technical Support Document for Water Quality-based Toxics Control (EPA)
<https://www3.epa.gov/npdes/pubs/owm0264.pdf>

Tennessee Nutrient Reduction Framework
https://www.tn.gov/content/dam/tn/environment/water/tmdl-program/wr-ws_tennessee-draft-nutrient-reduction-framework_030315.pdf

Tennessee Plant Optimization Program (TNPOP)
<https://www.tn.gov/environment/program-areas/wr-water-resources/tn-plant-optimization-programs/tnpop.html>

Tennessee Water Resources Data and Map Viewers
<https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-resources-data-map-viewers.html>

USGS StreamStats
https://www.usgs.gov/mission-areas/water-resources/science/streamstats-streamflow-statistics-and-spatial-analysis-tools?qt-science_center_objects=0#qt-science_center_objects

USGS SWToolbox
<https://www.usgs.gov/software/swtoolbox-software-information>



PART 5

5. STORMWATER POLLUTION PREVENTION PLAN (SWPPP) AND BIOCIDES/CORROSION TREATMENT PLAN (B/CTP)

5.1. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

Stormwater discharges associated with the industrial activity of this facility are covered by the Tennessee Multi-Sector General Storm Water Permit TNR051343. Stormwater concerns associated with this facility are covered in the general permit and will, therefore, not be addressed in detail in this permit.

5.2. BIOCIDES/CORROSION TREATMENT PLAN

The use of toxic chemicals and biocides at the site for process and non-process flows shall be managed under a Biocides/Corrosion Treatment Plan (B/CTP). The B/CTP shall describe chemical applications and macroinvertebrate controls, include all material feed rates, and proposed monitoring schedule(s). The permittee shall conduct treatments of intake or process waters under this permit using biocides, dispersants, surfactants, corrosion inhibiting chemicals, or detoxification chemicals in accordance with conditions approved and specified in the B/CTP.

The permittee shall maintain the B/CTP at the facility and make the plan available to the permit issuing authority upon request. The permittee shall amend the B/CTP whenever there is a change in the application of the chemical additives or change in the operation of the facility that materially increases the potential for these activities to result in a discharge of significant amounts of pollutants. The Division shall also be notified in writing within 30 days of any material changes that will change the active ingredients or quantities used of any such chemical additives.

The permittee shall submit an annual B/CTP report by January 31st of the following year for the duration of the permit. This report should describe the application of biocide and corrosion treatment chemicals throughout the year, including quantity of chemicals added, duration of application, and results from biomonitoring tests as outlined in the approved B/CTP.

5.3. DOCUMENTATION

The permittee shall maintain the SWPPP and the B/CTP plans at the facility and shall make the plans available to the permit issuing authority upon request.



5.4. SWPPP & B/CTP MODIFICATION

The permittee shall amend the SWPPP or B/CTP plans whenever there is a change in the facility or change in the operation of the facility that materially increases the potential for the ancillary activities to result in a discharge of significant amount of pollutants. A current B/CTP must be submitted with each permit renewal application.

5.5. MODIFICATION FOR INEFFECTIVENESS

If either the SWPPP or B/CTP plans prove to be ineffective in achieving the general objective of preventing the release of significant amounts of pollutants to surface waters and the specific objectives and requirements under Section B, the permit shall be subject to modification pursuant to 40 CFR § 122.62 or §122.63 to incorporate revised SWPPP or B/CTP requirements. Any such permit modification shall be subject to review in accordance with the procedures for permit appeals set forth in accordance with Tenn. Code Ann. §69-3-110.

5.6. COMPLIANCE SCHEDULE

The SWPPP and B/CTP plans shall be maintained, and the permittee shall begin implementation of any updates of the plan within six months after the effective date of this permit.

ADDENDUM TO RATIONALE

**Tennessee Valley Authority (TVA)
Watts Bar Nuclear (WBN) Plant
NPDES Permit Number TN0020168
Date: 1/10/2022
Permit Writer: Shannon McClellan**

The Division of Water Resources (the Division) received comments from TVA during the public notice comment period on January 6, 2022. The comments are listed below and the Division's answers in bold font. The Division thanks TVA for their comments and reviewing the draft. Please note the rationale cannot be changed after being public noticed.

"Page 1, Section 1.1., second paragraph: TVA posits Virtual Outfall V001 be included in this paragraph, as it is an outfall where discharge shall be limited and monitored as specified on page 7, Section 1.1.1."

The Division approves and has changed this in the permit.

"Page 3, Section 1.1.1., OSN 101 & OSN 102 Note (6), Pages 6 and 7, Section 1.1.1., Note (5): TVA requests chromium and zinc be added with the following language: *Priority Pollutants, other than chromium and zinc, will not be discharged in cooling tower blowdown in amounts that are detectable by analytical methods in 40 CFF Part 136. Monitoring for the priority pollutants, including chromium and zinc, will not be required unless it has been added to industrial processes and will be present in the discharge effluent.* This request also applies to the applicable parts in the Rationale.

Page 3, Section 1.1.1., OSN 101 & OSN 102 last note: TVA requests this note to be corrected with the following language: *See Part 3.2 for biomonitoring test and reporting requirements.*"

These changes have been made in the permit and rationale.

"Page 9, Section 1.1.2., first paragraph: TVA requests chromium be added with the following language: *Priority Pollutants contained in chemicals added for cooling tower maintenance except for chromium (if approved for use) and zinc, shall not be discharged in cooling tower blowdown in amounts that are detectable by analytical methods in 40 CFR Part 136.* This request also applies to the applicable parts in the Rationale."



These changes have been made in the permit and rationale.

Page 9, Section 1.1.2., third paragraph: TVA requests zinc be added with the following language: *The limit of 0.2 mg/L will apply to this permit. Priority Pollutants, with the exception of chromium and zinc, will not be discharged in cooling tower blowdown in amounts that are detectable by analytical methods in 40 CFR Part 136. Monitoring for the priority pollutants, including chromium and zinc, will not be required unless it has been added to industrial processes and will be present in the discharge effluent.* This request also applies to the applicable parts in the Rationale.

These changes have been made in the permit and rationale.

"Page 10, Section 1.1.2., Outfall OSN 113: Historical data collected and submitted by TVA between 2005 and 2021 has demonstrated a history of compliance for the passive mixing zone; therefore, TVA requests revising in-stream temperature surveys to a biennial (once per two years) frequency. (See Passive Mixing Zone Compliance Survey data submitted to the Division's Chattanooga Environmental Field Office between 2005 and 2017, and data submitted in NetDMR from 2017 to 2021.)".

The Division has reviewed the data and agrees to reduce the frequency to once every two years.

"Page 12, Section 1.2.1.: TVA requests language consistent with Sequoyah Nuclear Plant NPDES permit No. TN0026450 regarding the frequency of flow measurement device calibrations. TVA requests the following language: *Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated (biennially at a minimum) and maintained to ensure that the accuracy of the measurements is consistent with accepted capability of that type of device. Monitoring devices selected shall be capable of measuring flows with a maximum deviation of less than plus or minus 10% from the true discharge rates throughout the range of expected discharge volumes.*"

The Division approves of the language and has reflected these changes in the permit.

"Page 30, Section 3.2., third paragraph: In order to provide consistency with Sequoyah Nuclear Plant NPDES permit No. TN0026450, TVA requests that Biomonitoring Requirements in this paragraph be revised as follows: *The toxicity tests specified herein for Outfalls OSN 101, 102, and 113 shall be conducted according*



to the Biocide/Corrosion Treatment Plan (B/CTP). As outlined in the B/CTP, WET testing shall be performed twice per year at each outfall: once per year when oxidizing biocides are being used, and once per year when non-oxidizing biocides are being used. In months when WET testing is performed, the permittee shall indicate under which conditions WET testing was performed on Discharge Monitoring Reports. In order to effectively track WET monitoring, monthly reporting shall continue. For monitoring periods when WET testing is not required by the B/CTP, the permittee shall report "Monitoring not required" (NODI = 9) for that month in NetDMR."

The Division approves of the language and has reflected these changes in the permit.

"Page 31, Section 3.3.: TVA requests language consistent with other NPDES permits regarding the replacement of signs be added with the following language: *Existing signage using the former name of the Division as "Water Pollution Control" can be used until the signs need replacement, at which time the new name should be added.*"

The permit identifies minimum information needed on the sign. The Division will retain the new template language of the signage as "Water Resources" due to the name change that happened several years back. All signs are required to be updated by the permittee. We support maintaining signs and not waiting until they need replacement.

"Page 32, Section 3.4.: TVA requests the phrase "Thermal Variance" be deleted from the section title. WBN's thermal limits ensure compliance with state water quality criteria at the edge of a defined mixing zone. WBN does not have, nor is it requesting, a thermal variance, therefore this section is misleading. TVA requests this section to be revised to reflect the operational conditions at WBN".

After reviewing the current permit and those previous, the Division agrees and has revised section 3.4.

"Page 44, Section 5.1.: The requirements of Section 5.1. are governed by a separate NPDES Permit (Tennessee Storm Water Multi-Sector General permit for Industrial Activities). TVA requests adding language as follows: *Stormwater concerns associated with this facility are covered in the general permit and will therefore not be addressed in detail in this permit*".

The Division agrees and has revised the language in the permit.



“Rationale, Pages R14-R15, Section 5.1.7.: WBN no longer has PCB transformers on site and PCBs will not be present in the discharge effluent. Therefore, TVA requests to remove the requirement to monitor for PCBs”.

The monitoring requirements for PCB are once per permit cycle, as required by the permit application and to ensure narrative federal requirements (ELGs) are being met. Otherwise, in order for you to demonstrate compliance with the ELG, we would need certification statements and documentation (ex: BMPs) in lieu of permit effluent characterization.

“Rationale, Page R31, Section 5.6.2., top of page states that: *TRC concentrations from Outfalls OSN101/OSN 102, and OSN 113 are to be measured separately with individual concentrations and calculated “(summed up)” to get a total concentration at Outfall V001.* TVA requests that the language be corrected to state that a flow weighted average is calculated for Outfall V001, as shown in the diagram and equation on page R31”.

The rationale cannot be changed once put on public notice. The narrative condition in the permit on page 7 section 1.1.2 has been changed to clarify that it is the sum of flow weighted averages of the effluent.

“Rationale, Page R31, Section 6.1.1., first sentence: WBN does not have a thermal variance; the language provided in this sentence of the draft permit appears to apply to Sequoyah Nuclear Plant, and not WBN. TVA requests the narrative be corrected and revised to reflect the operational conditions at WBN and be consistent with section 1.1.2. of the permit (pages 9-12)”.

The rationale cannot be changed once put on public notice. The language has been changed in section 3.4 as previously requested by the permittee.

RATIONALE

Tennessee Valley Authority (TVA)
Watts Bar Nuclear (WBN) Plant
NPDES Permit Number TN0020168
Date: 12/7/2021
Permit Writer: Shannon McClellan

1. FACILITY INFORMATION

Permittee Name:	Tennessee Valley Authority (TVA)
Project Name:	Watts Bar Nuclear (WBN) Plant
Location:	PO Box 2000, LP4J-C, WBN HWY 68 Nuclear Plant Rd., Spring City, Rhea County, Tennessee
Contact:	Mr. Anthony Williams IV - Vice President (423) 365-8767 alwilliams12@tva.gov
Design Flow Rate:	211.7 MGD
Actual Flow Rate:	259.78 MGD
Nature of Business:	Production of electric power by thermonuclear fission and other associated operations.
SIC Code(s):	4911
Industrial Classification:	Primary Facility *
Discharger Rating:	Major

* PRIMARY INDUSTRY CATEGORY means any industry category listed in the NRDC Settlement Agreement (Natural Resources Defense Council v. Train, 8 ERC 2120 [D.D.C. 1976], modified 12 ERC 1833 [D.D.C. 1979])





1. FACILITY DISCHARGES AND RECEIVING STREAM INFORMATION

Tennessee Valley Authority (TVA) discharges process wastewater, cooling water and storm water runoff from Outfalls OSN 101 and OSN 102; turbine building sump water, alum sludge supernatant, reverse osmosis reject water, drum dewatering water, water purification plant water, and supplemental condenser cooling water (noncontact) from Outfall OSN 113; and the operation of a cooling water intake structure (OSN 114) to Tennessee River at mile 527.9. OSN 101 discharges to the Tennessee River at mile 527.9, OSN 102 discharges to the Tennessee River at mile 527.2, OSN113 discharges to river mile 529.2, and OSN 114 at river mile 529.8. [Appendix 5](#) summarizes facility discharges and the receiving stream information for the relevant outfall(s).

Stormwater discharges associated with the industrial activity of this facility are covered by the Tennessee Multi-Sector General Storm Water Permit TNR051343. Stormwater concerns associated with this facility are covered in the general permit and will, therefore, not be addressed in detail in this permit.

No Federally listed threatened or endangered species or designated critical habitat are known to exist in the vicinity of the permittee's cooling water intake. This statement is based on a review by the Tennessee Natural Heritage Program, TDEC Division of Natural Areas, and communications with U.S. Fish and Wildlife Service and the Tennessee Wildlife Resources Agency.

Cooling water flows from Chickamauga Reservoir through the plant intake channel to the intake pumping station (IPS) located downstream of Watts Bar Dam. WBN Unit 1 and Unit 2 use closed-cycle cooling such that the cooling water withdrawn at the intake pumping station is to make-up for evaporation and cooling tower blowdown. The intake channel leading to the pumping station has a cross-sectional area of approximately 1,650 ft² at a Chickamauga Reservoir winter pool elevation of 675 ft mean sea level (msl), and 3,150 ft² at a summer pool elevation of 682.5 ft msl. This produces average water velocities between approximately 0.03 feet per second (fps) (high pool) and 0.05 fps (low pool) in the intake channel. The IPS includes four gated openings containing a combined gross flow area of approximately 360 ft², producing an average intake velocity (in front of screen) of about 0.2 fps. At the traveling water screens, the combined unobstructed through-screen area of the flow corresponding to the gated openings is reduced to approximately 140 ft², producing a winter average through-screen velocity of approximately 0.67 fps. The average flowrate at the IPS for WBN Unit 1 is approximately 75 MGD or 116 cubic feet per second (cfs), or 0.4% of the long-term average river flow (27,000 cfs) past the plant.



Appendix 5 provides a flow diagram of WBN outfalls and summarizes facility discharges and the receiving stream information. There are three (3) main outfalls (OSN 101, 102, and 113) which discharge directly to waters of the state. Two (2) other outfalls (IMP 103 and IMP107) are internal discharges that contribute to the main outfalls, and outfalls OSN 101 and OSN 102 also convey stormwater runoff. Outfall OSN 114 is designated as the supplemental condenser cooling water (SCCW) traveling screen backwash outfall. Each of the outfalls is discussed in more detail as follows:

Outfall OSN 101

Outfall OSN 101 receives wastewater from the Unit 2 Cooling Tower Blowdown Line (45.773 MGD), once through cooling water (10.62 MGD), and the Yard Holding Pond (1.5 MGD). The WBN facility utilizes natural draft cooling towers, which recirculate cooling water. In order to control buildup of dissolved solids, a portion of the recirculated water must be discharged, i.e., cooling tower blowdown. Due to the nature of plant operation, this line may also contain once through cooling water from the supplemental condenser cooling water system. The remaining portion is made up of low volume wastes and metal cleaning wastes. The Yard Holding Pond receives low volume wastes and stormwater runoff from numerous sources and is designed to provide oil skimming, neutralization, and sedimentation treatment. The pond has a volume of approximately 40 million gallons. However, at times the pond is used as an alternative route to discharge emergency raw cooling water and cooling tower blowdown. The Unit 2 Cooling Tower Blowdown Line and the Yard Holding Pond discharge conduit are combined and discharged through a pipeline feeding a diffuser located in the Tennessee River at approximate mile 527.9. Discharge through the diffuser is only allowed when there is a minimum of 3500 cubic feet per second (cfs) flow from WBH.

Outfall OSN 102

This outfall represents the emergency discharge overflow weir for the Yard Holding Pond. The overflow weir operates only in the event of an emergency which prevents the use of the blowdown line and diffuser or in the event that the blowdown line and/or diffuser require maintenance. Based on information from DMR, this outfall discharged twice in 2018. In the event of a discharge, the flow would enter an unnamed tributary and flow for approximately 3000 feet to the



Tennessee River at mile 527.2. Wastewater sources are the same as for Outfall OSN 101.

Internal Monitoring Point (IMP) 103

This internal monitoring point (IMP) represents the discharge from the Low Volume Waste Treatment Pond. The outfall does not discharge directly to waters of the state, but rather discharges to the Yard Holding Pond (OSN 101). The Low Volume Waste Treatment Pond receives low volume wastes, storm water, and water leakage wastes as described in Appendix 5. This Pond has a total volume of approximately 17 million gallons, but normally is maintained at about 5 million gallons of wastewater. Treatment is provided by oil skimming, sedimentation, and neutralization. The IMP has been established as an internal monitoring point to verify treatment effectiveness and compliance with 40 CFR Part 423 effluent guidelines for low volume wastes.

Internal Monitoring Point (IMP) 107

This IMP represents the combined batch release from two holding/treatment ponds known as the Lined Pond and the Unlined Pond. These ponds are used to collect and treat wastes from periodic metal cleaning operations, and a small portion of storm water, diesel generator coolant, and drum rinsing water. Treatment may be provided by chemical addition (when necessary to meet limits) and recirculation/aeration to reduce concentrations of copper, iron, and/or phosphorus prior to discharge to the Yard Holding Pond (OSN 101). The Lined Pond has an approximate volume of 0.91 million gallons and the Unlined Pond has an approximate volume of 6.5 million gallons. Following treatment, the typical scenario is for the Lined Pond to be pumped to the Unlined Pond and the Unlined Pond discharged through OSN 101. Batch releases are normally confined to periods of 24 hours or less. This IMP has been established to verify treatment effectiveness and compliance with 40 CFR Part 423 effluent guidelines for metal cleaning wastes.

Outfall OSN 113

This outfall represents the discharge of Supplemental Condenser Cooling Water (SCCW), which is primarily non-contact, once through cooling water and Unit 1 cooling tower blowdown. The flow is the largest discharge from the facility averaging 201.89 MGD. The water is routed to a discharge point of the former TVA - Watts Bar Fossil Plant and discharged at the surface of the Tennessee River at approximate mile 529.2. A portion of the water discharged through Outfall OSN 113 enters the plant through the intake pumping station (IPS) and is treated with



corrosion inhibitors and biocide. The remaining portion is obtained by gravity flow through the intake for the old TVA - Watts Bar Fossil Plant, which withdraws water from Watts Bar Reservoir above WBH. The water withdrawn from Watts Bar Reservoir may be passed through the condensers as once through cooling water, or by using a bypass valve arrangement, may be routed directly to Outfall OSN 113.

Current operation of WBN Unit 1 utilizes the SCCW system through constant gravity flow from above WBH. Completion and operation of Unit 2 did not significantly alter or increase the thermal effluent from the SCCW outfall.

Two hydrothermal surveys and flow pattern surveys were conducted in the vicinity of WBN during the winter of 2020, when there were no releases from the WBH through generators or spillways to characterize attributes of the SCCW thermal plume. Water temperatures were recorded upstream and downstream of the SCCW discharge during this test to characterize the thermal aspects of the plume. Drogues, devices designed to drift with surface currents, were deployed at and near the SCCW outfall to track flow patterns and compare flow paths during normal and no generation from WBH. The survey reported maximum instream temperature during December was 52.3°F. This maximum seasonal temperature was lower than the Tennessee State WQC for temperature of 86.9°F (30.5°C).

Outfall OSN 114

This outfall consists of traveling screen backwash from the supplemental condenser cooling water intake. The discharge from the outfall consists only of screen reject and raw water, therefore no monitoring is required. Flow is estimated at 0.019 MGD. The name for this outfall has been changed from IMP 114 to OSN 114. This outfall discharges externally to waters of the United States, therefore, this external outfall will be known as OSN 114 in future permits.

Tennessee River

The TVA-WBN Plant has three direct discharges to the Tennessee River (Outfalls OSN 101, OSN 102, and OSN 113). The plant withdraws cooling water and most other water used for industrial processes through the Intake Pumping Station (IPS). Approximately 75 MGD is withdrawn at IPS and 174 MGD flows through the SCCW. As shown in Appendix 5, a portion of the SCCW flow serves the Unit 2 cooling tower while the remainder of the gravity flow bypasses to Outfall OSN 113.

Flow in the SCCW is withdrawn from above Watts Bar Dam and is discharged to the River below the dam, but above the Plant Intake Pumping Station.

For purposes of protecting water quality, the Tennessee River below Watts Bar Dam is designated for fish and aquatic life use, recreation use, irrigation use, livestock watering and wildlife use, domestic water supply use, industrial water supply use, and navigation use. In 2021 the Division has assessed this portion of Chickamauga Reservoir on the Tennessee River is deemed to be fully supporting the classified uses listed above.

Watts Bar Nuclear is located on an Exceptional Tennessee Waterbody, regulated by the Tennessee Valley Authority (TVA). As a regulated stream, Tennessee Rule 0400-40-03-.05(4) requires the application of the minimum critical low flow based on the 1Q10 recurrence interval, or the lowest 1-day average flow that occurs on average once every 10 years. Previous permits utilized a 1Q10 minimum flow value of 3190 cfs (2061.7 MGD) based on a period of record of 1975-1986 at gage station 03543005. A new 1Q10 flow was calculated using the TVA River Operations low flow data with a record period of 1975-2021 which resulted in a low flow value of 2144.4 cfs (1385.9 MGD) calculated by TDEC. This represents a reduction in low flow conditions. Given that this data is based on a more recent period of record and more accurately reflects current conditions in the Tennessee River, these values will be utilized for calculations in this permit. [Appendix 5](#) shows the 1Q10 data and graph used for this calculation.

Yellow Creek

The Yellow Creek embayment of Chickamauga Lake is designated for fish and aquatic life use, recreation use, irrigation use, and livestock watering and wildlife use. Low flow conditions in this stream are assumed to be zero.

2. CURRENT PERMIT STATUS

Issuance Date:	January 13, 2017
Expiration Date:	December 31, 2021
Effective Date:	February 1, 2017

3. APPLICABLE EFFLUENT LIMITATIONS GUIDELINES

40 CFR 423.12 - Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

The Standard Industrial Classification (SIC) code for Tennessee Valley Authority (TVA) is 4911 (Electric Services). Process wastewater discharged through Outfalls OSN 101, OSN 102, IMP 103, IMP 107, and OSN 113 is regulated by 40 CFR § 423 – Steam Electric Power Generating Point Source Category. This regulation is applicable to discharges resulting from the operation of a generating unit by an establishment primarily engaged in the generation of electricity for distribution or sale which results primarily from a process utilizing fossil-type fuel (coal, oil, or gas) or nuclear fuel in conjunction with a thermal cycle employing the steam water system as the thermodynamic medium. [Appendix 4](#) lists the applicable effluent limitations guidelines for 40 CFR423.12 and 40 CFR 423.13.

The guideline numeric limitations are listed for four specific wastewater sources, low volume wastes, metal cleaning wastes, cooling tower blowdown, and once through cooling water. In determining which guideline sources are attributable to each of the seven (7) outfalls, the Part 423.11, Specialized Definitions were used as follows:

The term **Low Volume Wastes** means, taken collectively as if from one source, wastewater from all sources except those for which specific limitations are otherwise established in this part. Low Volume Waste sources include but are not limited to: wastewaters from wet scrubber air pollution control systems, ion exchange water treatment system, water treatment evaporator blowdown, laboratory and sampling streams, boiler blowdown, floor drains, cooling tower basin cleaning wastes and recirculating house service water systems. Sanitary and air conditioning wastes are not included.

The term chemical **Metal Cleaning Wastes** means any wastewater resulting from cleaning [with or without chemical cleaning compounds] any metal process equipment including, but not limited to, boiler tube cleaning.

The term **Once Through Cooling Water** means water passed through the main cooling condensers in one or two passes for the purpose of removing waste heat.

The term **Recirculating Cooling Water** means water that is passed through the main condensers for the purpose of removing waste heat, passed through a



cooling device for purpose of removing such heat from the water and then passed again, except for blowdown, through the main condenser.

The term **Blowdown** means the minimum discharge of recirculating water for the purpose of discharging materials contained in the water, the further buildup of which would cause concentration in amounts exceeding limits established by best engineering practices.

The above definitions specifically exclude sanitary wastewater and air conditioning wastes. For sanitary wastes, Tennessee Effluent Guidelines from Rule 0400-40-05-.03(1) and/or best professional judgment have been applied.

The effluent limitations presented in 40 CFR 423 (see Appendix 2) are normally established in the permit as mass limitations by multiplying the flow of the specific waste source the applicable concentration limit. However, 40 CFR, Part 423.12(b) (11) and Part 423.13 (g) allow the permitting authority, at its discretion, to substitute concentration limits instead of the mass limitations. For the TVA-Watts Bar Nuclear Plant permit, only concentration limits will be established.

Also in developing guideline limitations for each outfall, EPA Rule Part 423.12(12) and Part 423.13(12) are applicable as follows:

In the event that waste streams from various sources are combined for treatment or discharge, the quantity of each pollutant or pollutant property controlled in the BPT/BAT limitation tables attributable to each controlled source shall not exceed the specified limitation for that source.

Utilizing these definitions and the waste source identification provided in the permit application (see summary tables in Appendix 5), the following waste sources and proportions are applied to each outfall as shown below:



Guideline Waste Sources and Flows for Two Unit Operations by Outfall

Outfall No	Contributing BPT/BAT Waste Source	Waste Source Flow	
		Flow MGD	% Outfall Total
OSN101	Yard Holding Pond (Metal Cleaning Waste)	1.500	2.6%
	Cooling Tower Blowdown	45.773	79.1%
	Misc. Cooling Waters (Low Volume Wastes)	10.620	18.3%
	Total Outfall Flow	57.893	
OSN102	Yard holding Pond Overflow Weir (Emergency Outfall) - provides an alternate discharge path for the diffuser discharge point (OSN101)	0.000	
IMP103	Low Volume Wastes	0.491	100.0%
IMP107	Turbine Building Station Sump alternate path, precipitation (less evaporation), stormwater runoff, drum rinsing, drum dewatering, diesel cleaning coolant	0.000	
OSN113	U1 CT Basin blowdown (noncontact cooling water) and supplemental condenser cooling water bypass	148.895	100.0%
OSN114	SCCW Intake screen backwash water	0.019	100.0%

Note: OSN 114 is backwash water and is not considered in the monitoring requirements for this permit.

Where the effluent limitation guideline concentration limits include the same parameter(s) for each source, the allocation of guideline limits by flow is straightforward. However, where a parameter is limited for one source and not limited for another, some judgment must take place. The approach taken has been to assure that each source complies with its parameter guideline concentration without that source being diluted by other wastewater source(s) for which the parameter is not limited. One means to accomplish this is to utilize internal outfalls, which enable monitoring at a location that is source specific. This approach has been utilized at the Watts Bar Nuclear Plant for Outfalls IMP 103, and IMP 107.

Using the above guidance, the 40 CFR guidelines have been applied to the plant outfalls as shown in Appendix 2 and described as follows:

Outfall OSN 101

Cooling tower blowdown represents approximately 79.1% of the outfall flow and Low Volume wastes represent 18.3%. Thus the guidelines for Cooling Tower Blowdown and Low Volume Waste will be applied to the total waste stream. The total suspended solids limit and the oil and grease limit applicable to the low volume waste sources is considered applicable to the cooling tower blowdown source as well. Because the metal cleaning wastes represent only 2.6% of the flow, the guideline limits for this source will not be applied to Outfall OSN 101. Rather,



compliance with metal cleaning waste limits will be handled by employing an internal monitoring point (Outfall IMP107). The applicable BPT and BAT limits are given in Appendix 2.

The flow from Outfall OSN 101 is monitored at Watts Bar Dam and includes the instrumentation that River Operations uses to measure the discharge through the hydro turbines. A control loop between Watts Bar Dam and WBN automatically closes the Outfall OSN 101 diffuser valves when the hydro discharge at Watts Bar Dam drops below 3500 cfs.

Outfall OSN 102

Since this is an emergency discharge for Outfall OSN 101, the same guidelines apply as for Outfall OSN 101. The limitations are presented in Appendix 2.

Outfall IMP 103

This outfall receives Low Volume Wastes exclusively; therefore, the Low Volume Waste guideline limitations will apply. The limitations are presented in Appendix 2.

Outfall IMP 107

This outfall receives 99.9% Metal Cleaning Wastes and <1% Low Volume Wastes. Therefore the Metal Cleaning Waste limitations will be applied as shown in Appendix 2.

Outfall OSN 113

This outfall receives noncontact supplemental condenser cooling water. The wastewater is defined by 40 CFR 423 as Once Through Cooling Water. Thus Outfall OSN 113 will be subject to the effluent limitations for the Once Through Cooling Water Source given in 40 CFR Part 423.12 (6) and Part 423.13 (b) (1&2) and shown in Appendix 2.

Outfall OSN 114

This outfall has no monitoring requirements, consists of traveling screen backwash from the supplemental condenser cooling water intake.

4. PREVIOUS PERMIT TERM REVIEW

A review of the permittee's Discharge Monitoring Reports (DMRs) from 2017 to 2021 revealed that the permittee reported 1 violation for pH from Outfall IMP 103. A summary of data reported on DMRs during the previous permit term is located in [Appendix 2](#).

During the previous permit term, Division personnel from the Chattanooga Environmental Field Office performed a Compliance Evaluation Inspection (CEI) of the permittee's facility. The CEI was performed by Michael Bascom on September 9, 2020, and the permittee was found to be in compliance. The inspection report described all outfall discharges to be free of oil, sheens, and any visible pollutants and all outfall signs were appropriately placed and legible. The facility kept all records according to the permit and were all readily available for viewing. There were no errors reported on DMRs and the facility was kept clean.

5. NEW PERMIT LIMITATIONS AND MONITORING REQUIREMENTS

The proposed new permit limits have been selected by determining a technology-based limit and evaluating if that limit protects the water quality of the receiving stream. If the technology-based limit would cause violations of water quality, the water quality-based limit is chosen. The technology-based limit is determined from EPA effluent limitations guidelines if applicable (see Section 3 above) or from State of Tennessee maximum effluent limits for effluent limited segments per [Rule 0400-40-05-.08](#). Note that in general, the term "anti-backsliding" refers to a statutory provision that prohibits the renewal, reissuance, or modification of an existing NPDES permit that contains effluents limits, permit conditions, or standards that are less stringent than those established in the previous permit.

- a) Language throughout the permit has been updated to reflect the eReporting Phase 2 requirements in 40 CFR § 127.
- b) For comparison, this rationale contains the previous permit limits and effluent monitoring requirements in [Appendix 1](#).
- c) The permittee requested that the following language be retained in Part I.A. to avoid the need for preparing a separate water quality certification for the Nuclear Regulatory Commission:

This TN-NPDES permit also constitutes the State's certification under Section 401 of the Clean Water Act for the purpose of obtaining any federal license for activities resulting in the discharges covered under the TN-NPDES permit.

The permittee also requested no changes from the current biomonitoring conditions at OSN 101, and 102 and that the permit language maintain consistent with the current Biocide Corrosion Treatment Plan (B/CTP). Due to the new low flow calculation of the receiving stream, this request cannot be

granted. The Chronic WET testing IC₂₅ limits have changed to 4.0% for Outfalls OSN 101/OSN 102 and 12.7% for Outfall OSN 113.

5.1. OUTFALL OSN101

5.1.1. Flow

Monitoring of flow quantifies the load of pollutants to the stream. Flow shall be reported in million gallons per day (MGD) and monitored at the time of sample collection.

5.1.2. Metals and Toxics

Effluent permit limits for metals and toxics were calculated as shown in [Appendix 3](#).

Chromium

Outfall OSN 101 is primarily composed of cooling tower blowdown. 40 CFR §423.13(d)(1) for BAT requirements for cooling tower blowdown establishes monthly average and daily maximum effluent limitations for the 126 priority pollutants of “no detectable amount”, except for total chromium and total zinc. However, §423.13(d)(3) allows the permitting authority, at its discretion, to utilize engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge by analytical methods in 40 CFR §136. This requirement is potentially applicable to Outfalls OSN101/ 102 and OSN 113. Watts Bar Nuclear Plant does not use corrosion control chemicals or biocides containing chromium at the facility. Sampling data submitted with the application demonstrated that chromium could not be detected in the effluent at a detection limit of 0.003mg/L. Therefore, the following statement is included in the permit: “Priority pollutants will not be discharged in cooling tower blowdown in amounts that are detectable by analytical methods in 40 CFR Part 136. Monitoring for the priority pollutants, including chromium, will not be required unless it has been added to industrial processes and will be present in the discharge effluent”.

Zinc

Outfall OSN 101 is primarily composed of cooling tower blowdown. 40 CFR Part 423.13 provides BAT effluent limitations for total zinc applicable to cooling tower blowdown wastewater discharges. The BAT limit is 1.0 mg/L daily maximum. The TVA - Watts Bar Nuclear Plant utilizes zinc in corrosion inhibitors for treatment of raw water. TVA’s policy is to control the feed of zinc containing chemicals to limit



the discharge concentration to 0.2 mg/L or less. The zinc limit of 1.0 mg/L daily maximum shall be continued in the new permit. The corrosion inhibiting chemicals are added to the raw water system and are recirculated through the condensers and the cooling towers. Thus the concentration of zinc is not expected to be highly variable. The monitoring frequency will be monthly, and the sample type will be grab.

5.1.3. Oil and Grease

The Division has determined that an oil and grease limitation is needed for this facility because of the potential of contamination from spills, leaks, and other industrial activities present at the site. The federal effluent guideline limits oil and grease at 20 mg/L (daily maximum) and 15 mg/L (monthly average) for low volume waste sources and metal cleaning wastes in 40 CFR §423.12(b)(3) and §423.12(b)(5). This level can be accomplished where oil/water separators are maintained, kept clean and are not overloaded. There should be less reliance upon the oil/water separator as a solution and a greater reliance upon good management, operation, and housekeeping practices to restrict pollution.

According to the State of Tennessee Water Quality Standards for the protection of Fish & Aquatic Life [Chapter [0400-40-03-.03\(3\)\(c\)](#)], there shall be no distinctly visible solids, scum, foam, oily slick, or the formation of slimes, bottom deposits or sludge banks of such size or character that may be detrimental to fish and aquatic life in the receiving stream.

The permit writer is selecting ELG-based limits for oil and grease of 20 mg/L as a daily maximum concentration and 15 mg/L as a monthly average concentration. In addition, the permit contains language prohibiting visible floating scum, oil, or other matter in the wastewater discharge. Monitoring for oil and grease apply only when the turbine building sump is aligned to bypass IMP103 and IMP107 where monitoring these parameters is required. Sample type will be grab.

The daily maximum concentration of 20 mg/L and monthly average concentration of 15 mg/L for oil and grease will be retained in the new permit.

5.1.4. Total Suspended Solids (TSS)

Total Suspended Solids is a general indicator of the quality of a wastewater and will be limited in this permit.

The State of Tennessee Water Quality Standards for the protection of Fish & Aquatic Life [[Chapter 0400-40-03-.03\(3\)\(c\)](#)] state there shall be no distinctly visible solids, scum, foam, oily slick, or the formation of slimes, bottom deposits or sludge

banks of such size or character that may be detrimental to fish and aquatic life in the receiving stream.

The federal effluent guidelines establish total suspended solids (TSS) limits of 30.0 mg/L (monthly average) and 100.0 mg/L (daily maximum) for low volume waste sources and metal cleaning wastes in 40 CFR §423.12(b)(3) and §423.12(b)(5). TVA is limited for TSS at IMP 103 for the Low Volume Waste Treatment Pond, which satisfies the federal requirement. Monitoring for TSS applies only when the turbine building sump is aligned to bypass IMP103 and IMP107 where monitoring these parameters is required. The sample type will be grab.

5.1.5. pH

According to the State of Tennessee Water Quality Standards [Chapter [0400-40-03.03\(3\)\(b\)](#)], the pH for the protection of Fish and Aquatic Life shall not fluctuate more than 1.0 unit over a period of 24 hours and shall not be outside the following ranges: 6.0 – 9.0 standard units (SU) in wadeable streams and 6.5 – 9.0 SU in larger rivers, lakes, reservoirs, and wetlands. Considering that the receiving stream will provide some buffering capacity, effluent limitation for pH will be retained in a range 6.0 to 9.0. Monitoring for pH apply only when the turbine building sump is aligned to bypass IMP 103 and IMP 107 where monitoring these parameters is required. The sample type will be grab.

5.1.6. Chlorination

The total residual chlorine (TRC) limit is derived using the mass balance formula and the EPA acute instream protection value of 0.019 mg/L for fish and aquatic life. Applying this formula yields the following calculation for the TRC daily maximum limit for OSN 101:

$$\frac{0.019 (Q_d + Q_s)}{Q_d} = \text{Limit (mg/L)} = \frac{0.019(57.893 + 1385.9)}{57.893} = 0.473 \text{ mg/L} \approx 0.5 \text{ mg/L}$$

Where:

0.019 mg/L	=	acute instream protection value
1385.9	=	Q _s – 1Q10 flow of receiving stream (MGD)
57.893	=	Q _d – Actual flow (MGD) OSN 101/102

Technology-based (BAT) limits of TRC will apply to free available chlorine in cooling tower blowdown and once through cooling water in accordance with 40 CFR, part 423, Subpart 423.13(b)(1). The total residual chlorine test includes all chlorine species measured in the free available chlorine test as well as other chlorine compounds such

as chloroamines. Due to the ELG limit being more protective of the receiving stream than the water-quality calculations above, the ELG limit of 0.2 daily maximum will apply to Outfall OSN 101 and OSN 102. Monitoring will be weekly and sample type shall be grab.

Compliance with the previous permit's monthly average and daily maximum limits of 0.1 mg/L were derived based on a mass balance calculation. This was done at the time in part because TRC decays over time and TVA was unable to sample the effluent within the required period of time due to the location of the outfall, and there was historically no portable testing equipment with sufficient sensitivity to meet the required method detection level (MDL) within the required period of time. Since sufficiently sensitive portable testing is now available, this permit implements ELG and water-quality based TRC limits.

5.1.7. Polychlorinated Biphenyl (PCBs)

According to federal effluent guidelines, no discharge of polychlorinated biphenyl compounds (PCBs) will be allowed. Monitoring for PCB will be required once per permit cycle to ensure compliance with the federal guidelines. Sample type will be grab.

5.1.8. Effluent Temperature

Temperature will be limited according to the State of Tennessee Water Quality Standards for the protection of Fish & Aquatic Life [Chapter 0400-40-03-.03(3)(e)]. It is recognized that the temperature of the cooling water discharge will be greater than the temperature of the water prior to its use for cooling or other purposes. This discharge must not cause the temperature change in receiving stream to exceed 3°C relative to an upstream control point. Also, this discharge must not cause the temperature of receiving stream to exceed 30.5°C (except as a result of natural causes), and this discharge must not cause the maximum rate of temperature change in receiving stream to exceed 2°C per hour (except as a result of natural causes).

The elevated temperature water of outfall OSN 101 is mixed with the Tennessee River receiving water by being discharged through a diffuser. Instream temperature criteria must be met at the edge of the mixing zone. The mixing zone is defined for this discharge as being a maximum width of 240 feet (the width of the diffuser) and extending 240 feet downstream. An operational requirement of the plant is that the diffuser is only operated when 3500 cubic feet per second (CFS) flow is present from the dam. Mathematical Model simulations were performed for a 30-year period based on observed hydrology and meteorology in



the upper Tennessee River watershed for years 1976 through 2005. Modeling of the temperature during mixing was carried out by TVA and was submitted in a report as supplemental information to the permit application in November 2016 (Final Supplemental Environmental Impact Statement, Completion and Operation of Watts Bar Nuclear Plant Unit 2, June 2007). The report was based on the 24-hour average for discharge evaluation as specified in the NPDES permit issued in 2011. The modeling assumed both nuclear units in operation and concluded that a steady-state discharge of 38.3°C under worst case conditions, which included 1) full thermal load from the nuclear plant, 2) the worst meteorology and 3) no operation of Watts Bar Hydro facility, would still protect the water quality based on modeling using daily averaging. A daily average value of 35°C was proposed to include a margin of safety. A continuous discharge at the temperature maximum of 35°C will not exceed water quality outside of the mixing zone based on past modeling. The Division approved a one-hour averaging period for evaluating compliance with temperature criteria in the receiving stream.

A numeric effluent limitation of 35°C shall continue as the daily maximum that can be discharged. Measurement frequency shall be continuous and sample type shall be by recorder. These limits are unchanged from the previous permit.

5.1.9. Biomonitoring

The discharge of industrial wastewater from Outfalls OSN101, OSN102, and OSN113 may contain several different pollutants, the combined effect of which has a reasonable potential to be detrimental to fish and aquatic life. The Division evaluates all discharges for reasonable potential to exceed the narrative water quality criterion “no toxics in toxic amounts”.

In cases where a discharger has characterized its effluent via toxicity test methods acceptable to the Division, reasonable potential to exceed the criterion is evaluated using the following rationale.

EPA’s [Technical Support Document for Water Quality Based Toxics Control](#) (TSD) recommends that the evaluation of both acute and chronic toxicity be based on the number of observations in the data set, the coefficient of variation and an uncertainty factor. The uncertainty factor value is taken from a chart in the technical support document and the coefficient of variation (C.V.) is based on the following numbers:

Less than ten observations: C.V. = 0.6

More than ten observations: C.V. = Standard Deviation / Mean



The result of each biomonitoring test is converted to toxic units using the equations listed below:

$$\begin{array}{ll}\text{Acute biomonitoring:} & \text{TUa} = 100 / \text{LC}_{50} \\ \text{Chronic biomonitoring:} & \text{TUc} = 100 / \text{IC}_{25}\end{array}$$

The highest numerical value of the acute data set (in TUa) is multiplied by the uncertainty factor (U.F.) and the dilution factor to derive the final acute value. The highest numerical value of the chronic data set (in TUc) is also multiplied by the uncertainty factor and the dilution factor to derive the final chronic value.

$$\begin{array}{ll}\text{Dilution Factor (DF)} & = \text{Design Flow} / 1\text{Q}_{10} \\ \text{Final Acute Value} & = \text{TUa} * \text{Uncertainty Factor} * \text{Dilution Factor} \\ \text{Final Chronic Value} & = \text{TUc} * \text{Uncertainty Factor} * \text{Dilution Factor}\end{array}$$

The final acute value is compared to the criteria maximum concentration (CMC) for acute toxicity ($\text{CMC} = 0.3 * \text{TUa}$). The CMC is defined as the highest instream concentration of an effluent to which organisms can be exposed to for a brief period of time without causing an acute effect. The final chronic value is compared to the criteria continuous concentration (CCC) for chronic toxicity ($\text{CCC} = 1.0 * \text{TUc}$). The CCC is defined as the highest instream concentration of an effluent to which organisms can be exposed indefinitely without causing an unacceptable effect. In the absence of chronic data, an acute to chronic ratio (ACR) of 4.4 is assumed (TSD Appendix A.3).

Outfalls OSN 101 & OSN 102

In this case, 18 observations of chronic are available from OSN 101 & 102.

$$\begin{array}{lll}18 & = & \text{number of chronic test samples} \\ 8.93 & = & \text{maximum value, chronic toxicity} \\ 0.0 & = & \text{chronic coefficient of variation (CVc) (for } n < 10, \text{ CV} = 0.6) \\ 1.1 & = & \text{chronic uncertainty factor (UFc)} \\ 0.19 & = & \text{Dilution Factor at } 1\text{Q}_{10} \text{ conditions}\end{array}$$

$$\begin{array}{ll}\text{Potential instream toxicity after mixing} & = 18 * 1.1 * 0.19 = 1.84 \\ \text{(Final chronic value)} & = (\text{Max. value} * \text{chronic toxicity} * \text{DF})\end{array}$$

Since the calculated dilution factor is less than 100:1, and assuming immediate and complete mixing, protection of the stream from chronic effects is required.

Even though the potential instream toxicity after mixing, expressed as TUa, exceeds the CMC, acute whole effluent toxicity testing is waived and replaced by a chronic IC₂₅ test that is more stringent than the LC₅₀ acute test. Due to the receiving stream being a source of water for OSN 101 & OSN 102, the dilution factor ratio below is used:

$$\text{Dilution Factor} = \frac{\text{Stream Low Flow}}{\text{Average Flow}} = \frac{1385.9}{57.893} = 23.89$$

$$IC_{25} \% \geq \frac{100\%}{\text{Dilution Factor}} \geq \frac{100\%}{23.89} \geq 4.2\%$$

Where:

1385.9 = 1Q10 Low Flow (MGD)
57.893 = Long Term Average Flow (MGD)
IC₂₅ = Concentration causing 25% reduction in survival, growth, and reproduction of test organisms

Dilution factor when receiving stream is a source of water at the facility		
OSN 101 & 102		
Stream Flow	Wastewater Flow	Total Flow
[MGD]	[MGD]	[MGD]
1385.9	57.893	1385.9
DF	23.9	
LC50 >	13.9	
IC 25 >	4.2	

Per the calculations in the table above, WET testing shall be required on all three outfalls. If toxicity is demonstrated in any of the effluent samples specified above, this will constitute a violation of this permit. The toxicity tests specified herein shall be conducted twice a year (2/year) for Outfalls OSN 101 and OSN 102 and begin no later than 90 days from the effective date of this permit.



5.2. OUTFALL OSN 102

Outfall OSN 102 is an emergency discharge used when the Outfall OSN 101 diffusers cannot be used. Thus the limits for this outfall shall be the same as for Outfall OSN 101. Sampling frequency and sample type are adjusted for flow and temperature to reflect that continuous monitoring equipment would not be available during an emergency discharge. When thermally loaded effluent is discharged through Outfall OSN 102, all reasonable efforts shall be made to keep flow to a minimum of 3500 cubic feet per second in the receiving waters. If such flow is absent, the permittee shall verify protection of water quality by taking instream temperature measurements.

The new permit shall require IC25 testing at a wastewater dilution of 4.2%. Monitoring frequency shall be semi-annual, only if discharge operated ≥ 30 days from Jan.–Jun., or Jul.– Dec. if all toxicity testing has not been completed for Outfall 102. Sample type shall be composite.

Monitoring for pH, total suspended solids and oil and grease apply only when the turbine building sump is aligned to bypass IMP 103 and IMP 107 where monitoring these parameters is required.

5.3. OUTFALL IMP 103

This outfall is an internal monitoring point receiving low volume wastes. Thus the Low Volume Waste technology-based limitations apply.

5.3.1. Flow

Monitoring of flow quantifies the load of pollutants to the stream. Flow shall be reported in million gallons per day (MGD) and monitored at the time of sample collection.

5.3.2. Metals and Toxics

Effluent permit limits for metals and toxics were calculated as shown in [Appendix 3](#).

5.3.3. Oil and Grease

The Division has determined that an oil and grease limitation is needed for this facility because of the potential of contamination from spills, leaks, and other industrial activities present at the site. The federal effluent guideline limits oil and grease at 20 mg/L (daily maximum) and 15 mg/L (monthly average) for low volume waste sources and metal cleaning wastes in 40 CFR §423.12(b)(3) and §423.12(b)(5). This level can be accomplished where oil/water separators are



maintained, kept clean and are not overloaded. There should be less reliance upon the oil/water separator as a solution and a greater reliance upon good management, operation, and housekeeping practices to restrict pollution.

According to the State of Tennessee Water Quality Standards for the protection of Fish & Aquatic Life [Chapter [0400-40-03-.03\(3\)\(c\)](#)], there shall be no distinctly visible solids, scum, foam, oily slick, or the formation of slimes, bottom deposits or sludge banks of such size or character that may be detrimental to fish and aquatic life in the receiving stream.

The permit writer is selecting ELG-based limits for oil and grease of 20 mg/L as a daily maximum concentration and 15 mg/L as a monthly average concentration. In addition, the permit contains language prohibiting visible floating scum, oil, or other matter in the wastewater discharge. Monitoring for oil and grease apply only when the turbine building sump is aligned to bypass IMP103 and IMP107 where monitoring these parameters is required. Sample type will be grab.

5.3.4. Total Suspended Solids (TSS)

Total Suspended Solids is a general indicator of the quality of a wastewater and will be limited in this permit.

The State of Tennessee Water Quality Standards for the protection of Fish & Aquatic Life [[Chapter 0400-40-03-.03\(3\)\(c\)](#)] state there shall be no distinctly visible solids, scum, foam, oily slick, or the formation of slimes, bottom deposits or sludge banks of such size or character that may be detrimental to fish and aquatic life in the receiving stream.

The federal effluent guidelines establish total suspended solids (TSS) limits of 30.0 mg/L (monthly average) and 100.0 mg/L (daily maximum) for low volume waste sources and metal cleaning wastes in 40 CFR §423.12(b)(3) and §423.12(b)(5). TVA is limited for TSS at IMP 103 for the Low Volume Waste Treatment Pond, which satisfies the federal requirement. Monitoring for TSS applies only when the turbine building sump is aligned to bypass IMP103 and IMP107 where monitoring these parameters is required. The sample type will be grab.

5.3.5. pH

Technology-based BPT effluent limitations from 40 CFR, Part 423.12(b)(1) establish a pH limitation of 6.0 to 9.0 for all discharges from this facility. pH shall be monitored once per batch and sample type shall be grab.



5.4. OUTFALL IMP 107

This outfall is an internal monitoring point incorporated to evaluate compliance with guideline limitations for metal cleaning wastes. These wastes are subject to technology based BPT and BAT guidelines for metal cleaning wastes under 40 CFR Part 423.12(b)(5) and 423.13 (e).

5.4.1. Flow

The flow from this outfall occurs as a controlled batch discharge from the Lined and Unlined Ponds. Flow duration is typically about 24 hours. Historical batch discharge frequency has been about 4 times per year. The flow is calculated by determining change in stage of the ponds. Monitoring of flow quantifies the load of pollutants to the stream. Flow shall be reported in Million Gallons per Day (MGD) and monitored each time there is a batch discharge from the ponds through the outfall. Flow frequency shall be once per batch and type measurement shall be calculated.

5.4.2. pH

Technology-based BPT effluent limitations from 40 CFR, Part 423.12(b)(1) establish a pH limitation of 6.0 to 9.0 for all discharges from this facility. pH shall be monitored once per batch and sample type shall be grab.

5.4.3. Oil and Grease

An oil and grease limitation is applied to this outfall because of the significant presence of metal cleaning wastes. Concentration limits are established at 15 mg/l monthly average and 20 mg/l daily maximum in accordance with BPT technology-based limits from 40 CFR Part 423.12(b)(5). Because the wastewater discharging to this outfall is batch treated, it is the permit writer's judgment that each batch can be treated to meet the 15 mg/l 20 mg/L concentrations. Sampling shall be once per batch discharge, and sample type shall be grab.

5.4.4. Total Suspended Solids (TSS)

Total Suspended Solids is a general indicator of the quality of a wastewater and shall be limited in this permit. The technology-based limit of 30 mg/l monthly average and 100 mg/l daily maximum are taken from 40 CFR Part 423.12(b)(3), the BPT limitations applicable to metal cleaning wastes. Sampling frequency shall be once per batch and sample type shall be grab.



5.4.5. Copper, Total Recoverable

Technology-based BAT limits are established for copper at 40 CFR Part 423, Subpart 423.13(e). The limits are 1.0 mg/L as a monthly average and 1.0 mg/L as a daily maximum. The previous permit contained concentration limits for copper at 1.0 mg/L as monthly average and as a daily maximum.

The new permit will retain the 1.0 mg/L total recoverable copper limit as both the monthly average and daily maximum in accordance with the technology-based guidelines. Sampling frequency shall be once per batch and the sample type shall be grab.

5.4.6. Iron, Total Recoverable

Technology-based BAT limits are established for iron at 40 CFR Part 423.13(e). The limits are 1.0 mg/L as a monthly average and 1.0 mg/L as a daily maximum. The previous permit contained concentration limits for iron at 1.0 mg/L as monthly average and as a daily maximum.

The new permit shall have a 1.0 mg/L total recoverable iron limit as both the monthly average and daily maximum in accordance with the technology-based guidelines. Because the wastewater comes from large ponds, which should have relatively good equalization of concentration and to be consistent with other outfall sampling requirements, the sample type shall be grab.

5.4.7. Phosphorus, Total

Phosphorus is not limited by technology-based guidelines, however it is of water quality concern because of its potential to be used in metal cleaning and its ability to contribute to nuisance aquatic growth in receiving water bodies. The previous permit established a 1.0 mg/L monthly average and a 1.0 mg/L daily maximum concentrations and required that phosphorus be monitored once per week only during periods when phosphate cleaning solutions are used. During the past five-year permit period, no permit violations were reported at the facility. Because phosphate and phosphate chemicals are listed in the permit application as chemicals added to wastewaters reaching Outfall IMP 107, the limits in the previous permit will be retained. Monitoring frequency shall be once per batch discharge only during periods when phosphate cleaning solutions are added. Because the wastewater comes from large ponds, which should have relatively good equalization of concentration and to be consistent with other outfall sampling requirements, the sample type shall be grab.

5.5. OUTFALL OSN 113

Outfall OSN 113 discharges SCCW, which is noncontact, once through cooling water, and is an emergency outfall for Unit 1 Cooling Tower Blowdown. Once through cooling water and cooling tower blowdown is subject to BPT and BAT technology-based limitations under 40 CFR Part 423. A portion of the water discharged through Outfall OSN 113 enters the plant through the IPS and is treated with corrosion inhibitors and biocide. The remaining portion is obtained by gravity flow through the intake for the old TVA - Watts Bar Fossil Plant, which withdraws water from Watts Bar Reservoir above WBH.

5.5.1. Flow

The previous permit required flow to be measured on a continuous basis using a recorder. This language shall be retained in the new permit. Should the continuous flow monitoring equipment fail or need to be taken offline for repairs or calibration, the flow shall be measured by staff gage as a backup method until the flow monitoring system is brought back online. The permittee shall take reasonable steps to restore the flow monitoring as soon as possible. Sudden changes in thermal loading at the plant, i.e., start-up or shutdown, should not be made unless there is discharge from Watts Bar Dam (the exception being changes necessary due to concern for human safety or the environment).

5.5.2. pH

The discharge is covered under 40 CFR Part 423 guidelines, which require that the pH be maintained between 6.0 and 9.0. Calculations given in Appendix 5d show that pH within this range will protect the water quality of the Tennessee River. Thus pH limitations shall remain 6.0 to 9.0 in the new permit. Sampling frequency shall be once per month and sample type shall be grab.

5.5.3. Metals and Toxics

Effluent permit limits for metals and toxics were calculated as shown in [Appendix 3](#).

Chromium

Outfall OSN 113 is primarily composed of SCCW but has the potential to discharge Unit 1 cooling tower blowdown during emergencies. 40 CFR §423.13(d)(1) for BAT requirements for cooling tower blowdown establishes monthly average and daily maximum effluent limitations for the 126 priority pollutants of “no detectable amount”, except for total chromium and total zinc. However, §423.13(d)3 allows the permitting authority, at its discretion, to utilize engineering calculations which



demonstrate that the regulated pollutants are not detectable in the final discharge by analytical methods in 40 CFR §136. This requirement is potentially applicable to Outfalls OSN101/ 102 and OSN 113. Watts Bar Nuclear Plant does not use corrosion control chemicals or biocides containing chromium at the facility. Sampling data submitted with the application demonstrated that chromium could not be detected in the effluent at a detection limit of 0.003mg/L. Therefore, the following statement is included in the permit: "Priority pollutants will not be discharged in cooling tower blowdown in amounts that are detectable by analytical methods in 40 CFR Part 136. Monitoring for the priority pollutants, including chromium, will not be required unless it has been added to industrial processes and will be present in the discharge effluent".

Zinc

Outfall OSN 113 is primarily composed of SCCW. 40 CFR Part 423.13 provides BAT effluent limitations for total zinc applicable to cooling tower blowdown wastewater discharges. The BAT limit is 1.0 mg/L daily maximum. The TVA - Watts Bar Nuclear Plant utilizes zinc in corrosion inhibitors for treatment of raw water. TVA's policy is to control the feed of zinc containing chemicals to limit the discharge concentration to 0.2 mg/L or less. The corrosion inhibiting chemicals are added to the raw water system and are recirculated through the condensers and the cooling towers. Thus the concentration of zinc is not expected to be highly variable. Due to OSN 113 being an emergency outfall for Unit 1 cooling tower blowdown, Zinc will not be monitored, unless known to be added and present in the emergency discharge effluent.

5.5.4. Total Suspended Solids (TSS)

The federal ELGs establish total suspended solids (TSS) limits of 30.0 mg/L (monthly average) and 100.0 mg/L (daily maximum) for low volume waste sources and metal cleaning wastes in 40 CFR §423.12(b)(3) and §423.12(b)(5). According to Tennessee Water Quality Criteria for the protection of fish and aquatic life [Chapter 0400-40-03-.03(3)(c)], there shall be no distinctly visible solids, scum, foam, oily slick, or the formation of slimes, bottom deposits or sludge banks of such size or character that may be detrimental to aquatic life in the receiving stream. Sampling frequency shall be once per month and sample type shall be grab.

5.5.5. Chlorine, Total Residual

Water quality calculations (presented in Appendix 3) were performed using the long-term average combined flow of Outfalls OSN 101 and OSN 113 from the current permit application. These calculations indicate that a monthly average of



0.07 mg/l and a daily maximum of 0.12 mg/L are necessary to comply with water quality criteria. These limits will be applied to virtual outfall V001. Due to the limits being applied to virtual outfall V001, TRC will be “report only”, monitoring will be weekly, and the sample type shall be grab.

Monitoring data from the previous permit period indicates that the long-term average and the maximum TRC concentration have been well below the permit limit (see Appendix 2). The WBN plant does not add chlorine to the SCCW, however chlorine/bromine is potentially present in the outfall due to commingling of cooling tower blowdown. Monitoring frequency shall be retained at weekly and sample type shall be grab.

5.5.6. Biomonitoring

The discharge of industrial wastewater from Outfall OSN113 may contain several different pollutants, the combined effect of which has a reasonable potential to be detrimental to fish and aquatic life. The Division evaluates all discharges for reasonable potential to exceed the narrative water quality criterion “no toxics in toxic amounts”.

In this case, 18 observations of chronic are available from OSN 113.

18	=	number of chronic test samples
26.8	=	maximum value, chronic toxicity
0.0	=	chronic coefficient of variation (CVc) (for n<10, CV = 0.6)
1.1	=	chronic uncertainty factor (UFc)
0.15	=	Dilution Factor at 1Q10 conditions

$$\begin{aligned} \text{Potential instream toxicity after mixing} &= 18 * 1.1 * 0.15 = 2.97 \\ \text{(Final chronic value)} &= (\text{Max. value} * \text{chronic toxicity} * \text{DF}) \end{aligned}$$

Since the calculated dilution factor is less than 100:1, and assuming immediate and complete mixing, protection of the stream from chronic effects is required.

Even though the potential instream toxicity after mixing, expressed as TUa, exceeds the CMC, acute whole effluent toxicity testing is waived and replaced by a chronic IC₂₅ test that is more stringent than the LC₅₀ acute test. Due to the receiving stream NOT being a source of water for OSN 113, the dilution factor ratio below is used:

$$\text{Dilution Factor} = \frac{\text{Stream Low Flow} + \text{Average Flow}}{\text{Average Flow}} = \frac{1587.9}{201.89} = 7.9$$

$$IC_{25} \% \geq \frac{100\%}{\text{Dilution Factor}} \geq \frac{100\%}{7.9} \geq 12.7\%$$

Where:

1385.9 = 1Q10 Low Flow (MGD)

201.89 = Long Term Average Flow (MGD)

IC₂₅ = Concentration causing 25% reduction in survival, growth, and reproduction of test organisms

Dilution factor when receiving stream is NOT a source of water at the facility		
OSN 113		
Stream Flow	Wastewater Flow	Total Flow
[MGD]	[MGD]	[MGD]
1385.9	201.89	1587.79
DF	7.9	
LC50 >	42.4	
IC 25>	12.7	

Per the calculations in the table above, WET testing shall be required on all three outfalls. If toxicity is demonstrated in any of the effluent samples specified above, this will constitute a violation of this permit. The toxicity tests specified herein shall be conducted twice a year (2/year) for Outfall OSN 113 and begin no later than 90 days from the effective date of this permit. Measurement frequency shall be retained at semi-annual, one during oxidizing biocide treatment and one during non-oxidizing biocide treatment. Sample type shall be composite.

5.5.7. Temperature, General

Tennessee water quality criteria for temperature contains three parts, (1) the discharge shall not cause the temperature of the receiving waters to exceed 30.5°C instream after mixing, (2) the discharge shall not cause an upstream to downstream temperature change of more than 3°C, and (3) the discharge shall not cause a rate of temperature change more than 2°C per hour. All of these conditions must be met at the edge of the mixing zone for the discharge. Further the extent of the mixing zone should be such that fish and aquatic life are not



harmful by the discharge. TVA, as part of a previous permit application process, presented dilution model results, which indicated that the mixing zone of this discharge would allow the free passage of fish while avoiding bottom dwelling species. During periods of Watts Bar dam releases, the heated plume is predicted to stay near the right bank (looking downstream) and extend downstream for approximately 1000 feet. During periods of dam shutoff, the heated plume is predicted to extend across the entire width of the river. Normally a "bank to bank" mixing zone is not allowable; however, in this case, only near the surface does the "passive" mixing zone extend across the width of the river. Temperature and Area of Mixing Zone The dynamic nature of the river operations in the vicinity of the Outfall OSN 113 discharge and the fact that this channel is not a natural stream led to issues with defining an appropriate mixing zone. It is recognized that the temperatures occurring in the Tennessee River at the location of the discharge are the result of a complex set of variables defining the mixing hydrodynamics and heat balance. Many of the variables, such as meteorological inputs, dam turbine releases, dam leakage, flow direction, and reservoir stage are beyond the control of the Watts Bar Nuclear Plant. It is further recognized that applying instantaneous criteria is problematic because of the dynamic nature of the receiving stream (barge traffic, dam operations, rapidly changing plume location, etc.). For this reason, the Division has determined that compliance with the temperature criteria should not be applied on an instantaneous basis instead compliance will be implemented with the following changes.

The approach to the mixing zone retained in this permit will be to define both an active and a passive mixing zone of approximately the same overall size. (See Mixing Zone Diagram, Figure 1-1.) In the passive mixing zone case, corresponding to dam shutoff, the mixing zone geometry will be defined as before. The passive mixing zone extends across the entire width of the river and extends downstream approximately 1000 feet. The active mixing zone will apply to other conditions where the plume tends to reside in the right-hand side of the river (facing downstream). Monitoring to establish compliance for the active mixing zone will occur 2000 feet downstream of Outfall OSN 113 in the right-hand side of the river. This monitoring will utilize two stations that will be placed to capture the true temperature in the plume. Temperature recorder station #33 and recorder station #34 are shown on the general locations on the mixing zone diagram in Figure 1-2. The data from the two stations are reported as the average of the temperatures for the two stations. This average will allow better tracking of the downstream extent of the plume.

The modeling that predicted the previously described passive mixing zone is verified by an instream thermal survey conducted semiannually. This passive

mixing zone that was described in the previous permit has been verified by instream modeling and instream thermal surveys.

TVA maintains a bottom temperature sensor in the Mussel Relocation Zone to ensure protection of bottom dwelling species and a zone of fish passage. The limit for the monitors in the relocation zone will remain at 33.5°C (92.3°F) as the maximum 1-hour average value to protect those bottom dwelling species. The permittee shall record this data on the DMRs, and any exceedances of the limit will be considered a permit violation.

Outfall OSN 113 is a near-surface discharge, and computations and measurements confirm that the effluent disperses in the surface region of the water column providing ample room for fish passage. Operation of Unit 2 has not altered the alinement of the thermal mixing zone.

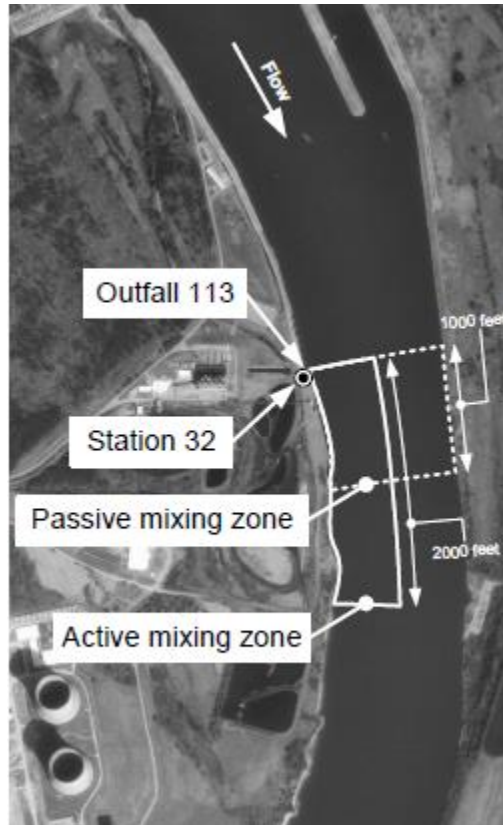


Figure 1-1 Mixing Zones for Outfall OSN 113

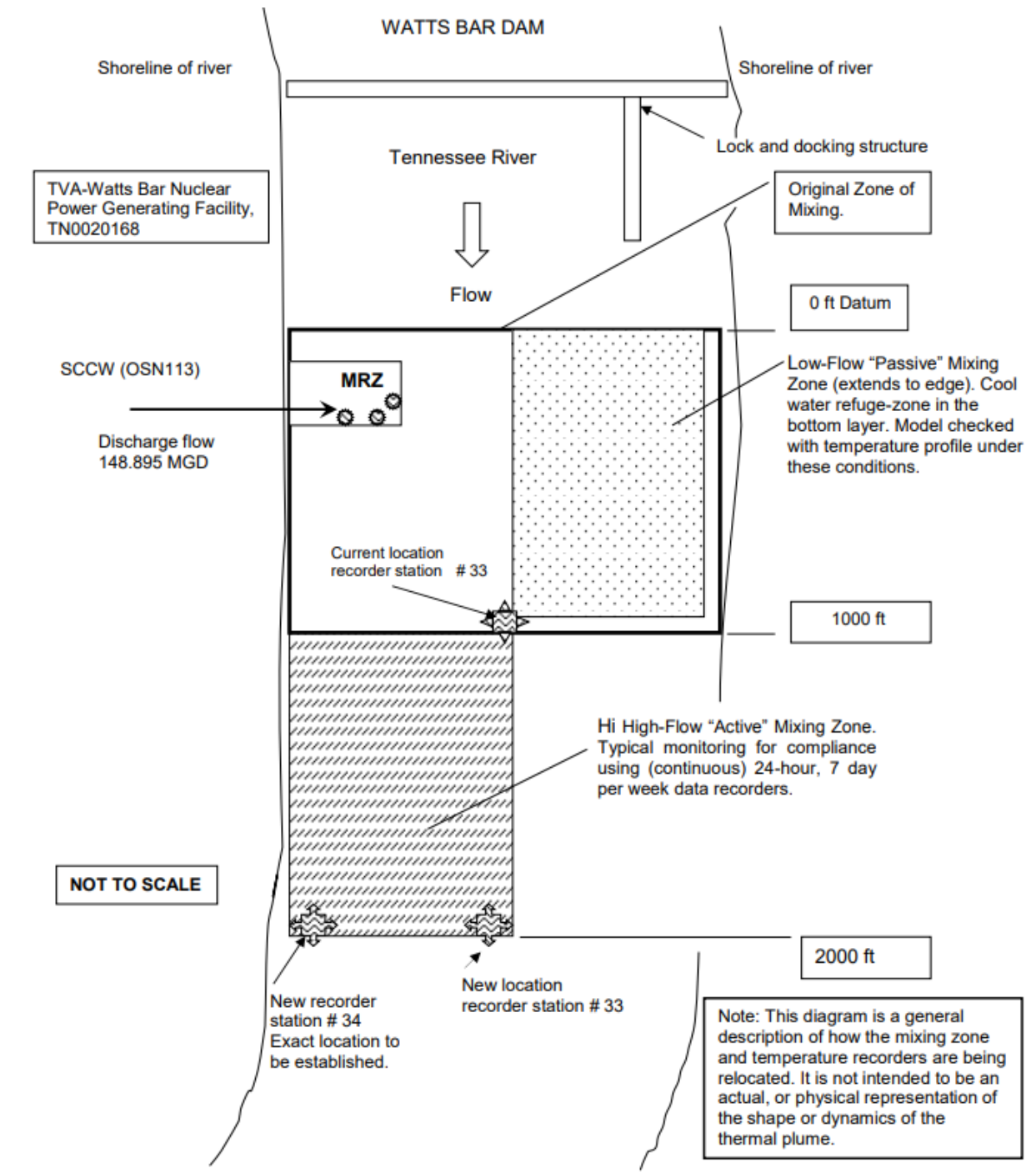


Figure 1-2 OSN 113 Mixing Zones

5.5.8. STUDY TO CONFIRM CALIBRATION OF NUMERICAL MODEL (OSN113)

The numerical model used to determine compliance with the temperature requirements for Outfall OSN 113 is the subject of a calibration study once during

the permit cycle. In Summer of 2016, TVA provided a study that confirmed the calibration of the model. Calibration of the diffuser flows and diffuser model calibration shall be done as needed and coordinated with the evaluation of thermal numerical modeling.

5.6. VIRTUAL OUTFALL V001

A new, “virtual” Outfall V001 has been added to the permit to monitor and limit the concentration of TRC discharged from both Outfalls OSN 101/OSN 102 and OSN 113, based on water quality criteria. Because the two outfalls discharge to the same river, a virtual outfall will capture what the fish will “see”, in total Chlorine and flow, and ensure that the concentrations do not exceed the assimilative capacity of the receiving stream (Chickamauga Reservoir). The combined treated effluent from Outfall OSN 101/OSN 102 and Outfall 113 shall be quantified and reported as Outfall V001.

5.6.1. Flow

Flow from Outfalls OSN 101/ OSN 102 and OSN 113 is to be calculated separately with individual flows and then summed to get a total flow at Outfall V001. Flow will be report only.

5.6.2. Chlorine, Total Residual (TRC)

Water quality calculations (presented in Appendix 3) were performed using the long-term average combined flow of Outfalls OSN 101/OSN 102 and OSN 113 from the current permit application. The permit writer assessed the toxics by making an across-the-board allocation for 29% of the allocation to Outfall 101 and 71% to Outfall 113. This assumes toxics were conservative and that discharges were going to the same spot. In fact, the discharges will be more than a mile apart. Water quality standards must be met instream. Allocation was a simple mass balance and no modeling of decay under various conditions has been made. This means that there is a margin of safety in the permit limits.

Effluent guidelines state that TRC shall not exceed the quantity of 0.5 mg/L times the volume of the sources for a daily maximum or 0.2 mg/L times the source volumes for the monthly average but water quality is more stringent. These calculations indicate that a monthly average of 0.07 mg/l and a daily maximum of 0.12 mg/L are necessary to comply with water quality criteria. Monitoring data from the previous permit period indicates that the long-term average and the maximum TRC concentration have been well below the permit limit (see Appendix 2). The WBN plant does not add chlorine to the SCCW, however chlorine/bromine is potentially present in the outfall due to commingling of cooling tower

blowdown. TRC concentrations from Outfalls OSN 101/OSN 102 and OSN 113 are to be measured separately with individual concentrations and then calculated (summed up) to get a total concentration at Outfall V001. See diagram and equation below. Monitoring frequency will be weekly.

Low River flow: 1,385.9 MGD

Outfall OSN 113		
Q = 201.89 MGD		
	Mon. Avg.	Daily Max.
TRC, ELG	NA	0.2 mg/L
TRC, WQ	NA	<0.2 mg/L
Permit	Report	Report

Outfall OSN 101/102		
Q = 57.893 MGD		
	Mon. Avg.	Daily Max.
TRC, ELG	NA	0.2 mg/L
TRC, WQ	NA	0.5 mg/L
Permit	NA	0.2 mg/L

Virtual Outfall (Sum of 113 & 101/102)		
Q = 259.783 MGD		
	Mon. Avg.	Daily Max.
TRC, ELG	NA	0.2 mg/L
TRC, WQ	0.07 mg/L	0.12 mg/L
Permit	0.07 mg/L	0.12 mg/L

Values at the virtual outfall are calculated from results measured at OSN 113 and OSN 101 based on mass (flow) as follows:

$$\frac{(C_{113})(Q_{113}) + (C_{101/102})(Q_{101/102})}{Q_{river} + Q_{113} + Q_{101/102}} = C_{virtual\ outfall}$$

Where:

C = concentration, mg/L

Q = flow, MGC

This calculation assumes TRC in the river upstream is 0 mg/L.

6. OTHER PERMIT REQUIREMENTS AND CONDITIONS

6.1. COMPLIANCE WITH CWA SECTION 316(A) – THERMAL VARIANCE

6.1.1. Thermal Limits and Monitoring Requirements

This permit requires compliance with Tennessee effluent temperature criteria except for the winter months of November through March when a variance is allowed for the temperature difference between upstream and downstream points to be as great as 5 °C. Otherwise, temperature shall be limited according to the State of Tennessee Water Quality Standards for the protection of Fish & Aquatic Life as outlined in Chapter [0400-40-03.03\(3\)\(e\)](#). It is recognized that the temperature of the cooling water discharge will be greater than the temperature



of the water prior to its use for cooling or other purposes. This discharge shall not cause the temperature change in the receiving stream to exceed 3 °C relative to an upstream control point for the summer months of April through October. Also, this discharge shall not cause the temperature of the receiving stream to exceed 30.5 °C, except as a result of natural causes, and this discharge shall not cause the maximum rate of temperature change in the receiving stream to exceed 2 °C per hour, except as a result of natural causes.

The calculated and measured temperatures of the effluent are reported electronically on the monthly Discharge Monitoring Reports (DMRs) in NetDMR. The temperature difference, rate of change, and receiving stream calculated temperatures are also limited and reported on monthly DMRs. The temperature of the effluent shall not be limited but shall be report only. Exceedances of the 30.5 °C water quality criteria for measured effluent temperature will not be considered a permit violation; the 30.5 °C value applies to the receiving stream and not the effluent temperature itself. When background stream temperatures are warm and approach 30.5 °C as a result of natural conditions, the Division understands that the plant will operate in Helper Mode, which is defined as the treatment of at least part of the plant effluent by the cooling towers. The permit maximum of 30.5 °C may be exceeded when the instream temperatures exceed 29.4 °C and the plant operates in Helper Mode. In no circumstance shall a one-hour average maximum downstream river temperature exceed 33.9 °C without consent of the permitting authority. When the ambient stream temperature is greater than 29.4 °C, the 1-hour average maximum downstream temperature limit of 33.9 °C becomes the next level of control for operating the plant. Should these conditions occur, the division shall be notified by phone, fax, and/or email as soon as possible (but no later than within 12 hours of calculating these conditions). Compliance with the 30.5 °C maximum limit shall be determined from the 24-hour average.

The 24-hour average temperature rise in the receiving stream shall be calculated by taking measurements continuously (as defined as measurements taken in 15 minute or less intervals). The 24-hour average value shall be determined using the current and previous 96 15-minute measurements. Thus, every 15 minutes a 24-hour average value shall be calculated. The maximum of the 96 observations generated per day by this procedure shall be the daily maximum temperature rise for that day. Similarly, instream river temperatures shall be averaged every 15 minutes to give a "rolling" 24-hour average. To determine compliance with the instream maximum limit of 30.5 °C and the temperature difference between upstream and downstream temperatures, the 24-hour average shall be used.



Tennessee Rule [0400-40-03-.05](#) applies to temperature monitoring by including protection of the water quality in the mixing zone. According to Rule 0400-40-03-.04 the “mixing zone” is defined as “[t]hat section of a flowing stream or impounded waters in the immediate vicinity of an outfall where an effluent becomes dispersed and mixed.” Additionally, Rule 0400-40-03-.05(2) states, in part, that “such mixing zones...shall be restricted in area and length; and shall not

- (a) prevent the free passage of fish or cause aquatic life mortality in the receiving waters;
- (b) contain materials in concentrations that exceed acute criteria beyond the zone immediately surrounding the outfall;
- (c) result in objectionable colors, odors, or other conditions;
- (d) produce undesirable aquatic life or result in dominance of a nuisance species;
- (e) endanger the public health or welfare; or
- (f) impair classified uses;
- (g) create a condition of chronic toxicity beyond the edge of the mixing zone;
- (h) adversely affect nursery and spawning areas; or
- (i) adversely affect species with special state or federal status.”

The elevated water temperature of outfall OSN 101 is mixed with the Tennessee River receiving water by being discharged through a diffuser. Instream temperature criteria must be met at the edge of the mixing zone. The mixing zone is defined for this discharge as being a maximum width of 240 feet (the width of the diffuser) and extending 240 feet downstream. An operational requirement of the plant is that the diffuser is only operated when 3500 cubic feet per second (CFS) flow is present from the dam. A continuous discharge at the temperature maximum of 35°C will not exceed water quality outside of the mixing zone based on past modeling.

The Division approved a one-hour averaging period for evaluating compliance with temperature criteria in the receiving stream. Depth of the mixing zone includes the entire depth of the reservoir on the downstream side of the diffusers. On the upstream side of the diffusers the mixing zone extends in depth from the surface 275 feet upstream of the diffusers to the top of the diffuser pipes. The initial mixing zone also included the intake forebay and diffuser pond when the plant operated in closed mode. The diffuser pond is not recognized as waters of the State, instead is considered part of the treatment system and therefore, is not part of the mixing zone for permit purposes. The intake forebay is recognized as waters of the State but shall be included in the mixing zone only in circumstances when the plant operates in closed mode. The intake forebay connects to the river through openings at the bottom of the skimmer wall. In closed mode operation relatively little water is coming through the openings in the skimmer wall.



Therefore, it makes sense to include the intake forebay in the mixing zone in these circumstances. TVA does not anticipate the operation of the plant in closed mode. However, if such emerges as a serious possibility, the monitoring requirements for the forebay shall be determined by appropriate study at that time.

The mixing zone is needed for two reasons. It allows mixing for the thermal loading of the effluent before water quality criteria must be met and, for compliance purposes, it allows a well-defined area to be used for actual instream assessments.

During the previous permit cycle, the average difference between upstream and downstream temperatures during winter months was 0.5°C, and the average difference in temperature during summer months was 0.8°C. Also during the previous permit cycle, the maximum reported instream temperature was 28.48°C reported in August 2020; no exceedances of the instream temperature criteria were reported.

6.2. COMPLIANCE WITH CWA SECTION 316(B) – COOLING WATER INTAKE

6.2.1. Background

The CWA Section 316(b) [Existing Facility Final Rule](#) applies to existing facilities that use cooling water intake structures (CWIS) to withdraw water from waters of the state and have or require a NPDES permit issued under the Tennessee Water Quality Control Act and Section 402 of the CWA. If a facility meets the conditions specified in 40 CFR § 125.91 as outlined below, it is subject to the rule.

The rule applies to owners and operators of existing facilities that meet all of the following criteria:

- a) The facility is a point source;
- b) The facility uses or proposes to use one or more cooling water intake structures with a cumulative design intake flow (DIF) of greater than 2 MGD to withdraw water from waters of the state; and
- c) 25% or more of the water the facility withdraws on an actual intake flow basis is used exclusively for cooling purposes.

If a facility has or requires a NPDES permit but does not meet the 2 MGD intake flow threshold, it is subject to permit conditions implementing CWA section 316(b) developed by the Director of the Division on a case-by-case basis using Best Professional Judgment (BPJ).

Generally, facilities that meet these criteria fall into two major categories: steam electric generating facilities and manufacturing facilities. The rule makes limited



corrections to the requirements for Phase I facilities, or new facilities. The rule establishes national requirements applicable to the location, design, construction, and capacity of CWIS at existing facilities that reflect the best technology available (BTA) for minimizing the adverse environmental impacts of impingement and entrainment associated with the use of these structures. The rule requires several types of information collection as part of the NPDES permit application in order to identify if the facility is meeting the rule, or how the facility plans to meet the rule requirements.

6.2.2. Specific Data Requirements with Permit Applications

Specific data requirements that apply to all facilities are outlined below:

- *§122.21(r)(2) – Source water physical data* which shows the physical configuration of all source waterbodies used by the facility, identifies and characterizes the source waterbody's hydrological and geomorphological features, and provides location through maps.
- *§122.21(r)(3) – Cooling water intake structure data* which shows the configuration and location of CWIS, provides details on the design and operation of each CWIS, and diagrams showing flow distribution and water balance.
- *§122.21(r)(4) – Source water baseline biological characterization data* that characterizes the biological community in the vicinity of the CWIS and characterizes the operation of the CWIS.
- *§122.21(r)(5) – Cooling water system data* that, among other things, describes the operation of the cooling water system, its relationship to the CWIS, the proportion of the design intake flow used in the system, the number of days the cooling water system is operational and seasonal changes in operation, as well as design and engineering calculations to support these descriptions.
- *§122.21(r)(6) – Impingement mortality standards compliance* information that describes the facility's selected methods. The specific requirements vary depending on the compliance approach chosen by the facility. This information would be reflected in the facility's Impingement Technology Performance Optimization Study.
- *§122.21(r)(7) – Entrainment performance studies* provide a description of any existing studies of biological survival conducted at the facility and a summary of any conclusions of results.
- *§122.21(r)(8) – Operational status* data that describes the operational status of each generating, production, or process unit.

In addition to the above requirements, existing facilities with actual intake flows in excess of 125 MGD are required as part of the permit application process to



submit an entrainment characterization study and related supporting information that has been peer reviewed. These requirements are outlined in § 122.21(r)(9) – (13) and summarized below. Facilities that withdraw less than 125 MGD actual intake flow do not have specific permit application requirements for entrainment, but the Director may require additional information on a site-specific basis.

- §122.21(r)(9) – *Entrainment characterization study* including a minimum of two years of entrainment data collection.
- §122.21(r)(10) – *Comprehensive Technical Feasibility and Cost Evaluation Study* which examines the feasibility of all technologies and includes engineering/social cost estimates.
- §122.21(r)(11) – *Benefits Valuation Study* which evaluates the benefits of potential entrainment reduction technologies.
- §122.21(r)(12) – *Non-water Quality Environmental and Other Impacts Study* discussing non-water quality impacts including changes to energy consumption, air pollutant emissions, noise, safety, and reliability.
- §122.21(r)(13) – *Peer review* of every study submitted by the permittee, to be performed by external peers approved in advance by the Director.

Under the Existing Facility Final Rule, a new unit at an existing facility that withdraws more than 2 MGD would have requirements similar to the requirements of a new facility in Phase I. A new unit (as defined by §125.92(u)) is required to reduce flow commensurate with closed-cycle cooling. Alternatively, a facility could demonstrate compliance with the entrainment control requirements by establishing reductions in entrainment mortality for the new unit that are 90% or greater of the reduction that could be achieved by closed-cycle cooling.

Finally, facilities are required to maintain records of all submitted documents, supporting materials, and monitoring results for at least five years. Depending on the compliance method chosen, facilities may also be required to perform compliance monitoring to demonstrate that their selected method of complying with the impingement mortality standard (*i.e.* screen velocity, actual intake flow, numeric impingement mortality performance) achieves the required performance.

6.2.3. Determination Summary

Significant factors in evaluating applicability of these rules to this permit include:

- TVA submitted a timely application on July 2, 2021. TVA submitted the information required under §122.21(r)(2) - (8) on July 27, 2017.
- The application indicated a long-term average discharge of 201.89MGD of primarily non-contact cooling water (plus stormwater and wastewater from the low volume waste treatment pond) through Outfalls OSN 101 and OSN 102.
- According to the permit application, the withdrawal rate for the intake pumping station located in Chickamauga Reservoir will be approximately 75 MGD and the SCCW intake withdrawal rate will remain approximately 174 MGD. Of the total withdrawal of approximately 249 MGD, approximately 42 MGD is consumptive (primarily cooling tower evaporation) with the remainder returning to the stream via permitted outfalls. The consumption amounts to only approximately 1.3% of the 7Q10 stream flow (3231.5 MGD). Therefore, water withdrawals will continue to be de minimis as described in TDEC Rule 0400-40-03-.06.

The closed-cycle cooling system at WBN is uniquely designed having one cooling water intake structure (CWIS) located in the inflow zone of Chickamauga Reservoir (Watts Bar Dam tailwater) that actively withdraws cooling water via pumping; and a gravity-driven, seasonally operated Supplemental Condenser Cooling Water (SCCW) diversion intake located in the forebay of Watts Bar Reservoir.

TVA has sought the opportunity to demonstrate to the Director that the Watts Bar Nuclear (WBN) cooling water system effectively operates as a closed-cycle recirculating system in the context of the § 316(b) rule; and thus, is eligible to support the waiver request.

In addition to restating the unique WBN cooling system configuration and closed-cycle operation, TVA has indicated it can demonstrate to the Director that sufficient information currently exists about impingement mortality and entrainment at the facility to defensibly support the Director's decision regarding BTA at WBN in the subsequent permit without the need for any additional information that would be obtained from the execution of §122.21(r)(9) through (13).

6.2.4. Conclusion

Based on submitted documentation, the Division of Water Resources, EPA Region 4, and Tennessee Fish and Wildlife Service (TFWS) granted a waiver to TVA for requirements of § 122.21(r)(9) through (13) in 2017. On December 3, 2021, TVA and

the Division held a meeting to discuss 316b requirements. TVA verbally requested to submit 316b application information two years, six months prior to permit expiration due to no change in the intake structure or its function. In accordance with 40CFR 125.95(c), the Division has agreed to the request to submit information to two years, six months before permit expiration.

Two years, six months prior to permit expiration, the permittee must submit to the Director for review the information required under 40 CFR 122.21:

- (r)(2) Source water physical data and (r)(3) Cooling water intake structure data, and any applicable paragraphs below:
 - (r)(4) Source water baseline biological characterization data
 - (r)(5) Cooling water system data
 - (r)(6) Method of compliance with impingement mortality standards
 - (r)(7) Existing entrainment performance studies
 - (r)(8) Operational status

Upon review and consideration of the submitted information, the Director will determine as to TVA's request for waiver of the information requirements of §122.21(r)(9) through (13).

- (r)(9) Entrainment characterization study
- (r)(10) Comprehensive technical feasibility and cost evaluation study
- (r)(11) Benefits valuation study
- (r)(12) Non-water quality and other environmental impacts study
- (r)(13) Peer review

In accordance with 40 CFR §125.98(b)(5), the above ensures that the Director will have all the information necessary to establish Best Technology Available (BTA) requirements for impingement mortality and entrainment in the subsequent permit. In the interim, based on evaluation of available information, TDEC has determined that the CWIS used by the TVA-WBN Plant represents BTA to minimize adverse environmental impact in accordance with Section 316(b) of the federal Clean Water Act (33 U.S.C. section 1326).

No thermal degradation is proposed or anticipated. TVA has performed an extensive hydrothermal analysis of the WBN heat dissipation system. This analysis indicates that near-field (and thus far-field) thermal impacts are to be de minimis and can be managed within the limitations of the current NPDES permit.



6.3. PERMIT TERM

The proposed limitations meet the requirements of Section 301(b)(2)(A), (C), (D), (E), and (F) of the Clean Water Act as amended. It is the general intent of the Division to organize the future issuance and expiration of this particular permit such that other permits located in the same watershed and group within the State of Tennessee will be set for issuance and expiration at the same time. The target future reissuance date for the Tennessee River (Meigs and Rhea County) watershed is 2023. However, in order for the permittee to comply with extensive sampling and reporting requirements associated with §316(a) and §316(b), this permit will be reissued for a full five-year cycle.

6.4. ELECTRONIC REPORTING

The [NPDES Electronic Reporting Rule \(eRule\)](#), which became effective on December 21, 2016, replaces most paper-based reporting requirements with electronic reporting requirements. NetDMR allows NPDES permittees to submit DMRs electronically to EPA through a secure internet application and has been approved by Tennessee as the official electronic reporting tool for DMRs. The permittee has been reporting electronically via NetDMR since December 2016.

Monitoring results shall be recorded monthly and submitted monthly using Discharge Monitoring Reports (DMRs) based on the effluent limits in **section 1.1** of the permit. DMRs and DMR attachments, including laboratory data and overflow reports, shall be submitted electronically in [NetDMR](#) or other electronic reporting tool approved by the State, no later than the 15th of the month following the end of the monitoring period. All NPDES program reports must be signed and certified by a responsible official or a duly authorized representative, as defined in 40 CFR § 122.22.

According to 40 CFR § 127.15, states have the flexibility to grant temporary or episodic waivers from electronic reporting to NPDES permittees who are unable to meet the electronic reporting requirements. To obtain an electronic reporting waiver, an [electronic reporting waiver request](#) must be submitted by email to DWRwater.compliance@tn.gov or by mail to the following address:

*Division of Water Resources
Compliance and Enforcement Unit – NetDMR Waivers
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, TN 37243-1102*

For contact and training information about NetDMR electronic reporting, visit the Division's website [here](#).

The permit language has been modified to accommodate the implementation of the MyTDEC Forms electronic reporting tool. For more information, visit EPA's website on [eReporting requirements](#).

6.5. ANTIDegradation Statement / Water Quality Status

Tennessee's Antidegradation Statement is found in the Rules of the Tennessee Department of Environment and Conservation, Chapter [0400-40-03-.06](#). It is the purpose of Tennessee's standards to fully protect existing uses of all surface waters as established under the Act.

Stream determinations for this permit action are associated with the waterbody segment identified by the Division as segment ID# TN06020001020_1000 (Chickamauga Reservoir) and TN06010201001_1000 (Watts Bar Reservoir).

The Division has made a determination of the receiving waters associated with the subject discharge(s) and has found this section of Chickamauga Reservoir to be an exceptional Tennessee water due to the presence of a federally designated threatened species of fish and mussels. No permanent degradation of water quality above the level of *de minimis* will be allowed unless the applicant demonstrates to the Division that the degradation is for necessary economic or social development and will not interfere with or become injurious to any existing uses. The specific requirements for this demonstration are described in the Rules of the Tennessee Department of Environment and Conservation, Chapter 0400-40-03-.06(4).

The Division, therefore, considers the potential for degradation to the receiving stream from these discharges to be negligible.

Total Maximum Daily Loads (TMDLs) have been developed and approved for the Watts Bars Reservoir waterbody segment on the following parameters and dates:

<u>Parameter:</u>	<u>TMDL Approval Date:</u>
PCBs and Dioxins	2010

The proposed terms and conditions of this permit comply with the wasteload allocations of these TMDLs.

On July 2 2021, the permittee submitted an analysis of reasonable alternatives to the continued treated wastewater discharge into the Tennessee River at mile 527.9 (OSN 101), Tennessee River at mile 527.2 (OSN 102), Tennessee River at mile 529.2 (OSN 113), and Tennessee River at mile 529.8, as required for Exceptional Tennessee Waters by Rule [0400-40-03-.06\(c\)](#).

The permittee stated:

“The withdrawal rate for the intake pumping station located in Chickamauga Reservoir will be approximately 75 MGD and the SCCW intake withdrawal rate will remain approximately 174 MGD. Of the total withdrawal of approximately 249 MGD, approximately 42 MGD is consumptive (primarily cooling tower evaporation) with the remainder returning to the stream via permitted outfalls. The consumption amounts to only approximately 1.3% of the 7Q10 stream flow (3231.5 MGD). Therefore, water withdrawals will continue to be de minimis as described in TDEC Rule 0400-40-03-.06.

No thermal degradation is proposed or anticipated. TVA has performed an extensive hydrothermal analysis of the WBN heat dissipation system. This analysis indicates that near-field (and thus far-field) thermal impacts are insignificant and can be managed within the limitations of the current NPDES permit”.

The Division agrees with the permittee’s alternatives analysis.

APPENDIX 1 – PREVIOUS PERMIT LIMITS

Description : External Outfall, Number : OSN 101 & OSN 102 , Monitoring : Effluent Gross, Season : All Year							
Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00010	Temperature, water deg. C ⁽⁴⁾	<=	35	deg C	Recorder	Continuous	Daily Maximum
00400	pH ^{*,(2)}	>=	6.0	SU	Grab	Monthly	Minimum
00400	pH ^{*,(2)}	<=	9.0	SU	Grab	Monthly	Maximum
00530	Total Suspended Solids (TSS) [*]	<=	100	mg/L	Grab	Monthly	Daily Maximum
00530	Total Suspended Solids (TSS) [*]	<=	30	mg/L	Grab	Monthly	Monthly Average
00556	Oil & Grease [*]	<=	20	mg/L	Grab	Monthly	Daily Maximum
00556	Oil & Grease [*]	<=	15	mg/L	Grab	Monthly	Monthly Average
01034	Chromium, total (as Cr) ⁽⁶⁾	<=	2.0	mg/L	Grab	When Discharging	Daily Maximum
01092	Zinc, total (as Zn)	<=	1.0	mg/L	Grab	Monthly	Daily Maximum
50050	Flow ⁽¹⁾	Report	-	Mgal/d	Instantaneous	Weekly	Monthly Average
50050	Flow ⁽¹⁾	Report	-	Mgal/d	Instantaneous	Weekly	Daily Maximum
50060	Chlorine, total residual (TRC) ^(2,3)	<=	0.1	mg/L	Grab	Weekly	Daily Maximum
50060	Chlorine, total residual (TRC) ^(2,3)	<=	0.1	mg/L	Grab	Weekly	Monthly Average
84165	Certification of in-stream flow 3,500 cfs or greater when required ⁽⁷⁾	Report	-	Y=1;N=0	Recorder	Monthly	Total

Description : External Outfalls, Numbers : OSN 101 & OSN 102, Monitoring : Effluent Gross, Season : All Year

<u>Code</u>	<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical Base</u>
TRP3B	IC25 Static Renewal 7 Day Chronic Ceriodaphnia ⁽⁵⁾	>	2.8	%	Composite	Semiannual	Minimum
TRP6C	IC25 Static Renewal 7 Day Chronic Pimephales ⁽⁵⁾	>	2.8	%	Composite	Semiannual	Minimum

- 1) Flow shall be reported in Million Gallons per Day (MGD). If the primary flow measurement device is out of service, flow may be calculated or estimated by alternate or secondary flow measurement devices.
- 2) pH and TRC analyses shall be performed within fifteen (15) minutes of sample collection.
- 3) The acceptable methods for analysis of TRC are any methods specified in Title 40 CFR, Part 136 as amended. The method detection level (MDL) for TRC shall not exceed 0.05 mg/l unless the permittee demonstrates that its MDL is higher. The permittee shall retain the documentation that justifies the higher MDL and have it available for review upon request. In cases where the permit limit is less than the MDL, the reporting of TRC at less than the MDL shall be interpreted to constitute compliance with the permit limit. The acceptable methods for detection and reporting of total residual chlorine are referenced in Part I, Section B. Monitoring Procedures, subsection 3. Test Procedures, paragraph b.
- 4) If the primary temperature monitoring equipment fails, monitoring will be done once per day. Reasonable and timely effort will be made to restore a temperature recorder to operation as soon as possible. See Part III for further temperature requirements. Secondary temperature measurement devices may be installed and calibrated for continuous use.
- 5) Sampling and analysis required only if discharge is operated 30 days or more during the semi-annual periods January through June or July through December and if all toxicity testing requirements have not already been completed for Outfalls OSN 101 and OSN 102. See Part III for methodology.
- 6) Monitoring for chromium is waived per 40 CFR 122.44 (a)(2)(I). See Rationale for more comments.
- 7) Certification shall be made during any month that a discharge occurs from this outfall.
- 8) If there is discharge during 1 or more days from Outfall OSN 102, sampling is required to comply with the maximum daily limit. If there are two or more separate days of discharge, or a continuous discharge during 5 or more consecutive days from this outfall then one sample is required from that "batch" discharge in order to report the monthly average limit.
- * monitoring and limits for pH, total suspended solids, and oil and grease apply only when the turbine building sump is aligned to bypass Internal Monitoring Points IMP 103 and IMP 107 where monitoring these parameters is required.

Notes:

There shall be no discharge of PCBs.

Discharges through Outfall OSN 102 (emergency overflow) is permitted only under emergency situations. This includes times when the diffuser pipe system is isolated as a result of diffuser maintenance and other emergency situations to preserve the integrity of the yard holding pond dikes such as in the event of a catastrophic storm event. All reasonable efforts shall be taken to resume normal discharge through Outfall OSN 101 as soon as possible.

Description : External Outfall, Number : IMP 103, Monitoring : Effluent Gross, Season : All Year

<u>Code</u>	<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical Base</u>
00400	pH ^(2,3)	>=	6.0	SU	Grab	Monthly	Minimum
00400	pH ^(2,3)	<=	9.0	SU	Grab	Monthly	Maximum
00530	Total Suspended Solids (TSS) ⁽³⁾	<=	100	mg/L	Grab	Monthly	Daily Maximum
00530	Total Suspended Solids (TSS) ⁽³⁾	<=	30	mg/L	Grab	Monthly	Monthly Average
00556	Oil & Grease ⁽³⁾	<=	20	mg/L	Grab	Monthly	Daily Maximum
00556	Oil & Grease ⁽³⁾	<=	15	mg/L	Grab	Monthly	Monthly Average
50050	Flow ⁽¹⁾	Report	-	Mgal/d	Instantaneous	Monthly	Daily Maximum
50050	Flow ⁽¹⁾	Report	-	Mgal/d	Instantaneous	Monthly	Monthly Average

1)

Flow shall be reported in Million Gallons per Day (MGD). In the event that the flow monitor is out of service, flow measurement shall be estimated or calculated.

2) pH analyses shall be performed within fifteen (15) minutes of sample collection.

3) In the event that turbine building station sump is discharged directly to the Yard Holding Pond, then TSS, Oil & Grease, and pH shall be monitored 1/Week and reported with the Discharge Monitoring Report (DMR) for the applicable reporting period.

Description : External Outfall, Number : IMP 107, Monitoring : Effluent Gross, Season : All Year

<u>Code</u>	<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Frequency</u>	<u>Statistical Base</u>
00400	pH ⁽²⁾	Report	-	SU	Grab	Once Per Batch	Maximum
00400	pH ⁽²⁾	Report	-	SU	Grab	Once Per Batch	Minimum
00530	Total Suspended Solids (TSS)	<=	100	mg/L	Grab	Once Per Batch	Daily Maximum
00530	Total Suspended Solids (TSS)	<=	30	mg/L	Grab	Once Per Batch	Monthly Average
00556	Oil & Grease	<=	15	mg/L	Grab	Once Per Batch	Monthly Average
00556	Oil & Grease	<=	20	mg/L	Grab	Once Per Batch	Daily Maximum
00665	Phosphorus, total (as P) ^(3,5)	<=	1.0	mg/L	Grab	Once Per Batch	Daily Maximum
00665	Phosphorus, total (as P) ^(3,5)	<=	1.0	mg/L	Grab	Once Per Batch	Monthly Average
01042	Copper, total (as Cu) ⁽⁴⁾	<=	1.0	mg/L	Grab	Once Per Batch	Monthly Average
01042	Copper, total (as Cu) ⁽⁴⁾	<=	1.0	mg/L	Grab	Once Per Batch	Daily Maximum
01045	Iron, total (as Fe) ⁽⁴⁾	<=	1.0	mg/L	Grab	Once Per Batch	Monthly Average
01045	Iron, total (as Fe) ⁽⁴⁾	<=	1.0	mg/L	Grab	Once Per Batch	Daily Maximum
50050	Flow ⁽¹⁾	Report	-	Mgal/d	Calculated	Once Per Batch	Monthly Average
50050	Flow ⁽¹⁾	Report	-	Mgal/d	Calculated	Once Per Batch	Daily Maximum

- 1) Flow shall be reported in Million Gallons per Day (MGD) for each batch discharge. If a batch discharge extends for more than a 24-hour period, flow measurement shall be obtained and reported for each 24 hour period.
- 2) pH analyses shall be performed within fifteen (15) minutes of sample collection.
- 3) Sampling for phosphorus is required only when metal cleaning chemicals containing phosphorus are being used.
- 4) Sampling for copper, iron, and phosphorous are required only when metal cleaning activities have occurred within the Lined/Unlined Ponds since the last batch discharge from this outfall. Non-metal cleaning wastewaters from the Lined/Unlined ponds may be routed to the LVWTP without compliance monitoring.
- 5) Batch Discharge: For the monitoring and reporting of measurements of FLOW, the "Monthly Avg." shall be the total flow volume during the reporting period divided by the number of calendar days in that period. The "Daily Max." shall be the total flow volume for the day with the greatest amount of discharge during the reporting period. Example: 3 discharges of 15,000 gallons/day and 1 discharge of 20,000 gallons/day during a 1-month period results in a Monthly Avg. of 65,000 gallons/30 days, or 2,166 gallons/day (to be reported as 0.002166 MGD). The Daily Maximum to be reported for this example is 20,000 gallons/day or 0.020 MGD.

Description : External Outfall, Number : **OSN 113**, Monitoring : Effluent Gross, Season : All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00010	Temperature, water deg. C	Report	-	deg C	Recorder	Hourly	Daily Maximum
00400	pH ⁽²⁾	>=	6.0	SU	Grab	Monthly	Minimum
00400	pH ⁽²⁾	<=	9.0	SU	Grab	Monthly	Maximum
00530	Total Suspended Solids (TSS)	<=	30	mg/L	Grab	Monthly	Monthly Average
00530	Total Suspended Solids (TSS)	<=	100	mg/L	Grab	Monthly	Daily Maximum
00556	Oil & Grease	<=	15	mg/L	Grab	Monthly	Monthly Average
00556	Oil & Grease	<=	20	mg/L	Grab	Monthly	Daily Maximum
50050	Flow ⁽¹⁾	Report	-	Mgal/d	Recorder	Continuous	Daily Maximum
50050	Flow ⁽¹⁾	Report	-	Mgal/d	Recorder	Continuous	Monthly Average
50060	Chlorine, total residual (TRC) ^(2, 3)	<=	0.158	mg/L	Grab	Weekly	Daily Maximum
50060	Chlorine, total residual (TRC) ^(2, 3)	<=	0.09	mg/L	Grab	Weekly	Monthly Average
84165	Certification of in-stream flow 3,500 cfs or greater when required	Report	-	Y=1;N=0	Recorder	Monthly	Total

Description : External Outfall, Number : **OSN113**, Monitoring : Instream Monitoring, Season : All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00010	Temperature, water deg. C	<=	30.5	deg C	Recorder	Hourly	Daily Maximum
00016	Temp. diff., effluent & upstream deg. C	<=	3.0	deg C	Calculated	Hourly	Daily Maximum
82234	Temperature rate of change deg. C/hr	<=	2.0	deg C/hr	Calculated	Hourly	Daily Maximum

Description : External Outfall, Number : **OSN113**, Monitoring : See Comments⁽⁵⁾, Season : All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
00010	Temperature, water deg. C	<=	33.5	deg C	Recorder	Hourly	Daily Maximum

Description : External Outfall, Number : **OSN113**, Monitoring : Effluent Gross, Season : All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Frequency	Statistical Base
TRP3B	IC25 Static Renewal 7 Day Chronic Ceriodaphnia ⁽⁴⁾	>	6.7	%	Composite	Semiannual	Minimum

Flow shall be reported in Million Gallons per Day (MGD).

pH and TRC analyses shall be performed within fifteen (15) minutes of sample collection.

The acceptable methods for analysis of TRC are any methods specified in Title 40 CFR, Part 136 as amended. The method detection level (MDL) for TRC shall not exceed 0.05 mg/l unless the permittee demonstrates that its MDL is higher. The permittee shall retain the documentation that justifies the higher MDL and have it available for review upon request. In cases where the permit limit is less than the MDL, the reporting of TRC at less than the MDL shall be interpreted to constitute compliance with the permit limit. The acceptable methods for detection and reporting of total residual chlorine are referenced in Part I, Section B, Monitoring Procedures, subsection 3. Test Procedures, paragraph b.

See Part III for methodology

See Rationale, Part VII, Section E. Outfall OSN 113, **Temperature and Area of Mixing Zone**

PERMIT LIMITS FOR IMP 114

TVA-Watts Bar Nuclear

Supplemental Condenser Cooling Water Intake Screen Backwash water

Note: No numerical monitoring limitations are applied to this outfall.

APPENDIX 2 – DMR SUMMARY

TN0020168- Tennessee Valley Authority (TVA)

Outfall 101

	Chlorine, total residual, Effluent Gross		Chromium, total [as Cr], Effluent Gross		Discharge event observation [Visual Monitoring], Effluent Gross	Flow, in conduit or thru treatment plant, Effluent Gross		IC25 Static Renewal 7 Day Chronic Chrceriodaphnia, Effluent Gross	IC25 Static Renewal 7 Day Chronic Chrpimephales, Effluent Gross	Oil & Grease, Effluent Gross		pH, Effluent Gross		Solids, total suspended, Effluent Gross		Temperatu re, water deg. centigrade , Effluent Gross	Zinc, total [as Zn], Effluent Gross
	Weekly average or geo. mean (mg/L)	Daily max. (mg/L)	Weekly average or geo. mean (mg/L)	Daily max. (mg/L)	Weekly or daily (N=0;Y=1)	Monthly or total (MGD)	Weekly or daily (MGD)	Monthly average or min. (%)	Monthly average or min. (%)	Weekly average or geo. mean (mg/L)	Daily max. (mg/L)	Monthly average or min. (SU)	Daily max. (SU)	Weekly average or geo. mean (mg/L)	Daily max. (mg/L)	Daily max. (deg C)	Daily max. (mg/L)
06/30/2021	< .05	< .05	NODI 9	NODI 9	1	66.806	82.558	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	28	0
05/31/2021	< .05	< .05	NODI 9	NODI 9	1	65.612	80.123	> 11.2	> 11.2	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	27	< 0
04/30/2021	< .05	< .05	NODI 9	NODI 9	1	66.624	77.394	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	22	0
03/31/2021	< .05	< .05	NODI 9	NODI 9	1	53.941	72.951	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	21	0
02/28/2021	< .05	< .05	NODI 9	NODI 9	1	74.876	84.595	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	22	0
01/31/2021	< .05	< .05	NODI 9	NODI 9	1	91.105	124.196	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	23	0
12/31/2020	< .05	< .05	NODI 9	NODI 9	1	60.953	77.844	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	23	0.1
11/30/2020	< .05	< .05	NODI 9	NODI 9	1	75.936	117.416	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	24	0.3
10/31/2020	< .05	< .05	NODI 9	NODI 9	1	79.212	94.539	> 11.2	> 11.2	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	27	0
09/30/2020	< .05	< .05	NODI 9	NODI 9	1	77.711	94.018	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	30	0
08/31/2020	< .05	< .05	NODI 9	NODI 9	1	54.512	86.641	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	30	0
07/31/2020	< .05	< .05	NODI 9	NODI 9	1	48.553	76.855	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	29	0
06/30/2020	< .05	< .05	NODI 9	NODI 9	1	77.629	91.28	> 11.2	> 11.2	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	27	0
05/31/2020	< .05	< .05	NODI 9	NODI 9	1	84.192	95.057	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	27	0
04/30/2020	< .05	< .05	NODI 9	NODI 9	1	79.367	98.036	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	26	0
03/31/2020	< .05	< .05	NODI 9	NODI 9	1	42.294	61.76	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	33	0
02/29/2020	< .05	< .05	NODI 9	NODI 9	1	67.341	86.393	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	21	0
01/31/2020	< .05	< .05	NODI 9	NODI 9	1	60.152	98.568	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	20	0.1
12/31/2019	< .05	< .05	NODI 9	NODI 9	1	74.12	101.448	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	22	0
11/30/2019	< .05	< .05	NODI 9	NODI 9	1	83.078	106.25	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	20	0
10/31/2019	< .05	< .05	NODI 9	NODI 9	1	78.691	113.172	> 11.2	> 11.2	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	28	0.1
09/30/2019	< .05	< .05	NODI 9	NODI 9	1	79.758	113.675	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	28	0.1

08/31/2019	< .05	< .05	NODI 9	NODI 9	1	79.829	98.518	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	29	0
07/31/2019	< .05	< .05	NODI 9	NODI 9	1	80.447	94.409	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	28	0
06/30/2019	< .05	< .05	NODI 9	NODI 9	0	66.24	108.33	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	27	0
05/31/2019	< .05	< .05	NODI 9	NODI 9	1	85.831	105.38	> 11.2	> 11.2	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	29	0.1
04/30/2019	< .05	< .05	NODI 9	NODI 9	1	89.535	105.582	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	25	0.1
03/31/2019	< .05	< .05	NODI 9	NODI 9	1	55.918	81.58	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	19	0.3
02/28/2019	< .05	< .05	NODI 9	NODI 9	1	68.158	102.86	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	20	0
01/31/2019	< .05	< .05	NODI 9	NODI 9	1	41.31	53.407	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	18	0.1
12/31/2018	< .05	< .05	NODI 9	NODI 9	1	35.368	46.18	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	22	0.1
11/30/2018	< .05	< .05	NODI 9	NODI 9	1	35.015	63.69	> 11.2	> 11.2	NODI 9	NODI 9	8.3	8.3	NODI 9	NODI 9	24	0.06
10/31/2018	< .05	< .05	NODI 9	NODI 9	1	48.862	59.554	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	28	0.15
09/30/2018	< .05	< .05	NODI 9	NODI 9	1	60.222	67.253	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	29	0.07
08/31/2018	< .05	< .05	NODI 9	NODI 9	1	40.197	52.216	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	28	0.06
07/31/2018	< .05	< .05	NODI 9	NODI 9	1	39.896	60.89	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	31	0.06
06/30/2018	< .05	< .05	NODI 9	NODI 9	1	47.072	70.16	NODI 9	NODI 9	NODI 9	NODI 9	8.5	8.5	NODI 9	NODI 9	30	0.1
05/31/2018	< .05	< .05	NODI 9	NODI 9	1	48.412	71.39	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	26	0.07
04/30/2018	< .05	< .05	NODI 9	NODI 9	1	50.166	68.43	> 11.2	> 11.2	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	22	0.08
03/31/2018	< .05	< .05	NODI 9	NODI 9	1	58.33	72.84	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	24	0.07
02/28/2018	< .05	< .05	NODI 9	NODI 9	1	41.589	67.28	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	27	0.27
01/31/2018	< .05	< .05	NODI 9	NODI 9	1	51.07	60.642	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	18	0.08
12/31/2017	< .05	< .05	NODI 9	NODI 9	1	50.27	62.4	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	22	0.07
11/30/2017	< .05	< .05	NODI 9	NODI 9	1	50.821	65.41	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	25	0.13
10/31/2017	< .05	< .05	NODI 9	NODI 9	1	48.129	66.585	> 11.2	> 11.2	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	30	0.13
09/30/2017	< .05	< .05	NODI 9	NODI 9	1	63.09	72.38	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	29	0.1
08/31/2017	< .05	< .05	NODI 9	NODI 9	1	44.143	67.71	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	31	0.05
07/31/2017	< .05	0.07	NODI 9	NODI 9	1	39.852	73.11	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	31	0.06
06/30/2017	< .05	< .05	NODI 9	NODI 9	1	31.929	49.608	> 11.2	> 11.2	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	28	0.08
05/31/2017	< .05	< .05	NODI 9	NODI 9	1	57.763	81.39	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	22	0.19
04/30/2017	< .05	< .05	NODI 9	NODI 9	1	49.885	63.189	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	NODI 9	22	0.01
03/31/2017	< .05	< .05	NODI 9	NODI 9	1	49.987	78.82	NODI 9	NODI 9	< 6	< 6	NODI 9	NODI 9	NODI 9	NODI 9	23	0.02
02/28/2017	< .05	< .05	NODI 9	NODI 9	1	43.967	54.67			NODI 9	NODI 9	8	8	NODI 9	NODI 9	21	0.02

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Outfall 103

	Flow, in conduit or thru treatme nt plant, Effluent Gross		Oil & Grease, Effluent Gross		pH, Effluent Gross			Solids, total suspended, Effluent Gross		
	Monthly or total (MGD)	Weekly or daily (MGD)	Weekly average or geo. mean (mg/L)	Daily max. (mg/L)	Monthly average or min. (SU)	Daily max. (SU)	Percent exceedan ce	Weekly average or geo. mean (mg/L)	Daily max. (mg/L)	Percent exceedan ce
06/30/2021	0.478	0.497	< 2	< 2	8.2	8.2		10	10	
05/31/2021	0.546	0.595	< 5	< 5	8.6	8.6		< 3	< 3	
04/30/2021	0.404	0.498	< 5	< 5	7.1	7.1		< 3	< 3	
03/31/2021	0.359	0.452	< 6	< 6	7.4	7.4		5	5	
02/28/2021	0.308	0.321	< 4	< 5	8.5	8.8		< 3	< 3	
01/31/2021	0.234	0.301	< 5	< 5	8.9	8.9		< 3	< 3	
12/31/2020	0.388	0.42	< 2	< 2	8.7	8.7		2	2	
11/30/2020	0.211	0.228	< 5	< 5	8.7	8.7		17	17	
10/31/2020	0.386	0.455	< 5	< 5	8.6	8.6		15	15	
09/30/2020	0.474	0.607	< 2	< 2	8.8	8.8		29	32	
08/31/2020	0.314	0.334	< 5	< 5	6.3	6.3		16	16	
07/31/2020	0.337	0.358	< 2	< 2	8.6	8.6		9	9	
06/30/2020	0.593	0.656	< 14	< 14	8.7	8.7		< 3	< 3	
05/31/2020	0.54	0.71	< 6	< 6	6.2	6.2		9	9	
04/30/2020	0.277	0.294	< 2	< 2	7.7	7.7		2	2	
03/31/2020	0.328	0.39	< 6	< 6	8.3	8.3		< 3	< 3	
02/29/2020	0.595	0.615	2	2	7.8	7.8		1	1	
01/31/2020	0.389	0.634	< 5	< 5	7	7		3	3	
12/31/2019	0.242	0.249	< 5	< 5	8.8	8.8		10	10	
11/30/2019	0.395	0.449	< 6	< 6	7.9	7.9		23	23	
10/31/2019	0.428	0.505	< 6	< 6	6.4	6.4		21	21	
09/30/2019	0.62	0.65	< 6	< 6	8.1	8.1		14	14	
08/31/2019	0.336	0.536	< 5	< 5	6.9	7		18	18	
07/31/2019	0.4	0.41	2	2	8.8	8.8		1	1	
06/30/2019	0.43	0.48	< 6	< 6	6.6	6.6		3	3	
05/31/2019	0.13	0.22	< 5	< 5	6.3	6.3		8	8	
04/30/2019	0.394	0.628	< 6	< 6	7.9	7.9		3	3	

03/31/2019	0.083	0.165	< 2	< 2	8.4	8.4		14	14	
02/28/2019	0.447	0.454	< 5	< 5	8.8	8.8		11	11	
01/31/2019	0.076	0.151	< 6	< 6	8	8		19	19	
12/31/2018	0.065	0.071	< 6	< 6	6.6	6.6		11	11	
11/30/2018	0.54	0.54	< 6	< 6	8.8	8.8		17	17	
10/31/2018	0.326	0.33	< 5	< 5	6.8	6.8		25	25	
09/30/2018	0.009	0.017	< 5	< 5	6.6	6.6		25	25	
08/31/2018	0.28	0.33	< 5	< 5	7.2	7.2		27	27	
07/31/2018	0.228	0.344	< 5	< 5	8.1	8.1		18	18	
06/30/2018	0.469	0.479	< 5	< 5	9.6	9.6		18	18	
05/31/2018	0.223	0.223	< 5	< 5	8.9	8.9		24	24	
04/30/2018	0.383	0.453	< 5	< 5	8.7	8.7		35	43	17
03/31/2018	0.418	0.42	< 5	< 5	7.8	7.8		19	19	
02/28/2018	0.509	0.525	< 6	< 6	8.6	8.6		7	7	
01/31/2018	0.462	0.553	< 5	< 5	8.4	8.4		3	3	
12/31/2017	0.925	1.066	< 5	< 5	7.2	7.2		< 3	< 3	
11/30/2017	0.23	0.23	< 5	< 5	8.3	8.4		4	4	
10/31/2017	0.37	0.043	< 6	< 6	7.5	7.5		9	9	
09/30/2017	0.441	0.49	< 5	< 5	7.1	7.1		7	7	
08/31/2017	0.531	0.545	< 5	< 5	7.2	7.2		6	6	
07/31/2017	0.44	0.44	< 5	< 5	8.9	8.9		7	7	
06/30/2017	0.221	0.321	< 6	< 6	7.3	7.3		15	15	
05/31/2017	0.427	0.5	< 2	< 2	8.4	8.4		1	1	
04/30/2017	0.213	0.213	< 2	< 2	7.3	7.3		1	1	
03/31/2017	0.357	0.419	< 5	< 5	8.5	8.5		< 3	< 3	
02/28/2017	0.459	0.52	< 5	< 5	8.5	8.5		5	5	

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Outfall 113

	Chlorine, total residual, Effluent Gross		Discharge event observation [Visual Monitoring], Effluent Gross	Flow, in conduit or thru treatment plant, Effluent Gross		IC25 Static Renewal 7 Day Chronic Chrceriodap hnia, Effluent Gross	IC25 Static Renewal 7 Day Chronic Chrpimep hales, Effluent	Oil & Grease, Effluent Gross		pH, Effluent Gross		Solids, total suspended, Effluent Gross		Temp. diff. between samp. & upstrm deg. C, Instream Monitoring	Temperature rate of change deg. C/hr, Instream Monitoring	Temperature, water deg. centigrade, Effluent Gross	Temperature, water deg. centigrade, Instream Monitoring	Temperature, water deg. centigrade, See Comments
	Weekly average or geo. mean (mg/L)	Daily max. (mg/L)	Weekly or total (N=0;Y=1)	Monthly or total (MGD)	Weekly or daily (MGD)	Monthly average or min. (%)	Monthly average or min. (%)	Monthly average or min. (mg/L)	Weekly average or geo. mean (mg/L)	Monthly average or min. (SU)	Daily max. (SU)	Weekly average or geo. mean (mg/L)	Daily max. (mg/L)	Daily max. (deg C)	Weekly or daily (deg C/hr)	Daily max. (deg C)	Daily max. (deg C)	Daily max. (deg C)
06/30/2021	< .05	< .05	1	121.586	158.521	NODI 9	NODI 9	< 5.4	< 5.4	7.9	7.9	10	10	1.37	1	33.6	26.11	26.11
05/31/2021	< .05	< .05	1	101.803	115.405	> 26.8	> 26.8	< 5.6	< 5.6	8.1	8.1	4	4	1.01	1	31.34	20.97	21.16
04/30/2021	< .05	< .05	1	103.427	150.358	NODI 9	NODI 9	< 5.3	< 5.3	8.2	8.2	7	7	0.95	1	30.43	16.79	16.79
03/31/2021	< .05	< .05	1	72.544	98.785	NODI 9	NODI 9	<= 5.6	<= 5.6	7.5	7.5	4	4	0.48	0	28.68	13.78	14.4
02/28/2021	< .05	< .05	1	29.514	46.462	NODI 9	NODI 9	< 3.4	< 5.3	7.8	8.6	4	4	0.11	0	28.82	8.47	8.68
01/31/2021	< .05	< .05	1	33.31	51.683	NODI 9	NODI 9	< 5.6	< 5.6	8.1	8.1	4	4	0.28	0	27.82	8.67	9.77
12/31/2020	< .05	< .05	1	36.575	60.611	NODI 9	NODI 9	< 5.6	< 5.6	8.2	8.2	7	7	0.26	1	25.88	13.43	13.9
11/30/2020	< .05	< .05	1	33.857	88.004	NODI 9	NODI 9	< 5.4	< 5.4	6.9	6.9	< 3	< 3	0.06	0	26.3	19.08	19.28
10/31/2020	< .05	< .05	1	55.758	114.786	> 26.8	> 26.8	< 5.2	< 5.2	8.3	8.3	7	7	0.25	0	30.97	22.92	23.68
09/30/2020	< .05	< .05	1	135.587	186.468	NODI 9	NODI 9	< 5.3	< 5.3	8.4	8.4	4	4	0.75	0	34.32	27.69	27.8
08/31/2020	< .05	< .05	1	161.178	173.118	NODI 9	NODI 9	< 5.1	< 5.1	6.7	6.7	< 3	< 3	0.41	0	34.56	28.48	28.66
07/31/2020	< .05	< .05	1	170.498	201.89	> 26.8	> 26.8	< 5.3	< 5.3	6.3	6.3	5	5	1	1	35.2	28.3	29
06/30/2020	< .05	< .05	1	137.446	191.68	NODI 9	NODI 9	< 5.6	< 5.6	6.2	6.2	5	5	1.4	1	35.8	25.3	26.5
05/31/2020	< .05	< .05	1	9.785	56.65	NODI 9	NODI 9	< 5.6	< 5.6	6.1	6.1	< 3	< 3	0.2	0	23.6	21.5	22.3
04/30/2020	< .05	< .05	1	2.885	5.037	NODI 9	NODI 9	< 5.6	< 5.6	6.2	6.2	< 3	< 3	0.3	0	18.3	16	16.8
03/31/2020	< .05	< .05	1	3.532	4.34	NODI 9	NODI 9	< 5.4	< 5.4	6.2	6.2	< 3	< 3	2.1	0	20.8	14.9	15.2
02/29/2020	< .05	< .05	1	14.442	45.671	NODI 9	NODI 9	< 5.4	< 5.4	6.3	6.3	8	8	0.9	0	24	10	10.5
01/31/2020	< .05	< .05	1	38.114	71.519	NODI 9	NODI 9	< 5.3	< 5.3	7.9	7.9	5	5	0.1	0	20.9	10.6	11.2
12/31/2019	< .05	< .05	1	71.52	102.576	NODI 9	NODI 9	< 5.2	< 5.2	6.3	6.3	4	4	0.1	0	25.2	12.4	14.2
11/30/2019	< .05	< .05	1	77.548	102.323	> 26.8	> 26.8	< 5.3	< 5.3	6.2	6.2	13	13	0.3	1	27.4	19.4	19.4
10/31/2019	< .05	< .05	1	85.586	104.363	NODI 9	NODI 9	< 5.5	< 5.5	7	7	8	8	0.4	0	29.3	27.2	31.1
09/30/2019	< .05	< .05	1	99.727	110.707	NODI 9	NODI 9	11.1	11.1	7.9	7.9	3	3	0.7	1	41.1	27.5	29
08/31/2019	< .05	< .05	1	104.683	125.922	NODI 9	NODI 9	< 5.4	< 5.4	8.3	8.3	< 3	< 3	0.8	1	33.2	27.9	29
07/31/2019	< .05	< .05	1	119.388	132.978	> 26.8	> 26.8	< 5.6	< 5.6	8.1	8.1	4	4	1.3	2	32.7	28.1	29.1
06/30/2019	< .05	< .05	1	107.672	141.17	NODI 9	NODI 9	< 5.3	< 5.3	8	8	4	4	1.3	1	32	25.2	26.5
05/31/2019	< .05	< .05	1	14.139	92.42	NODI 9	NODI 9	< 5	< 5	7.5	7.5	6	6	0.6	1	30.4	21.5	22.9
04/30/2019	< .05	< .05	1	2.634	3.23	NODI 9	NODI 9	< 5.6	< 5.6	6.9	6.9	< 5	< 5	1.1	1	19.1	19	20.7
03/31/2019	< .05	< .05	1	2.735	3.54	NODI 9	NODI 9	< 5.3	< 5.3	6.8	6.8	3	3	2.6	1	14.4	14.4	12.5
02/28/2019	< .05	< .05	1	33.959	71.18	NODI 9	NODI 9	< 5.7	< 5.7	8.1	8.1	10	10	0.5	1	24.4	11.1	10.3
01/31/2019	< .05	< .05	1	8.901	30.213	NODI 9	NODI 9	< 5.3	< 5.3	7.2	7.2	< 3	< 3	-0.1	0	24.7	10.4	10.3
12/31/2018	< .05	< .05	1	31.249	54.2	NODI 9	NODI 9	< 5.5	< 5.5	6.9	6.9	6	6	0	0	26.2	10.9	10.8
11/30/2018	< .05	< .05	1	35.548	63.286	> 26.8	> 26.8	< 5.2	< 5.2	7.1	7.1	21	21	0.2	0	27	17.9	17.7
10/31/2018	< .05	< .05	1	21.713	45.24	NODI 9	NODI 9	< 5.4	< 5.4	6.9	6.9	< 3	< 3	0.8	0	26.2	25.2	25.9
09/30/2018	< .05	< .05	1	38.53	84.02	NODI 9	NODI 9	< 5.3	< 5.3	7.1	7.1	4	4	0.7	1	31.9	27.9	28.2

09/30/2018	< .05	< .05	1	38.53	84.02	NODI 9	NODI 9	< 5.3	< 5.3	7.1	7.1	4	4	0.7	1	31.9	27.9	28.2
08/31/2018	< .05	< .05	1	90.146	115.253	NODI 9	NODI 9	< 5.3	< 5.3	8.3	8.3	5	5	0.6	1	32.7	27.6	28
07/31/2018	< .05	< .05	1	112.498	150.768	NODI 9	NODI 9	< 5.6	< 5.6	8.4	8.4	3	3	0.8	1	32.6	27.6	27.8
06/30/2018	< .05	< .05	1	60.949	65.037	NODI 9	NODI 9	< 5.2	< 5.2	7.4	7.4	9	9	1.1	2	32.6	26	26
05/31/2018	< .05	< .05	1	56.286	103.47	NODI 9	NODI 9	< 5.3	< 5.3	8.1	8.1	4	4	0.9	2	30.9	24.6	24.7
04/30/2018	< .05	< .05	1	41.451	70.883	> 26.8	> 26.8	< 5.3	< 5.3	8.2	8.2	8	8	0.7	0	28	15.4	15.7
03/31/2018	< .05	< .05	1	38.462	72.261	NODI 9	NODI 9	< 5.3	< 5.3	8.3	8.3	6	6	0.4	2	26.5	11.7	24.4
02/28/2018	< .05	< .05	1	42.326	79.77	NODI 9	NODI 9	< 5.6	< 5.6	6.6	6.6	6	6	0.4	0	28.3	11.7	28.2
01/31/2018	< .05	< .05	1	66.009	77.18	NODI 9	NODI 9	< 5.3	< 5.3	6.8	6.8	3	3	0.7	0	26.1	7.5	8.3
12/31/2017	< .05	< .05	1	70.266	80.08	NODI 9	NODI 9	< 5.6	< 5.6	7.6	7.6	3	3	0.4	1	26.1	13	13.2
11/30/2017	< .05	< .05	1	24.513	72.583	NODI 9	NODI 9	< 5.4	< 5.4	6.3	6.4	3	3	0.5	0	19.3	17.9	18.3
10/31/2017	< .05	< .05	1	49.532	88.89	> 26.8	> 26.8	< 5.4	< 5.4	8.4	8.4	3	3	0.5	0	31.1	24.2	24.4
09/30/2017	< .05	< .05	1	62.317	80.33	NODI 9	NODI 9	< 5.4	< 5.4	8.2	8.2	5	5	1	1	30.8	26.3	26.4
08/31/2017	< .05	< .05	1	113.638	158.287	NODI 9	NODI 9	< 5.4	< 5.4	8.1	8.1	4	4	0.6	1	32.5	28.1	28.3
07/31/2017	< .05	< .05	1	90.979	146.721	NODI 9	NODI 9	< 5.4	< 5.4	8.4	8.4	< 3	< 3	0.5	1	32.9	28.4	28.8
06/30/2017	< .05	< .05	1	113.714	177.75	> 26.8	> 26.8	< 5.6	< 5.6	8.4	8.4	4	4	0.6	1	30.8	24.8	25.1
05/31/2017	< .05	< .05	1	108.387	129.489	NODI 9	NODI 9	< 5.6	< 5.6	8.3	8.3	4	4	0.8	1	31.2	22.2	22.4
04/30/2017	< .05	< .05	1	16.877	86.386	NODI 9	NODI 9	< 5.6	< 5.6	8.2	8.2	< 3	< 3	0.1	0	21.1	19.5	19.8
03/31/2017	< .05	< .05	1	29.877	65.257	NODI 9	NODI 9	< 5.4	< 5.5	8.1	8.1	6	6	0.5	1	27.8	14.1	14.4
02/28/2017	< .05	< .05	1	62.341	67.82			< 5.3	< 5.3	8.2	8.2	6	6	0.8	1	28.8	11.1	11.2

Violations Report Summary

NPDES ID(s): TN0020168
State: TN
Major/Minor Indicator:
Violation Date: 02/01/2017 -
Violation Type(s):

Environmental Protection Agency
Integrated Compliance Information System
Violations Report

Created Date: 09/15/2010
Refresh Date: 08/31/2021
t Version 1.5, Modified: 1/4/2017

TN0020168

Permittee Name:	Tennessee Valley Authority (TVA)	Primary SIC Code:	4911	Permit Issued:	01/13/2017
Permittee Address:	PO Box 2000, LP 4J-C WBN Soddy Daisy, TN 37379	Primary SIC Desc:	Electric Services	Permit Effective:	02/01/2017
Major/Minor Indicator:	Major	Primary NAICS		Permit Expired:	12/31/2021
Compliance Track. Status:	On	Primary NAICS Desc:		Permit Status:	Effective
DMR Non Receipt Flag:	On	Cognizant Official:			
RNC Tracking Flag:	On	Cognizant Offcl. Ph.:			
		Receiving Body:	Tennessee River (Meigs & Rhea County)		

Facility Information

Facility Name:	TENNESSEE VALLEY AUTHORITY (TVA) - WATTS BAR NUCLEAR PLANT (WBN)	County:	Rhea	FRS ID:	110006887173
Facility Location:	PO BOX 2000, LP4J-C, WBN HWY 68 NUCLEAR PLANT RD. SPRING CITY, TN 37381	Region:	4	Federal Facility	N
		State-Region:		Type of Ownership:	Federal Facility (U.S. Government)

Effluent Violations

Violation Code	Monitoring Period End Date	Limit Set	Parameter	Mon. Loc.	Seas. ID	SNC Group	EA Identifier	Value Type/ Stat. Base	Reported Value/Units	% Exceed.	Limit Value/Units	RNC Det. Code/ RNC Det. Date	RNC Res. Code/ RNC Res. Date
E90	06/30/2018	103-G	00400 - pH	1	0			C3	9.6		<=9		
E90	04/30/2018	103-G	00530 - Solids, total suspended	1	0	1		C2 MO AVG	35 mg/l	17%	<=30 mg/l		

APPENDIX 3 – METALS & TOXICS CALCULATIONS

The following procedure is used to calculate the allowable instream concentrations for pass-through guidelines and permit limitations:

- a) The most recent background conditions of the receiving stream segment are compiled. This information includes:
 - 1Q10 of receiving stream (1385.9 MGD, TVA ROS data)
 - Calcium hardness (80.5 mg/L)
 - Total suspended solids (10 mg/L, default)
 - Background metals concentrations (½ water quality criteria)
 - Other dischargers impacting this segment (none)
 - Downstream water supplies, if applicable
- b) The chronic water quality criteria are converted from total recoverable metal at lab conditions to dissolved lab conditions for the following metals: cadmium, copper, trivalent chromium, lead, nickel, and zinc. Then translators are used to convert the dissolved lab conditions to total recoverable metal at ambient conditions.
- c) The acute water quality criteria are converted from total recoverable metal at lab conditions to dissolved lab conditions for the following metals: cadmium, copper, trivalent chromium, lead, nickel, zinc, and silver. Then translators are used to convert the dissolved lab conditions to total recoverable metal at ambient conditions for the following metals: cadmium, copper, lead, nickel, and silver.
- d) The resulting allowable trivalent and hexavalent chromium concentrations are compared with the effluent values characterized as total chromium on permit applications. If reported total chromium exceeds an allowable trivalent or hexavalent chromium value, then the calculated value will be applied in the permit for that form of chromium unless additional effluent characterization is received to demonstrate reasonable potential does not exist to violate the applicable state water quality criteria for chromium.
- e) A standard mass balance equation determines the total allowable concentration (permit limit) for each pollutant. This equation also includes a percent stream allocation of no more than 90%.

The following formulas are used to evaluate water quality protection:

$$C_m = \frac{Q_s C_s + Q_w C_w}{Q_s + Q_w}$$

Where:

C_m = resulting instream concentration after mixing
 C_w = concentration of pollutant in wastewater
 C_s = stream background concentration
 Q_w = wastewater flow (STP Design flow)
 Q_s = stream low flow

To protect water quality:

$$C_w \leq \frac{(S_A)[C_m(Q_s + Q_w) - Q_s C_s]}{Q_w}$$

Where: S_A = the percent "Stream Allocation"

Calculations for this permit have been done using a standardized spreadsheet, titled "Water Quality Based Effluent Calculations". Division policy dictates the following procedures in establishing these permit limits:

- 1) The critical low flow values are determined using USGS data:

Fish and Aquatic Life protection:

7Q10 – Low flow under natural conditions
 1Q10 – Regulated low flow conditions

Other than Fish and Aquatic Life protection:

30Q5 – Low flow under natural conditions

- 2) Fish and Aquatic Life water quality criteria for certain metals are developed through application of hardness dependent equations. These criteria are combined with dissolved fraction methodologies in order to formulate the final effluent concentrations.
- 3) For criteria that are hardness dependent, chronic and acute concentrations are based on a hardness of 25 mg/L and Total Suspended Solids (TSS) of 10 mg/L unless available ambient monitoring information substantiates a different value. Minimum and maximum limits on the hardness value used for water quality calculations are 25

mg/L and 400 mg/L respectively. The minimum limit on the TSS value used for water quality calculations is 10 mg/L.

- 4) Background concentrations are determined from the Division database, results of sampling obtained from the permittee, and/or obtained from nearby stream sampling data. If this background data is not sufficient, one-half of the chronic "In-stream Allowable" water quality criteria for fish and aquatic life is used. If the measured background concentration is greater than the chronic "In-stream Allowable" water quality criteria, then the measured background concentration is used in lieu of the chronic "In-stream Allowable" water quality criteria for the purpose of calculating the appropriate effluent limitation (C_w). Under these circumstances, and in the event the "stream allocation" is less than 100%, the calculated chronic effluent limitation for fish and aquatic life should be equal to the chronic "In-stream Allowable" water quality criteria. These guidelines should be strictly followed where the industrial source water is not the receiving stream. Where the industrial source water is the receiving stream, and the measured background concentration is greater than the chronic "In-stream Allowable" water quality criteria, consideration may be given as to the degree to which the permittee should be required to meet the requirements of the water quality criteria in view of the nature and characteristics of the receiving stream.

The spreadsheet has 15 data columns, all of which may not be applicable to any particular characteristic constituent of the discharge. A description of each column is as follows:

Column 1: The "stream background" concentrations of the effluent characteristics.

Column 2: The "chronic" Fish and Aquatic Life water quality criteria. For cadmium, copper, trivalent chromium, lead, nickel, and zinc, this value represents the criteria for the dissolved form at laboratory conditions. The Criteria Continuous Concentration (CCC) is calculated using the equation:

$$CCC = (\exp\{m_c[\ln(\text{stream hardness})] + b_c\}) * (CCF)$$

CCF = Chronic Conversion Factor

This equation and the appropriate coefficients for each metal are from Tennessee Rule [0400-40-03-.03](#) and the EPA guidance contained in *The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From a Dissolved Criterion* (EPA 823-B-96-007, June 1996). Values for other metals are in the total form and are not hardness dependent; no chronic criterion exists for silver. Published criteria are used for non-metal parameters.

Column 3: The "Acute" Fish and Aquatic Life water quality criteria. For cadmium, copper, trivalent chromium, lead, nickel, silver, and zinc, this value represents the criteria for the dissolved form at laboratory conditions. The Criteria Maximum Concentration (CMC) is calculated using the equation:

$$CMC = (\exp\{m_A[\ln(\text{stream hardness})] + b_A\}) * (ACF)$$

ACF = Acute Conversion Factor

This equation and the appropriate coefficients for each metal are from Tennessee Rule 0400-40-03-.03 and the EPA guidance contained in *The Metals Translator: Guidance for Calculating A Total Recoverable Permit Limit From a Dissolved Criterion* (EPA 823-B-96-007, June 1996). Values for other metals are in the total form and are not hardness dependent. Published criteria are used for non-metal parameters.

Column 4: The "Fraction Dissolved" converts the value for dissolved metal at laboratory conditions (columns 2 & 3) to total recoverable metal at in-stream ambient conditions (columns 5 & 6). This factor is calculated using the linear partition coefficients found in *The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From a Dissolved Criterion* (EPA 823-B-96-007, June 1996) and the equation:

$$\frac{C_{\text{diss}}}{C_{\text{total}}} = \frac{1}{1 + \{[K_{\text{po}}][ss^{(1+a)}][10^{-6}]\}}$$

ss = in-stream suspended solids concentration (mg/L)

Linear partition coefficients for streams are used for unregulated (7Q10) receiving waters, and linear partition coefficients for lakes are used for regulated (1Q10) receiving waters. For those parameters not in the dissolved form in columns 2 & 3 (and all non-metal parameters), a Translator of 1 is used.

Column 5: The "Chronic" Fish and Aquatic Life water quality criteria at in-stream ambient conditions. This criteria is calculated by dividing the value in column 2 by the value in column 4.

Column 6: The "Acute" Fish and Aquatic Life water quality criteria at in-stream ambient conditions. This criteria is calculated by dividing the value in column 3 by the value in column 4.

- Column 7:** The "Chronic" Calculated Effluent Concentration for the protection of fish and aquatic life. *This is the chronic limit.*
- Column 8:** The "Acute" Calculated Effluent Concentration for the protection of fish and aquatic life. *This is the acute limit.*
- Column 9:** The In-Stream Water Quality criteria for the protection of Human Health associated with the stream use classification of Organism Consumption (Recreation).
- Column 10:** The In-Stream Water Quality criteria for the protection of Human Health associated with the stream use classification of Water and Organism Consumption. These criteria are only to be applied when the stream use classification for the receiving stream includes both "Recreation" and "Domestic Water Supply".
- Column 11:** The In-Stream Water Quality criteria for the protection of Human Health associated with the stream use classification of Domestic Water Supply.
- Column 12:** The Calculated Effluent Concentration associated with Organism Consumption.
- Column 13:** The Calculated Effluent Concentration associated with Water and Organism Consumption.
- Column 14:** The Calculated Effluent Concentration associated with Domestic Water Supply.
- Column 15:** The Effluent Limited criteria. This upper level of allowable pollutant loading is established if (a) the calculated water quality value is greater than accepted removal efficiency values, (b) the treatment facility is properly operated, *and* (c) full compliance with the pretreatment program is demonstrated. This upper level limit is based upon EPA's 40 POTW Survey on levels of metals that should be discharged from a POTW with a properly enforced pretreatment program and considering normal coincidental removals.

The most stringent water quality effluent concentration from Columns 7, 8, 12, 13, 14, and 15 is applied if the receiving stream is designated for domestic water supply. Otherwise, the most stringent effluent concentration is chosen from columns 7, 8, 12, and 15 only.

Water Quality Based Effluent Calculations:

WATER QUALITY CALCULATIONS FOR METALS AND OTHER TOXIC SUBSTANCES
WATER QUALITY BASED EFFLUENT CALCULATIONS
OUTFALL OSN101 & OSN113

FACILITY: WATTS BAR NUCLEAR PERMIT #: TN0020168 DATE: 8/13/2021 CALC BY: SDM

regulated stream worksheet (1Q10)

Stream	Stream	Waste	Ttl. Susp.	Hardness	Margin of
(1Q10)	(3Q05)	Flow	Solids	(as CaCO3)	Safety
[MGD]	[MGD]	[MGD]	[mg/l]	[mg/l]	[%]
1385.9	1385.9	259.78	10	80.498	90

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Stream	Fish/Aqua. Life (F & AL) WQC			F & AL- instream allowable		Calc. Effluent Concentration		Human Health Water Quality Criteria *							effluent
Bckgrnd.	lab conditions			ambient conditions (Tot)		based on F & AL		In-Stream Criteria			Calc. Effluent Concentration **			limited	applicant
Conc.	Chronic	Acute	Fraction	Chronic	Acute	Chronic	Acute	Organisms	Water/Organisms	DWS	Organisms	Water/Organisms	DWS	case	reported
[ug/l]	[ug/l]	[ug/l]	[Fraction]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	ug/l	ug/l
PARAMETER															PARAMETER
Copper (a,b)	0.979	7.440	10.955	0.218	34.136	50.260	189.92	281.85	N/A	N/A	N/A	NA	NA	80.0	2.54
Chromium III	0.749	62.050	477.016	0.078	791.509	6084.813	4509.12	34688.41	N/A	N/A	N/A	NA	NA		
Chromium VI	0.749	11.000	16.000	1.000	11.000	16.000	59.12	87.63	N/A	N/A	N/A	NA	NA		
Chromium, Total	0.749	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100.0	NA	NA	60.0	<3.00
Nickel (a,b)	1.480	43.286	389.725	0.206	210.374	1894.083	1192.32	10791.84	4600.0	610.0	100.0	26219.37	3470.75	180.0	<0.600
Cadmium (a,b)	0.218	0.610	1.470	0.193	3.165	7.627	17.00	42.44	N/A	N/A	5.0	NA	NA	5.0	<0.300
Lead (a,b)	1.481	1.986	50.955	0.146	13.606	349.163	70.46	1983.61	N/A	N/A	5.0	NA	NA	45.0	<0.500
Mercury (T) (c)	0.052	0.770	1.400	1.000	0.770	1.400	4.14	7.73	0.051	0.05	2.0	0.04	0.04	0.4	0.02
Silver (a,b,e)	1.107	N/A	2.215	1.000	NA	2.215	N/A	7.31	N/A	N/A	N/A	NA	NA	5.0	<0.3
Zinc (a,b)	389.901	98.303	97.505	0.125	786.181	779.802	2610.26	2573.90	26000.0	7400.0	N/A	146364.56	40318.35	200.0	19.70
Cyanide (d)	2.600	5.200	22.000	1.000	5.200	22.000	17.16	112.95	140.0	140.0	200.0	785.71	785.71	230.0	<1.67
Toluene									15000.0	1300.0	1000.0	85521.13	7411.83	15.0	<0.333
Benzene									510.0	22.0	5.0	2907.72	125.43	3.0	<0.333
1,1,1 Trichloroethane									N/A	N/A	200.0	NA	NA	30.0	<0.333
Ethylbenzene									2100.0	530.0	700.0	11972.96	3021.75	4.0	<0.333
Carbon Tetrachloride									16.0	2.3	5.0	91.22	13.11	15.0	<0.333
Chloroform									4700.0	57.0	N/A	26796.62	324.98	85.0	<0.333
Tetrachloroethylene									33.0	6.9	5.0	188.15	39.34	25.0	<0.333
Trichloroethylene									300.0	25.0	5.0	1710.42	142.54	10.0	<0.333
1,2 trans Dichloroethylene									10000.0	140.0	100.0	NA	798.20	1.5	<0.333
Methylene Chloride									5900.0	46.0	5.0	33638.31	262.26	50.0	<1.67
Total Phenols									860000.0	10000.0	N/A	4903211.64	57014.09	50.0	0.43
Naphthalene									N/A	N/A	N/A	NA	NA	1.0	<0.333
Total Phthalates									N/A	N/A	N/A	NA	NA	64.5	
Chlorine (T. Res.)	0.000	11.000	19.000	1.000	11.000	19.000	69.68	120.36	NA	NA	NA	NA	NA	n/a	<.05

- a Denotes metals for which Fish & Aquatic Life Criteria are expressed as a function of total hardness.
b The criteria for this metal is in the dissolved form at lab conditions. The calculated effluent concentration is in the total recoverable form.
c The chronic criteria for mercury is not converted to dissolved, since it is based on fish tissue data rather than toxicity.
d The criteria for this parameter is in the total form.
e Silver limit is daily max if column 8 is most stringent.
f When columns 7 or 8 result in a negative number, use results from columns 5 or 6, respectively.
g When columns 12, 13 or 14 result in a negative number, use results from columns 9, 10 or 11, respectively, as applicable.

* Domestic supply included in river use so pick from columns 7,8,12,13,14,15 or Domestic supply not included in river use so pick from columns 7, 8, 12 or 15.
** Water quality criteria for stream use classifications other than Fish & Aquatic Life are based on the 3Q05 flow.

Note: A copy of this spreadsheet can be found on h:\mfs\pretreat\Pass-through Limits\Spreadsheets\name of Control Authority.xls

APPENDIX 4 – APPLICABLE EFFLUENT LIMITATIONS GUIDELINES

Guideline Waste Sources and Flows for Two Unit Operations by Outfall

Outfall No	Contributing BPT/BAT Waste Source	Waste Source Flow	
		Flow MGD	% Outfall Total
OSN101	Yard Holding Pond (Metal Cleaning Waste)	1.500	2.6%
	Cooling Tower Blowdown	45.773	79.1%
	Misc. Cooling Waters (Low Volume Wastes)	10.620	18.3%
	Total Outfall Flow	57.893	
OSN102	Yard holding Pond Overflow Weir (Emergency Outfall) - provides an alternate discharge path for the diffuser discharge point (OSN101)	0.000	
IMP103	Low Volume Wastes	0.491	100.0%
IMP107	Turbine Building Station Sump alternate path, precipitation (less evaporation), stormwater runoff, drum rinsing, drum dewatering, diesel cleaning coolant	0.000	
OSN113	U1 CT Basin blowdown (noncontact cooling water) and supplemental condenser cooling water bypass	201.89	100.0%
OSN114	SCCW Intake screen backwash water	0.019	100.0%

Effluent Guidelines by Outfall

SIC GROUP 4911, 40 CFR PART 423
STEAM ELECTRIC POWER GENERATING
APPLICABLE EFFLUENT GUIDELINES AND
TENNESSEE DOMESTIC WASTE WATER GUIDELINES

Outfall 101 and 102

EFFLUENT CHARACTERISTIC	BPT		BAT	
	MONTHLY	DAILY	MONTHLY	DAILY
	AVG. CONC. (mg/L)	MAX CONC. (mg/L)	AVG. CONC. (mg/L)	MAX CONC. (mg/L)
Total Suspended Solids	30	100	--	--
Oil and Grease	15	20	--	--
pH	6.0-9.0		--	--
Chromium, Total			0.2	0.2
Zinc, Total			1.0	1.0
Priority Pollutants (126) contained in chemicals added for cooling tower maintenance, except Chromium and Zinc			No Detectable Amount	
Polychlorinated Biphenyl Compounds	No Discharge Allowed		No Discharge Allowed	
Total Residual Chlorine			0.2	
Chlorine, Free Available	0.2	0.5	0.2	0.5

For any plant with a total rated electric generating capacity of 25 or more megawatts, the quantity of pollutants discharged in once through cooling water from each discharge point shall not exceed the quantity determined by multiplying the flow of once through cooling water from each discharge point times the concentration listed in the above table.

There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.

Total Residual Chlorine may not be discharged from any single generating unit for more than two hours per day unless the discharger demonstrates to the permitting authority that discharge for more than two hours is required for macroinvertebrate control. Simultaneous multi-unit chlorination is permitted.

Outfall 103

EFFLUENT CHARACTERISTIC	BPT		BAT	
	SUBPART 423.12		SUBPART 423.13	
	MONTHLY	DAILY	MONTHLY	DAILY
	AVG. CONC. (mg/L)	MAX CONC. (mg/L)	AVG. CONC. (mg/L)	MAX CONC. (mg/L)
Total Suspended Solids	30	100	--	--
Oil and Grease	15	20	--	--
pH	6.0-9.0		--	--
Polychlorinated Biphenyl Compounds	No Discharge Allowed		No Discharge Allowed	

There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.

Outfall 107

EFFLUENT CHARACTERISTIC	BPT		BAT	
	SUBPART 423.12		SUBPART 423.13	
	MONTHLY	DAILY	MONTHLY	DAILY
	AVG. CONC. (mg/L)	MAX CONC. (mg/L)	AVG. CONC. (mg/L)	MAX CONC. (mg/L)
Total Suspended Solids	30	100	--	--
Oil and Grease	15	20	--	--
pH	6.0-9.0		--	--
Copper, Total	1.0	1.0	1.0	1.0
Iron, Total	1.0	1.0	1.0	1.0
Polychlorinated Biphenyl Compounds	No Discharge Allowed		No Discharge Allowed	

There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.

Outfall 113

EFFLUENT CHARACTERISTIC	BPT		BAT	
	MONTHLY	DAILY	MONTHLY	DAILY
	AVG. CONC. (mg/L)	MAX CONC. (mg/L)	AVG. CONC. (mg/L)	MAX CONC. (mg/L)
	AVG. CONC. (mg/L)	MAX CONC. (mg/L)	AVG. CONC. (mg/L)	MAX CONC. (mg/L)
pH	6.0-9.0		--	--
Chromium, Total	--	--	0.2	0.2
Zinc, Total	--	--	1.0	1.0
Priority Pollutants (126), except Chromium and Zinc	--	--	No Detectable Amount	
Polychlorinated Biphenyl Compounds	No Discharge Allowed		No Discharge Allowed	
Chlorine, Free Available	0.2	0.5	0.2	0.5
Chlorine, Total Residual	--	--	--	0.2

There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.

Total Residual Chlorine may not be discharged from any single generating unit for more than two hours per day unless the discharger demonstrates to the permitting authority that discharge for more than two hours is required for macroinvertebrate control. Simultaneous multi-unit chlorination is permitted.

APPENDIX 5 – FACILITY DISCHARGES AND LOW FLOW DETERMINATION

FACILITY DISCHARGES AND RECEIVING WATERS																													
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FACILITY DISCHARGES AND RECEIVING WATERS																													
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FLOW (MGD)	DISCHARGE SOURCE																												
0.000	Yard holding Pond Overflow Weir (Emergency Outfall) - provides an alternate discharge path for the diffuser discharge point (OSN 101)																												
0.000	TOTAL DISCHARGE																												
Treatment: Biocide, sedimentation, neutralization, and oil skimming, mixing by submerged multiport diffuser. * Reference: TVA Watts Bar Hydroelectric Dam daily average flow data 1976-2021 spreadsheet. Calculations by TDEC.																													

FACILITY DISCHARGES AND RECEIVING WATERS

IMP103	
LONGITUDE	LATITUDE
-84.79166	35.604167

FLOW (MGD)	DISCHARGE SOURCE
	Low Volume Waste Holding Pond
0.0053	Precipitation, Less evaporation
0.0250	Alum sludge supernate
0.2600	Vendor water treatment RO reject
0.2007	Turbine building station sump
0.491	TOTAL DISCHARGE

RECEIVING STREAM DISCHARGE ROUTE			
Internal monitoring point that discharges through the yard holding pond (Tennessee River @~TRM 527.9 via OSN 101)			
STREAM LOW FLOW (CFS) *	7Q10	1Q10	30Q5
	0.0	0.0	0.0
(MGD)	0.0	0.0	0.0

STREAM USE CLASSIFICATIONS (WATER QUALITY)				
AQUATIC LIFE	RECREATION	IRRIGATION	LIVESTOCK & WILDLIFE	DOMESTIC SUPPLY
X	X	X	X	X
INDUSTRIAL	NAVIGATION			
X				

Treatment: Oil skimming, sludge thickening, and neutralization.

* No low stream flow assigned to the internal monitoring point which discharges to the yard holding pond.

FACILITY DISCHARGES AND RECEIVING WATERS

IMP107	
LONGITUDE	LATITUDE
-84.7932	35.5988

FLOW (MGD)	DISCHARGE SOURCE
	Low Volume Waste Holding (lined/unlined) Ponds
0.0020	Precipitation, Less evaporation
0.0001	Stormwater runoff
0.0001	Drum rinsing
0.0001	Drum dewatering
0.0306	Turbine building station sump
0.033	TOTAL DISCHARGE

RECEIVING STREAM DISCHARGE ROUTE			
Internal monitoring point that discharges through the lined/unlined ponds (Tennessee River @~TRM 527.9 via OSN 101)			
STREAM LOW FLOW (CFS) *	7Q10	1Q10	30Q5
	0.0	0.0	0.0
(MGD)	0.0	0.0	0.0

STREAM USE CLASSIFICATIONS (WATER QUALITY)				
AQUATIC LIFE	RECREATION	IRRIGATION	LIVESTOCK & WILDLIFE	DOMESTIC SUPPLY
X	X	X	X	X
INDUSTRIAL	NAVIGATION			
X				

Treatment: Oil skimming, sludge thickening, and neutralization.

* No low stream flow assigned to the internal monitoring point which discharges to the lined/unlined ponds.

FACILITY DISCHARGES AND RECEIVING WATERS

OSN113	
LONGITUDE	LATITUDE
-84.78583	35.593333

FLOW (MGD)	DISCHARGE SOURCE
201.890	U1 CT Basin blowdown (noncontact cooling water) and Supplemental Condenser Cooling Water bypass
201.890	TOTAL DISCHARGE

RECEIVING STREAM DISCHARGE ROUTE			
Discharge via diffuser to Chickamauga Reservoir (Tennessee River @ ~TRM 529.2)			
STREAM LOW FLOW (CFS) *	7Q10	1Q10	30Q5
	NA	2144.4	NA
(MGD)		1385.9	

STREAM USE CLASSIFICATIONS (WATER QUALITY)				
AQUATIC LIFE	RECREATION	IRRIGATION	LIVESTOCK & WILDLIFE	DOMESTIC SUPPLY
X	X	X	X	X
INDUSTRIAL	NAVIGATION			
X				

Treatment: Thermal mixing.

* Reference: TVA Watts Bar Hydroelectric Dam daily average flow data 1976-2021 spreadsheet. Calculations by TDEC.

FACILITY DISCHARGES AND RECEIVING WATERS

IMP114	
LONGITUDE	LATITUDE
-84.78333	35.620833

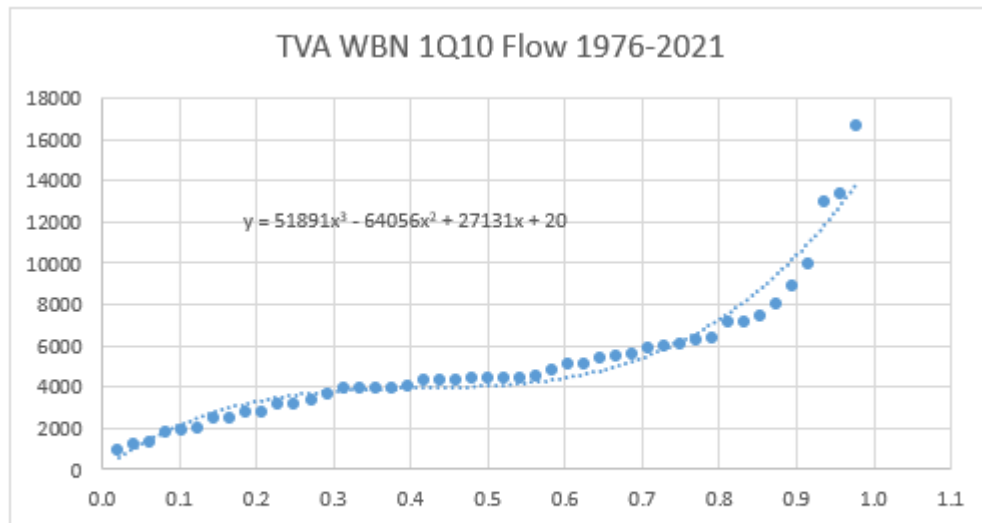
FLOW (MGD)	DISCHARGE SOURCE
0.019	SCCW Intake screen backwash water
0.019	TOTAL DISCHARGE

RECEIVING STREAM DISCHARGE ROUTE			
Tennessee River @ ~TRM 529.8			
STREAM LOW FLOW (CFS) *	7Q10	1Q10	30Q5
	NA	2144.4	NA
(MGD)		1385.9	

STREAM USE CLASSIFICATIONS (WATER QUALITY)				
AQUATIC LIFE	RECREATION	IRRIGATION	LIVESTOCK & WILDLIFE	DOMESTIC SUPPLY
X	X	X	X	X
INDUSTRIAL	NAVIGATION			
X				

Treatment: NA

* Reference: TVA Watts Bar Hydroelectric Dam daily average flow data 1976-2021 spreadsheet. Calculations by TDEC.

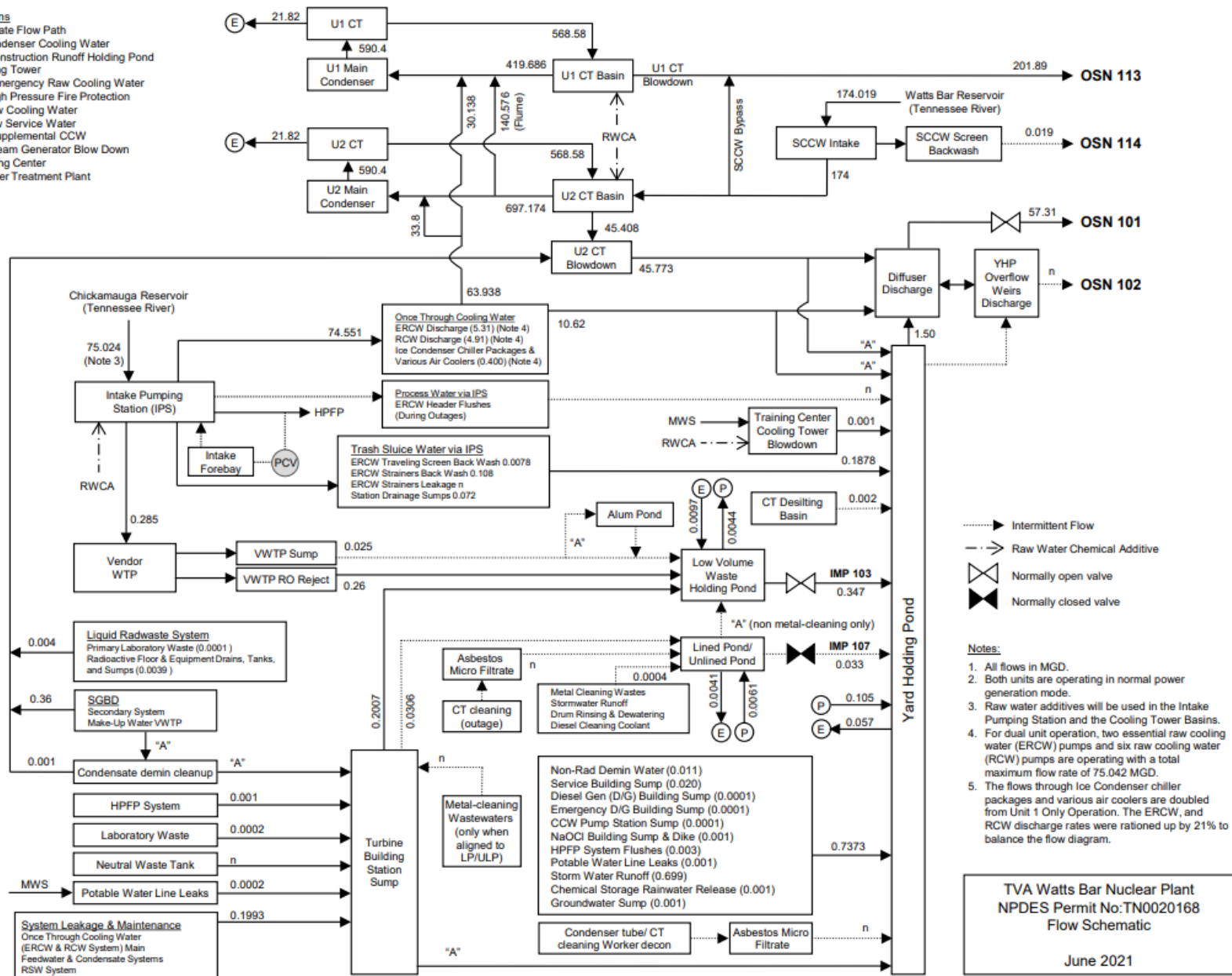


POLYLINEAR: 2144.43 cfs

Where x=0.1

Abbreviations

"A" – Alternate Flow Path
CCW – Condenser Cooling Water
CRHP – Construction Runoff Holding Pond
CT – Cooling Tower
ERCW – Emergency Raw Cooling Water
HPFP – High Pressure Fire Protection
RCW – Raw Cooling Water
RSW – Raw Service Water
SCCW – Supplemental CCW
SGBD – Steam Generator Blow Down
TC – Training Center
WTP – Water Treatment Plant



APPENDIX 6 – NEW PERMIT LIMITS

Description: External Outfall, Number: OSN101 & OSN102, Monitoring: Effluent Gross, Season: All Year							
<u>Code</u>	<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Monitoring Frequency</u>	<u>Statistical Base</u>
00010	Temperature, water deg. C	<=	35.0	deg C	Recorder	Continuous	Daily Maximum
00400	pH	>=	6.0	SU	Grab	Monthly	Minimum
00400	pH	<=	9.0	SU	Grab	Monthly	Maximum
00530	Total Suspended Solids (TSS)*	<=	100	mg/L	Grab	Monthly	Daily Maximum
00530	Total Suspended Solids (TSS)*	<=	30	mg/L	Grab	Monthly	Monthly Average
00556	Oil & Grease*	<=	20	mg/L	Grab	Monthly	Daily Maximum
00556	Oil & Grease*	<=	15	mg/L	Grab	Monthly	Monthly Average
01034	Chromium, total (as Cr)	<=	0.2	mg/L	Grab	See Permit	Daily Maximum
01092	Zinc, total (as Zn)	<=	1.0	mg/L	Grab	Monthly	Daily Maximum
39516	Polychlorinated biphenyls (PCBs)	<=	0	ppm	Grab	Once Every Permit Cycle	Daily Maximum
50050	Flow	Report	-	MGD	Instantaneous	Weekly	Daily Maximum
50050	Flow	Report	-	MGD	Instantaneous	Weekly	Monthly Average
50060	Chlorine, total residual (TRC)	<=	.2	mg/L	Grab	Weekly	Daily Maximum
84165	Certification of instream flow 3,500cfs or greater when required	Report	-	Y=1; N=0	Recorder	Monthly	Total
TRP3B	IC25 Static Renewal 7 Day Chronic Ceriodaphnia	>	4.0	%	Composite	Semiannual	Minimum
TRP6C	IC25 Static Renewal 7 Day Chronic Pimephales promelas	>	4.0	%	Composite	Semiannual	Minimum

Description: External Outfall, Number: IMP103, Monitoring: Effluent Gross, Season: All Year							
<u>Code</u>	<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Monitoring Frequency</u>	<u>Statistical Base</u>
00400	pH	>=	6.0	SU	Grab	Monthly	Minimum
00400	pH	<=	9.0	SU	Grab	Monthly	Maximum
00530	Total Suspended Solids (TSS)	<=	100	mg/L	Grab	Monthly	Daily Maximum
00530	Total Suspended Solids (TSS)	<=	30	mg/L	Grab	Monthly	Monthly Average
00556	Oil & Grease	<=	20	mg/L	Grab	Monthly	Daily Maximum
00556	Oil & Grease	<=	15	mg/L	Grab	Monthly	Monthly Average
50050	Flow	Report	-	MGD	Instantaneous	Monthly	Daily Maximum
50050	Flow	Report	-	MGD	Instantaneous	Monthly	Monthly Average

Description: External Outfall, Number: IMP107, Monitoring: Effluent Gross, Season: All Year							
<u>Code</u>	<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Monitoring Frequency</u>	<u>Statistical Base</u>
00400	pH	Report	-	SU	Grab	Once Per Batch	Maximum
00400	pH	Report	-	SU	Grab	Once Per Batch	Minimum
00530	Total Suspended Solids (TSS)	<=	100	mg/L	Grab	Once Per Batch	Daily Maximum
00530	Total Suspended Solids (TSS)	<=	30	mg/L	Grab	Once Per Batch	Monthly Average
00556	Oil & Grease	<=	20	mg/L	Grab	Once Per Batch	Daily Maximum
00556	Oil & Grease	<=	15	mg/L	Grab	Once Per Batch	Monthly Average
00665	Phosphorus, total (as P)	<=	1.0	mg/L	Grab	Once Per Batch	Daily Maximum
00665	Phosphorus, total (as P)	<=	1.0	mg/L	Grab	Once Per Batch	Monthly Average
01042	Copper, total (as Cu)	<=	1.0	mg/L	Grab	Once Per Batch	Daily Maximum
01042	Copper, total (as Cu)	<=	1.0	mg/L	Grab	Once Per Batch	Monthly Average
01045	Iron, total (as Fe)	<=	1.0	mg/L	Grab	Once Per Batch	Daily Maximum
01045	Iron, total (as Fe)	<=	1.0	mg/L	Grab	Once Per Batch	Monthly Average
50050	Flow	Report	-	MGD	Calculated	Once Per Batch	Daily Maximum
50050	Flow	Report	-	MGD	Calculated	Once Per Batch	Monthly Avera

Description: External Outfall, Number: OSN113, Monitoring: Effluent Gross, Season: All Year							
<u>Code</u>	<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Monitoring Frequency</u>	<u>Statistical Base</u>
00010	Temperature, water deg. C	Report	-	deg C	Recorder	Hourly	Daily Maximum
00400	pH	>=	6.0	SU	Grab	Monthly	Minimum
00400	pH	<=	9.0	SU	Grab	Monthly	Maximum
00530	Total Suspended Solids (TSS)	<=	100	mg/L	Grab	Monthly	Daily Maximum
00530	Total Suspended Solids (TSS)	<=	30	mg/L	Grab	Monthly	Monthly Average
00556	Oil & Grease	<=	20	mg/L	Grab	Monthly	Daily Maximum
00556	Oil & Grease	<=	15	mg/L	Grab	Monthly	Monthly Average
01034	Chromium, total (as Cr)	<=	0.2	mg/L	Grab	See Permit	Daily Maximum
01092	Zinc, total (as Zn)	<=	1.0	mg/L	Grab	See Permit	Daily Maximum
39516	Polychlorinated biphenyls (PCBs)	<=	0	ppm	Grab	Once Every Permit Cycle	Daily Maximum
50050	Flow	Report	-	MGD	Recorder	Continuous	Daily Maximum
50050	Flow	Report	-	MGD	Recorder	Continuous	Monthly Average
50060	Chlorine, total residual (TRC)	Report	-	mg/L	Grab	Weekly	Daily Maximum
50060	Chlorine, total residual (TRC)	Report	-	mg/L	Grab	Weekly	Monthly Average
84165	Certification of instream flow 3,500cfs or greater when required	Report	-	Y=1; N=0	Recorder	Monthly	Total
TRP3B	IC25 Static Renewal 7 Day Chronic Ceriodaphnia	>	12.7	%	Composite	Semiannual	Minimum
TRP6C	IC25 Static Renewal 7 Day Chronic Pimephales promelas	>	12.7	%	Composite	Semiannual	Minimum
Description: External Outfall, Number: OSN113, Monitoring: Instream Monitoring, Season: All Year							
<u>Code</u>	<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Monitoring Frequency</u>	<u>Statistical Base</u>
00010	Temperature, water deg. C	<=	30.5	deg C	Recorder	Hourly	Daily Maximum
00016	Temp. diff., effluent & upstream deg. C	<=	3.0	deg C	Calculated	Hourly	Daily Maximum

82234	Temperature rate of change deg. C/hr	<=	2.0	deg C/hr	Calculated	Hourly	Daily Maximum
Description: External Outfall, Number: OSN113, Monitoring: See Comments - Tier II, Season: All Year							
Code	Parameter	Qualifier	Value	Unit	Sample Type	Monitoring Frequency	Statistical Base
00010	Temperature, water deg. C	<=	33.5	deg C	Recorder	Hourly	Daily Maximum

Description: External Outfall, Number: V001, Monitoring: Effluent Gross, Season: All Year							
<u>Code</u>	<u>Parameter</u>	<u>Qualifier</u>	<u>Value</u>	<u>Unit</u>	<u>Sample Type</u>	<u>Monitoring Frequency</u>	<u>Statistical Base</u>
50050	Flow	Report	-	MGD	Calculated	Weekly	Daily Maximum
50050	Flow	Report	-	MGD	Calculated	Weekly	Monthly Average
50060	Chlorine, total residual (TRC)	<=	.12	mg/L	Calculated	Weekly	Daily Maximum
50060	Chlorine, total residual (TRC)	<=	.07	mg/L	Calculated	Weekly	Monthly Average



**CONDITIONAL MAJOR SOURCE
OPERATING PERMIT RENEWAL APPLICATION
WATTS BAR NUCLEAR PLANT
SPRING CITY, TENNESSEE**



JUNE 2022

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**CONDITIONAL MAJOR SOURCE
OPERATING PERMIT RENEWAL APPLICATION
WATTS BAR NUCLEAR PLANT (WBN)**

Introduction

The Tennessee Valley Authority (TVA) herewith submits an application for renewal of its Conditional Major Source Operating Permit for Watts Bar Nuclear Plant. WBN is a steam electric generating facility located just south of Watts Bar Reservoir on the Tennessee River near Spring City in east Tennessee.

Changes Since Last Operating Permit 463822, Amendment Date June 20, 2020

DG-9 NODE Building permit info in last operating permit 463822, amendment date July 20, 2020, needs to be updated to the March 2018 Construction Permit. From 150 hp Kohler engine to 176 hp Cummins engine Tier 3.

DG-13 is rated 0.47 MMBtu/hr instead of 0.74 MMBtu/hr as listed in permit 463822.

Info for DG-18 (Chiller Generator) from September 2021 Construction Permit is included in Renewal Application. DG-18 is still under construction.

TVA WBN would like to request that a permit condition be added concerning the two Auxiliary Boilers since they are currently not operable. TVA WBN would like to be permitted to bring in either one or two temporary diesel auxiliary boilers, as needed, as long as their total heat input (either one or two boilers) is less than 105.6 MMBtu/hr, operate as limited-use boilers (less than 876 hr/yr), and have a model year later than the two current Auxiliary Boilers constructed April 1977.

Emissions Summary

Table 1 shows the annual estimated emissions based on the average annual hours of operation for the auxiliary boilers and diesel generators from CY16 to CY20 (Table 2). Sandblasting emissions are estimated based on a calculated hourly rate and 2,080 hr/yr of operation. VOC emissions from surface coating are based on the average emissions from CY16 to CY20 from the monthly and yearly logs kept at WBN. NOx emissions are the highest pollutant and averaged 16 tons per year. WBN will continue to keep all criteria pollutants below 99.9 tons per year.

Table 1. Watts Bar Nuclear Plant Annual Estimated Emissions*

	PM ton/yr	SO ₂ ton/yr	NO _x ton/yr	CO ton/yr	VOC ton/yr
Two Diesel Auxiliary Boilers	1.93E-03	6.84E-02	1.93E-02	4.82E-03	1.93E-04
Sandblasting Operation**	1.71				
Surface Coating Operation***					4.26E-01
Diesel Generators DG-1 through DG-5	2.93E-01	2.12	13.5	3.57	3.44E-01
Diesel Generator DG-6	3.16E-03	2.96E-03	4.50E-02	9.69E-03	3.67E-03
Diesel Fire Pump FP-1	7.32E-03	6.84E-03	1.04E-01	2.24E-02	8.50E-03
Diesel Generator DG-13	1.96E-03	1.84E-03	2.79E-02	6.01E-03	2.28E-03
Propane Generator PG-1	7.76E-04	5.43E-05	2.16E-02	2.00E-02	1.29E-02
Propane Generator PG-2	5.12E-04	3.58E-05	1.42E-02	1.32E-02	8.50E-03
Diesel Generator DG-14	3.09E-03	9.26E-05	9.28E-02	5.36E-02	6.19E-03
Diesel Generator DG-15	2.32E-03	6.94E-05	6.96E-02	4.02E-02	4.64E-03
Diesel Generator DG-16	1.56E-04	4.20E-06	2.92E-03	2.71E-03	2.08E-04
Diesel Generator DG-17	1.04E-04	2.80E-06	1.94E-03	1.81E-03	1.39E-04
Diesel Generator DG-8	5.32E-04	1.64E-05	9.94E-03	9.23E-03	7.10E-04
Diesel Generator DG-9	4.95E-04	1.57E-05	9.23E-03	8.57E-03	6.60E-04
Diesel Generator DG-18****	1.29E-01	1.49E-03	2.23	2.75	3.24E-01
Insignificant Activities					
Two No. 2 Fuel Oil Storage Tanks					4.04E-02
Two Natural Draft Cooling Towers	4.01				
Units 1 and 2 Oil Vapor Extractors					2.23
Sodium Hypochlorite Storage Tank	0.0825				
Carpenter Shop	3.57				
Total Estimated Annual Emissions	9.82	2.21	16.1	6.52	3.41

* Annual estimates for auxiliary boilers and generators based on average annual hours of operation CY16 to CY20.

** Sandblasting emissions based on calculated value of 1.64 lb/hr and 2,080 hr/yr operation.

*** Surface coating emissions based on average VOC emissions CY16 to CY20.

**** Based on potential emissions for DG-18 because generator is under construction.

Insignificant Activities Emissions based on calculations in Insignificant Activities Section.

Table 2. Average Annual Hours of Operation CY16 to CY20

		2016	2017	2018	2019	2020	Average, hr/yr
AB-1	aux boiler 1	24.3	0	0	0	0	5
AB-2	aux boiler 2	0	0	0	0	0	0
DG-1 thru DG-5	large generators	209.1	212.8	231	140.2	150.1	189
DG-6	security	7	5	5	4	4	5
FP-1	fire pump	30	28.3	16.6	12.3	14.8	20
DG-13	radio tower	32.3	41.1	10.7	19.3	31.6	27
PG-1	propane (sewage)	18.2	46.4	14.1	17.3	17	23
PG-2	propane (met tower)	29.5	27.2	81.5	26.6	26.4	38
DG-14	large flex generator	2.9	7.1	0.8	6.6	0.6	4
DG-15	large flex generator	4.8	1.6	5.8	3.35	0.9	3
DG-16	small flex generator	0.8	7.7	4.6	0	0.2	3
DG-17	small flex generator	0.6	4.9	5.1	0.35	0.4	2
DG-8	TSOB building	7.8	48.7	5	0.48	6.1	14
DG-9	NODE building	1.8	37.1	13	14.1	19.4	17
DG-18	chiller	being installed 2022					



DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor, Nashville, TN 37243
Telephone: (615) 532-0554, Email: Air.Pollution.Control@TN.gov

APC 100

**NON-TITLE V PERMIT APPLICATION
FACILITY IDENTIFICATION**

Type or print and submit. Attach appropriate source description forms.				
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)				
2. Site name (if different from legal name)				
3. Is a construction permit application fee being submitted? Yes No ☒ X (see instructions for appropriate fee to submit)				
4. Site address (St./Rd./Hwy.) 1270 Highway 68			County name Rhea	
City Spring City		Zip code 37381-2000		5. NAICS or SIC code 221113
6. Site location (in lat. /long.)	Latitude 35.604335		Longitude -84.789943	
7. Responsible person/Authorized contact Anthony L. Williams IV				
Mailing address (St./Rd./Hwy.) P. O. Box 2000, 1270 Highway 68			Phone number with area code 423-365-8767	
City Spring City	State TN	Zip code 37381-2000	Fax number with area code	
			Email address alwilliams12@tva.gov	
8. Principal technical contact Jennifer L. Grubb				
Mailing address (St./Rd./Hwy.) P. O. Box 2000, 1270 Highway 68			Phone number with area code 423-365-3191	
City Spring City	State TN	Zip code 37381-2000	Fax number with area code	
			Email address jlgrubb@tva.gov	
9. Billing contact Michael G. Tritapoe				
Mailing address (St./Rd./Hwy.) 1101 Market Street, BR 2C-C			Phone number with area code 423-751-2811	
City Chattanooga	State TN	Zip code 37402	Fax number with area code	
			Email address mtritapoe@tva.gov	

AIR CONTAMINANT SOURCE(S) INFORMATION

10. Description of air contaminant source(s) and Unique Source ID(s). List, identify, and briefly describe process emission sources, fuel burning installations, and incinerators that are contained in this application and include a Unique Source ID for each source. The Unique Source ID is a name/number/letter, which uniquely identifies the air contaminant source(s), like Boiler #1, Paint Line #1, Engine #1, etc. (see instructions for more details)

Auxiliary Boilers A and B	AB-1
Sandblasting Operation	SS-1
Surface Coating Operation	SS-2
Large Diesel Emergency Generators (5)	DG-1 through DG-5
Small Diesel Security Generator	DG-6
Small Diesel Emergency Fire Pump	FP-1
Small Diesel Radio Tower Emergency Generator	DG-13
Sewage Treatment Propane-Fired Emergency Generator	PG-1
Met Tower Propane-Fired Emergency Generator	PG-2
Large Diesel Flex Emergency Generators (2)	DG-14 and DG-15
Small Diesel Flex Emergency Generators (2)	DG-16 and DG-17
Small Diesel TSOB Building Emergency Generator	DG-8
Small Diesel NODE Building Emergency Generator	DG-9
Small Diesel Chiller Emergency Generator	DG-18

Insignificant Sources

No. 2 Fuel Oil Storage Tanks (2 at 71,000 gallons each)	T-1 and T-2
Natural-Draft Hyperbolic Cooling Towers (2)	CT-1 and CT-2
Unit 1 and Unit 2 Lubricating Oil System Vapor Extractors (2)	SS-5 and SS-6
Sodium Hypochlorite Storage Tank (6,000 gallons)	T-3
Carpenter Shop	CS-1

11. Is the air contaminant source(s) in a nonattainment area? If "Yes", then minor source BACT must be addressed. Yes No ☒

12. Normal operation:	Hours/Day 24	Days/Week 7	Weeks/Year 52	Days/Year 365
13. Percent annual throughput	Dec. – Feb. 25%	March – May 25%	June – August 25%	Sept. – Nov. 25%

14. Operating permit	Date construction started	Date completed	Date of ownership change (if applicable)
X	Last permit number(s) 463822	Emission Source Reference Number(s) 72-0029	
Construction permit	Last permit number(s)	Emission Source Reference Number(s)	

If you chose Construction permit above, then choose either New Construction, Modification, or Location Transfer

New Construction	Starting date	Completion date
Modification	Date modification started or will start	Date completed or will complete
Location Transfer	Transfer date	Address of last location

15. Describe changes that have been made to this equipment or operation(s) since the last construction or operating permit application:

1. DG-9 NODE Building permit info in last operating permit 463822, amendment date July 20, 2020, needs to be updated to the March 2018 Construction Permit. From 150 hp Kohler engine to 176 hp Cummins engine Tier 3.
2. DG-13 is rated 0.47 MMBtu/hr instead of 0.74 MMBtu/hr as listed in permit 463822.
3. Info for DG-18 (Chiller Generator) from September 2021 Construction Permit is included in Renewal Application. DG-18 is still under construction.

16. Comments

TVA WBN would like to request that a permit condition be added concerning the two Auxiliary Boilers since they are currently not operable. TVA WBN would like to be permitted to bring in either one or two temporary diesel auxiliary boilers, as needed, as long as their total heat input (either one or two boilers) is less than 105.6 MMBtu/hr, operate as limited-use boilers (less than 876 hr/yr), and have a model year later than the two current Auxiliary Boilers constructed April 1977.

SIGNATURE

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

17. Signature (application must be signed before it will be processed)

Date

June 17, 2022

Signer's name (type or print)

Anthony L. Williams IV

Title

Site VP, Watts Bar Nuclear

Phone number with area code

423-365-8767



**NON-TITLE V PERMIT APPLICATION
EMISSION POINT DESCRIPTION**

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.					
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)					
2. Unique Source ID (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1) Auxiliary Boilers AB-1					
3. Unique Emission Point ID (name/number/letter which uniquely identifies this emission point, like Stack #1) AB-1					
4. Brief description of air contaminant source (Attach a diagram if appropriate): Two No. 2 fuel oil-fired auxiliary boilers (Boilers A & B) share stack AB-1. Each boiler has a rated heat input capacity of 52.8 MMBtu/hr. The auxiliary boilers provide steam for startup of the WBN nuclear generating units, other process steam needs, and building space heat as needed. The auxiliary boilers meet the definition of limited-use boilers.					
5. Emission point location	Latitude 35.6028	Longitude 84.7900	6. Distance to nearest property line (Ft.) 2,720		
7. Stack or emission point data: →	Height above grade (Ft.) 107	Diameter (Ft.) 6	Temperature (°F) 570	% of time over 125°F 100	Direction of exit (Up, down or horizontal) Up
Data at exit conditions: →	Flow (actual Ft. ³ /Min.) 4.24 x 10 ⁴	Velocity (Ft. /Sec.) 25.0	Moisture (Grains/Ft. ³) 20.7		Moisture (Percent) 12.2
Data at standard conditions: →	Flow (Dry std. Ft. ³ /Min.) 1.93 x 10 ⁴	Velocity (Ft. /Sec.) 11.4	Moisture (Grains/Ft. ³) 45.4		Moisture (Percent) 12.2
8. Monitoring device and recording instrument (check all that apply): Opacity monitor SO ₂ monitor NO _x monitor Strip chart Electronic data logger Other (specify in comments) No monitor (none) X					
9. Control device. Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.). N/A					

10. Air contaminants. Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

Air contaminants	Average Emissions (Lbs./Hr.)	Maximum Emissions (Lbs./Hr.)	Concentration	Average Emissions (Ton/Yr.)	Potential Emissions (Ton/Yr.)	Emissions Estimation Method Code *	Control Devices *	Control Efficiency %
Particulate matter (PM)	1.54	1.54	**	1.93E-03	0.675	3	000	0
Sulfur dioxide (SO ₂)	54.7	54.7	***	6.84E-02	24.0	3	000	0
Carbon monoxide (CO)	3.85	3.85	PPM	4.82E-03	1.69	3	000	0
Volatile organic compounds (VOC)	0.154	0.154	PPM	1.93E-04	6.75E-02	3	000	0
Nitrogen oxides (NO _x)	15.4	15.4	PPM	1.93E-02	6.75	3	000	0
Hydrogen fluoride (HF)								
Hydrogen chloride (HCl)								
Lead (Pb)								
Greenhouse gases (CO ₂ equivalents)	17,278	17,278		21.6	7,568	5	000	0
Hazardous air pollutant (specify) Gas HAP Total	5.15E-02	5.15E-02		6.43E-05	2.25E-02	3	000	0
Hazardous air pollutant (specify) PM HAP Total	3.27E-03	3.27E-03		4.09E-06	1.43E-03	3	000	0
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Other (specify)								
Other (specify)								
Other (specify)								
Other (specify)								

11. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Hourly emission estimates are based on rated heat input capacities for auxiliary boilers A and B combined. Average annual usage based on 5 year average of 5 hours per year for Boiler A and 0 hours per year for Boiler B for years 2016 to 2020. This is not a permit restriction. Potential annual emissions based on combined operation of 876 hr/yr for each boiler. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

12. Signature**Date**

June 17, 2022

Signer's name (type or print)**Title****Phone number with area code**

* Refer to the tables in the instructions for estimation method and control device codes.

** Exit gas particulate matter concentration units: Process – Grains/Dry Standard Ft³ (70°F), Wood fired boilers - Grains/Dry Standard Ft³ (70°F), all other boilers – Lbs. /Million BTU heat input.

*** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input



DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor, Nashville, TN 37243
Telephone: (615) 532-0554, Email: Air.Pollution.Control@TN.gov

APC 102

NON-TITLE V PERMIT APPLICATION
PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.			
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)		2. Emission Source Reference Number 72-0029-08	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes ☒ No ☐ If Yes, list rule citation, including Part, Subpart, and applicable Sections: NESHAP: 40 CFR Part 63 Subpart JJJJJJ			
4. Unique Source ID (see instructions) Auxiliary Boilers AB-1		5. Unique Emission Point ID (see instructions) AB-1	
6. Description of air contaminant source Two No. 2 fuel oil-fired auxiliary boilers (Boilers A & B) share stack AB-1. Each boiler has a rated heat input capacity of 52.8 MMBtu/hr. The auxiliary boilers provide steam for startup of the WBN nuclear generating units, other process steam needs, and building space heat as needed. The auxiliary boilers meet the definition of limited-use boilers.			
7. Type of air contaminant source (Check only one option to the right)			
Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14)			
Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14)			
Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14)			X
8. Type of operation: Continuous ☐ Batch ☐		Normal batch time	Normal batches/day
9. Process material inputs and In-process solid fuels	Diagram reference	Input rates (pounds/hour)	
		Design	Actual
A.			
B.			
C.			
D.			
E.			
F.			
G.			
Totals			

* A simple process flow diagram must be attached.

DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE							
10. Boiler or burner data: (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)							
Serial Number				Type of firing*** Horizontal-fired Oil Burner			
Rated horsepower		Rated input capacity (10 ⁶ BTU/Hr.) 52.8 per boiler		Other rating (specify capacity and units)			
Date constructed 4-15-1977		Date manufactured		Date of last modification (explain in comments below)			
** Source with a common stack will have the same stack number. *** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments)).							
FUEL USED IN BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE							
11. Fuel data: (Complete for a process emission source with in process fuel or a non-process fuel burning source)							
Primary fuel type (specify)		#2 Fuel Oil		Standby fuel type(s) (specify)		N/A	
Fuels used	Annual usage	Hourly usage		% Sulfur	% Ash	BTU value of fuel	(For APC use only) SCC code
		Design	Average				
Natural gas:	10 ⁶ Cu. Ft.	Cu. Ft.	Cu. Ft.	///////// /////////	///// /////	1,000	
#2 Fuel oil: Hourly usage per Boiler	10 ³ Gal. 2	Gal. 385.4	Gal. 385.4	0.5 max	///// /////	137,000	
#5 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////		
#6 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////		
Coal:	Tons	Lbs.	Lbs.				
Wood:	Tons	Lbs.	Lbs.	///////// /////////	///// /////		
Liquid propane:	10 ³ Gal.	Gal.	Gal.	///////// /////////	///// /////	85,000	
Other (specify type & units):							
12. If Wood is used as a fuel, specify types and estimate percent by weight of bark							
13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.							

14. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Hourly usage are based on rated heat input capacities per boiler. Annual usage based on 5 year average of 5 hours per year for Boiler A and 0 hours per year for Boiler B for years 2016 to 2020. This is not a permit restriction. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

15. Signature**Date**

June 17, 2022

Signer's name (type or print)**Title****Phone number with area code**

Table 3. Watts Bar Nuclear Plant Estimated Emissions for Stationary Auxiliary Boilers

MMBtu/hr			Auxiliary Boiler #1 and #2		
Diesel (137,000 Btu/gal), gal/hr			105.6		
Avg. Annual Hours of Operation CY16 to CY20, hr/yr			770.8		
			2.5		Combined
	AP-42 Emission Factor*		Combined Actual Emissions		Potential
	lb/1000 gallons	lb/10^6 Btu	lb/hr	ton/yr***	Emissions
PM	2		1.54	1.93E-03	ton/yr****
SO2**	71		54.7	6.84E-02	0.675
NOX	20		15.4	1.93E-02	24.0
CO	5		3.85	4.82E-03	6.75
VOC	0.2		0.154	1.93E-04	1.69
					6.75E-02
Formaldehyde	0.061		4.70E-02	5.88E-05	2.06E-02
Total POMs	0.0033		2.54E-03	3.18E-06	1.11E-03
Arsenic (As)		4.00E-06	4.22E-04	5.28E-07	1.85E-04
Beryllium (Be)		3.00E-06	3.17E-04	3.96E-07	1.39E-04
Cadmium (Cd)		3.00E-06	3.17E-04	3.96E-07	1.39E-04
Chromium (Cr)		3.00E-06	3.17E-04	3.96E-07	1.39E-04
Lead (Pb)		9.00E-06	9.50E-04	1.19E-06	4.16E-04
Manganese (Mn)		6.00E-06	6.34E-04	7.92E-07	2.78E-04
Mercury (Hg)		3.00E-06	3.17E-04	3.96E-07	1.39E-04
Nickel (Ni)		3.00E-06	3.17E-04	3.96E-07	1.39E-04
Selenium (Se)		1.50E-05	1.58E-03	1.98E-06	6.94E-04
PM HAP Total*****		3.10E-05	3.27E-03	4.09E-06	1.43E-03
Gaseous HAP Total*****			5.15E-02	6.43E-05	2.25E-02
Carbon Dioxide Equivalent*****		163.6	17,278	21.6	7,568

* AP-42, 5th edition, Section 1.3, 9/98.

** Sulfur content based on 0.5% sulfur or 5000 ppm sulfur (currently using 0.0015% sulfur or 15 ppm sulfur).

*** Annual emissions based on average hours of operation for years 2016 to 2020 of 5 hr/yr for AB #1 and 0 hr/yr for AB #2.

This is not a permit restriction.

Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

**** Combined Potential Emissions for both boilers each operating 876 hr/yr.

***** PM HAP total includes As, Be, Cd, Cr, Pb, Mn, and Ni.

***** Gaseous HAP total includes Formaldehyde, POM, Hg, and Se.

***** CO2 factor is 73.96 kg CO2/MMBtu, CH4 factor is 0.003 kg CH4/MMBtu, N2O factor is 0.0006 kg N2O/MMBtu.

CO2 equivalent factor for CO2 is 1.0, CO2 equivalent factor for CH4 is 25, CO2 equivalent factor for N2O is 298.

Sample Calculations for AB-1

Particulates: $2 \text{ lb}/1000 \text{ gal} \times 770.8 \text{ gal}/\text{hr} = 1.54 \text{ lb}/\text{hr}$
 $1.54 \text{ lb}/\text{hr} \times 2.5 \text{ hr}/\text{yr} \times \text{ton}/2000 \text{ lb} = 1.93\text{E-}03 \text{ ton}/\text{yr}$

Arsenic: $4.00\text{E-}06 \text{ lb/MMBtu} \times 105.6 \text{ MMBtu/hr} = 4.22\text{E-}04 \text{ lb/hr}$
 $4.22\text{E-}04 \text{ lb/hr} \times 2.5 \text{ hr/yr} \times \text{ton}/2000 \text{ lb} = 5.28\text{E-}07 \text{ ton/yr}$

PM Potential: $1.54 \text{ lb/hr} \times 876 \text{ hr/yr} \times \text{ton}/2000 \text{ lb} = 0.675 \text{ ton/yr}$ for both boilers



NON-TITLE V PERMIT APPLICATION EMISSION POINT DESCRIPTION

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.												
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)												
2. Unique Source ID (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1) Sandblast Shop SS-1												
3. Unique Emission Point ID (name/number/letter which uniquely identifies this emission point, like Stack #1) SS-1												
4. Brief description of air contaminant source (Attach a diagram if appropriate): The sandblast shop (SS-1) and paint shop (SS-2), which are located in the same building, are used for ongoing construction and maintenance activities at WBN. A compressed-air blasting machine is the equipment that generates particulate emissions. Sandblast/ paint shop equipped with Clemco Model 2880 bagfilter dust collector.												
5. Emission point location	Latitude 35.6028	Longitude 84.7900	6. Distance to nearest property line (Ft.) 2,600									
7. Stack or emission point data: →	Height above grade (Ft.) 9.5	Diameter (Ft.) 1.6 x 1.4	Temperature (°F) Ambient	% of time over 125°F 0	Direction of exit (Up, down or horizontal) Up							
Data at exit conditions: →	Flow (actual Ft. ³ /Min.) 10,900	Velocity (Ft. /Sec.) 85	Moisture (Grains/Ft. ³) 0		Moisture (Percent) 0							
Data at standard conditions: →	Flow (Dry std. Ft. ³ /Min.)	Velocity (Ft. /Sec.)	Moisture (Grains/Ft. ³)		Moisture (Percent)							
8. Monitoring device and recording instrument (check all that apply): <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">Opacity monitor</td> <td style="text-align: center;">SO₂ monitor</td> <td style="text-align: center;">NO_x monitor</td> <td style="text-align: center;">Strip chart</td> <td style="text-align: center;">Electronic data logger</td> <td style="text-align: center;">Other (specify in comments)</td> <td style="text-align: center;">No monitor (none) X</td> </tr> </table>						Opacity monitor	SO ₂ monitor	NO _x monitor	Strip chart	Electronic data logger	Other (specify in comments)	No monitor (none) X
Opacity monitor	SO ₂ monitor	NO _x monitor	Strip chart	Electronic data logger	Other (specify in comments)	No monitor (none) X						
9. Control device. Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.). Clemco Model 2880 bagfilter dust collector												

10. Air contaminants. Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

Air contaminants	Average Emissions (Lbs./Hr.)	Maximum Emissions (Lbs./Hr.)	Concentration	Average Emissions (Ton/Yr.)	Potential Emissions (Ton/Yr.)	Emissions Estimation Method Code *	Control Devices *	Control Efficiency %
Particulate matter (PM)	1.64	1.87	** 0.02	1.71	2.43	6	017	99
Sulfur dioxide (SO ₂)			***					
Carbon monoxide (CO)			PPM					
Volatile organic compounds (VOC)			PPM					
Nitrogen oxides (NO _x)			PPM					
Hydrogen fluoride (HF)								
Hydrogen chloride (HCl)								
Lead (Pb)								
Greenhouse gases (CO ₂ equivalents)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Other (specify)								
Other (specify)								
Other (specify)								
Other (specify)								

11. Comments

Conduct periodic maintenance as described by manufacturer.

Sandblast shop emissions are estimated using two different methods: (1) based on air flowrate and typical outlet grain loading, and (2) based on manufacturer's guaranteed efficiency and assumed final particle size distribution (see Attachment A).

Facility is typically operated 8 hours/day, 5 days/week, 52 weeks/year. Expected operation is significantly less. Average annual emissions are calculated based on maximum possible operation (260 days/year) and the average hourly emission rate (1.64 lb/hr). Potential annual emissions are calculated on maximum possible operation (260 days/year) and particulate permit limit (2.34 lb/hr).

The Clemco dust collector is rated for 8,200 to 10,900 cfm. The exhaust fan has a maximum rate of 12,000 cfm and will be adjusted to match the dust collector rating.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

12. Signature**Date**

June 17, 2022

Signer's name (type or print)**Title****Phone number with area code**

* Refer to the tables in the instructions for estimation method and control device codes.

** Exit gas particulate matter concentration units: Process – Grains/Dry Standard Ft³ (70°F), Wood fired boilers - Grains/Dry Standard Ft³ (70°F), all other boilers – Lbs. /Million BTU heat input.

*** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input



NON-TITLE V PERMIT APPLICATION
PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.			
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)		2. Emission Source Reference Number 72-0029-11	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes No ☒ If Yes, list rule citation, including Part, Subpart, and applicable Sections:			
4. Unique Source ID (see instructions) Sandblast Shop SS-1		5. Unique Emission Point ID (see instructions) SS-1	
6. Description of air contaminant source The sandblast shop (SS-1) and paint shop (SS-2), which are located in the same building, are used for ongoing construction and maintenance activities at WBN. A compressed-air blasting machine is the equipment that generates particulate emissions. Sandblast/paint shop equipped with Clemco Model 2880 bagfilter dust collector.			
7. Type of air contaminant source (Check only one option to the right)			
Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14)			X
Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14)			
Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14)			
8. Type of operation: Continuous ☒ Batch		Normal batch time	Normal batches/day
9. Process material inputs and In-process solid fuels	Diagram reference	Input rates (pounds/hour)	
		Design	Actual
A. Abrasive (Note 2)	1	1,000	(Note 3)
B.			
C.			
D.			
E.			
F.			
G.			
Totals		1,000	(Note 3)

* A simple process flow diagram must be attached.

DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE								
10. Boiler or burner data: (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)								
Serial Number				Type of firing***				
Rated horsepower		Rated input capacity (10 ⁶ BTU/Hr.)			Other rating (specify capacity and units)			
Date constructed		Date manufactured		Date of last modification (explain in comments below)				
** Source with a common stack will have the same stack number. *** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments)).								
11. Fuel data: (Complete for a process emission source with in process fuel or a non-process fuel burning source)								
Primary fuel type (specify)				Standby fuel type(s) (specify)				
Fuels used	Annual usage	Hourly usage		% Sulfur	% Ash	BTU value of fuel	(For APC use only) SCC code	
		Design	Average					
Natural gas:	10 ⁶ Cu. Ft.	Cu. Ft.	Cu. Ft.	///////// /////////	///// /////	1,000		
#2 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////	137,000		
#5 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////			
#6 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////			
Coal:	Tons	Lbs.	Lbs.					
Wood:	Tons	Lbs.	Lbs.	///////// /////////	///// /////			
Liquid propane:	10 ³ Gal.	Gal.	Gal.	///////// /////////	///// /////	85,000		
Other (specify type & units):								
12. If Wood is used as a fuel, specify types and estimate percent by weight of bark								
13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.								

14. Comments

Note 1: Facility is typically operated 8 hours/day, 5 days/week, 52 weeks/year. Actual operation will be intermittent and variable, depending on construction/maintenance needs.

Note 2: Abrasive used varies depending on equipment being cleaned. Normally, either Dupont Starblast[®] CP-2-51 or Black Beauty abrasive is used. For cleaning stainless steel, glass beads are used.

Note 3: Actual input rates will vary depending on the condition of the equipment being cleaned. The maximum input rate will be 1,000 lb/hr.

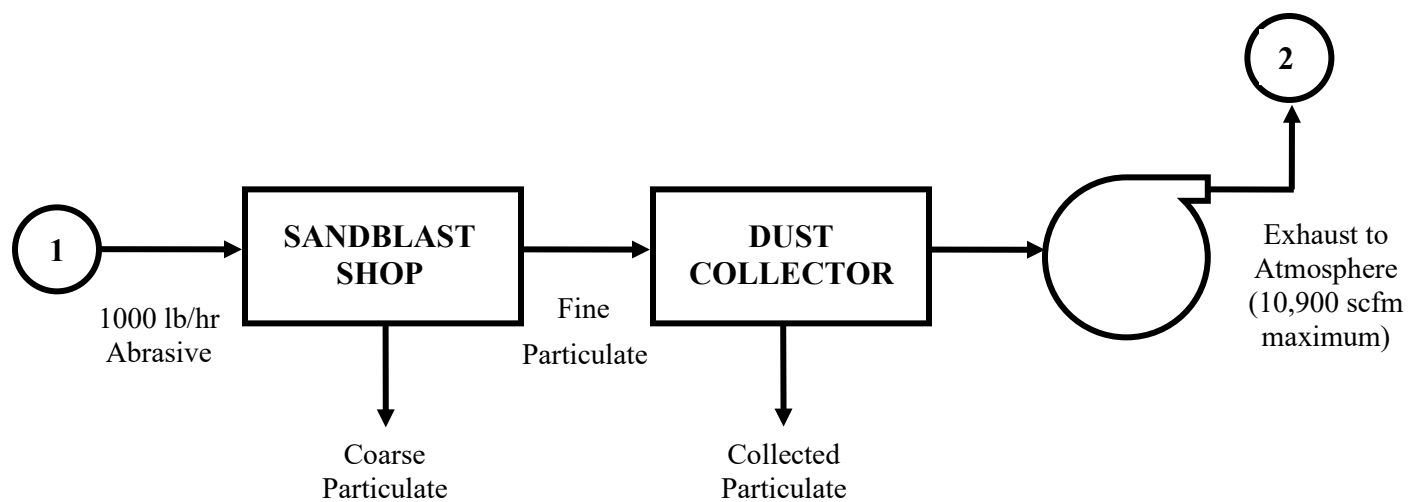
If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

15. Signature**Date**

June 17, 2022

Signer's name (type or print)**Title****Phone number with area code**



**WATTS BAR NUCLEAR PLANT
SANDBLAST/PAINT SHOP (SS-1)
PROCESS FLOW DIAGRAM**

APC 101 (SS-1) ATTACHMENT A EMISSION CALCULATIONS

1. Based on airflow rate and a typical outlet grain loading for fabric filters (0.02 gr/scf)
 - a. Maximum emission rate
 $(0.02 \text{ gr/scf})(10,900 \text{ scfm})(1 \text{ lb}/7,000 \text{ gr})(60 \text{ min}) = 1.87 \text{ lb/hr}$
 - b. Average emission rate
 $(0.02)(9,550)(1/7,000)(60) = 1.64 \text{ lb/hr}$
 - c. Average annual emissions
 $(1.64 \text{ lb/hr})(8 \times 5 \times 52 \text{ hr/yr})(1 \text{ ton}/2,000 \text{ lb}) = 1.71 \text{ ton/yr}$
2. Based on manufacturer's guaranteed efficiency and assumed final sand size distribution
 - a. Guaranteed efficiency: 99% for particle size greater than 1.0 micron
 - b. Rate of usage: 1000 lb/hr, (400 to 900 microns initial size)
 - c. Typical particle size analysis of emissions from sandblasting operations (from Air Pollution Engineering Manual, AP-40, Second Edition, May 1973):
 100% of particles smaller than 150 microns
 0.4% of particles smaller than 1.6 microns
 - d. Assumptions:
 - i. Final abrasive has size range 0 to 400 micron corresponding to fines and fine sand in COE Unified Soil Classification. Distribution is similar to filter sand (Perry's Chemical Engineering Handbook, 4th edition, Fig. 8-4). Less than 10% of total is smaller than 150 microns.
 - ii. All particles smaller than 1.6 microns are also smaller than 1.0 micron.
 - iii. Only particles smaller than 150 microns are carried over to dust collector. Coarser particles drop out inside facility.
 - e. Uncontrolled emission rate: $(0.10)(1000 \text{ lb/hr}) = 100 \text{ lb/hr}$
 - f. Controlled emission rate:

$(0.004)(100 \text{ lb/hr})$ fraction smaller than 1.0 micron	$+$	$(0.01)(0.996)(100)$ fraction larger than 1.0 micron which escapes	$= 1.40 \text{ lb/hr}$
---	-----	--	------------------------



NON-TITLE V PERMIT APPLICATION
SURFACE COATING DESCRIPTION

Type or print. Submit for each spray booth, dip tank, or other surface coating equipment. Submit with the APC 100.							
1. Organization's legal name and SOS control number [as registered with the Tennessee Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)						2. Emission Source Reference Number 72-0029-12	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes No ☒ If Yes, list rule citation, including Part, Subpart, and applicable Sections:							
4. Unique Source ID (name/number/letter that uniquely identifies this air contaminant source, like Paint Line 1) Source Coating Operation - SS-2							
5. Type of coating operation		Spray booth X		Dip tank		Other (describe)	
6. Spray booth dimensions	Width (ft.) 27		Height (ft.) 15		Depth (ft.) 40		Number of open sides 1 (Note 3)
7. Method of spray:	Airless	Air atomized X	Electrostatic			Overspray (Percent) 4 to 6	Date purchased * Unknown
			Airless	Disc	Air atomized		
8. Exhaust data:	Number of fans		Total horsepower 1/4			Total volume (CFM) 1,250	
9. Exhaust control:	None X	Waterwash	Exhaust filters	Baffle plates	Adsorption **	Other (Describe)	
10. Exhaust stack data **	Diameter (Ft.) 1.5	Height (Ft.) Above Grade 17		Flow (CFM) 1,250		Specify serial numbers that share this vent	
11. Control device. Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.). Record all coatings, thinners, and solvents product name, usage, density, VOC and HAP content.							

* The actual surface coating equipment (spray gun, spray heads, etc.) and not the spray booth per se determines the status of the source (new or existing).

** Complete one line for each stack or vent. Attach additional sheets if necessary

12. Coatings, Thinners, and Clean-up Solvents used:

List all types of coatings, thinners, and clean-up solvents used and attach a statement of the chemical composition of each (i.e. Safety Data Sheet). This statement usually may be obtained from the coating, thinner, or clean-up solvent supplier. The minimum information required is the percent of solids by weight, the percent volatile by weight, the hydrocarbon composition and/or description of the volatile component, and the density of the coating, thinner, or clean-up solvent in pounds per gallon.

* Name Solvent Base type

** For new construction, this quantity will be used as a permit limitation on capacity.

13. Air contaminants. Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

Air contaminants	Average Emissions (Lbs./Hr.)	Maximum Emissions (Lbs./Hr.)	Concentration	Average Emissions (Tons/Yr.)	Potential Emissions (Ton/Yr.)	Emissions Estimation Method Code *	Control Devices *	Control Efficiency %
Particulate matter (PM)		1.00**						
Sulfur dioxide (SO ₂)								
Carbon monoxide (CO)			PPM					
Volatile organic compounds (VOC)			PPM	1.00**	41.0**			
Nitrogen oxides (NO _x)			PPM					
Hydrogen fluoride (HF)								
Hydrogen chloride (HCl)								
Lead (Pb)								
Greenhouse gases (CO ₂ equivalents)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Other (specify)								
Other (specify)								

* Refer to the tables in the instructions for estimation method and control device codes.

** Permit limit of 1 lb/hr PM and 41.0 ton/yr VOC. 12-month rolling average of less than 1 ton/yr VOC with maximum of 2.2 ton/yr VOC for CY13 to CY20.

EQUIPMENT DESCRIPTION		
14. Equipment manufacturer The DeVibloss Company	Model number P-MBC	Serial number (or plant ID)
Construction date Unknown		Modification date 5/12/86 (construction of new shop)
Describe any modifications*		
15. Describe articles coated Miscellaneous steel construction items - plates, tube, pipe, unistrut, I-beams, clamps, etc.		
16. Comments Note 1: The sandblast/paint shop is a modified Pasco Building. The spray equipment parts are replaced on an as-needed basis. Note 2: Facility is typically operated 8 hours/day, 5 days/week, 52 weeks/yr. Expected operation is significantly less. Note 3: The painting portion of the sandblast/paint shop is equipped with two roll-up doors. No more than one door will be open at any given time. Note 4: Coatings listed are typical of the products used at the facility. Specific coatings may vary. Total usage should not vary. Note 5: Either Carboline thinner No. 26 (33) or Amercoat thinner No. 8 is used with the Carbozinc 11 primer, depending on the ambient temperature. Both thinners will not be used at the same time. Thinner No. 26 is used most often. Note 6: Amerlock 400 with thinner #8 and Keeler and Long P-Series Enamel Coating with thinner #1638 are used infrequently (i.e. approximately one day per month).		
If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.		
Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.		
17. Signature		Date June 17, 2022
Signer's name (type or print)	Title	Phone number with area code

APC 107 ATTACHMENT A

SAMPLE CALCULATIONS FOR WATTS BAR NUCLEAR PLANT PAINT BOOTH EMISSIONS

Coatings:

<u>Product Name</u>	<u>% Volatile by Weight</u>	<u>Density, lb/gal</u>
Carbozinc 11	74	8.8
SG Base		
Amerlock	11	12.7
400NT Resin		
Keeler and Long	45	11.0
P-Series Enamel		

$$\text{Average Coatings Volatiles (lb/gal)} = [(0.74 \times 8.8 \text{ lb/gal}) + (0.11 \times 12.7 \text{ lb/gal}) + (0.45 \times 11.0 \text{ lb/gal})]/3$$

$$= 4.29 \text{ lb/gal}$$

Thinners:

<u>Product Name</u>	<u>% Volatile by Weight</u>	<u>Density, lb/gal</u>
Carboline	100	7.4
Thinner #26 (33)		
Amercoat	100	6.9
Thinner #8		
Keeler and Long	100	6.5
Thinner #1638		

$$\text{Average Thinners Volatiles (lb/gal)} = [(1.00 \times 7.4 \text{ lb/gal}) + (1.00 \times 6.9 \text{ lb/gal}) + (1.00 \times 6.5 \text{ lb/gal})]/3$$

$$= 6.93 \text{ lb/gal}$$

Clean-up Solvent:

<u>Product Name</u>	<u>% Volatile by Weight</u>	<u>Density, lb/gal</u>
Carboline Thinner #26 (33)	100	7.4

$$\text{Average Clean-up Solvent Volatiles (lb/gal)} = (1.00 \times 7.4 \text{ lb/gal})/1$$

$$= 7.4 \text{ lb/gal}$$

VOC Maximum Annual Emissions

$$[(365+243+152 \text{ gal/mo}) \times 12 \text{ mo/yr} \times 4.29 \text{ lb/gal} + (152+152+30 \text{ gal/mo}) \times 12 \text{ mo/yr} \times 6.93 \text{ lb/gal} + (152 \text{ gal/mo}) \times 12 \text{ mo/yr} \times 7.4 \text{ lb/gal}] \times \text{ton}/2000 \text{ lb} = 40.2 \text{ ton VOC/yr}$$

41.0 ton/yr permit limit



**NON-TITLE V PERMIT APPLICATION
EMISSION POINT DESCRIPTION**

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.					
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)					
2. Unique Source ID (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1) Diesel Generator #1 through #5					
3. Unique Emission Point ID (name/number/letter which uniquely identifies this emission point, like Stack #1) DG-1 through DG-5					
4. Brief description of air contaminant source (Attach a diagram if appropriate): Five 4.7 MW (44.5 MMBtu/hr) emergency diesel generators.					
5. Emission point location	Latitude 35.6028	Longitude 84.7900	6. Distance to nearest property line (Ft.) 3,230		
7. Stack or emission point data: →	Height above grade (Ft.) 33	Diameter (Ft.) 1.83 2 stacks/generator	Temperature (°F) 730	% of time over 125°F 100	Direction of exit (Up, down or horizontal) up
Data at exit conditions: →	Flow (actual Ft. ³ /Min.) 19,650/stack	Velocity (Ft. /Sec.) 125/stack	Moisture (Grains/Ft. ³) 8.7		Moisture (Percent) 6
Data at standard conditions: →	Flow (Dry std. Ft. ³ /Min.) 8,227/stack	Velocity (Ft. /Sec.) 52/stack	Moisture (Grains/Ft. ³) 20.8		Moisture (Percent) 6
8. Monitoring device and recording instrument (check all that apply): Opacity monitor SO ₂ monitor NO _x monitor Strip chart Electronic data logger Other (specify in comments) No monitor (none) X					
9. Control device. Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.). N/A					

10. Air contaminants. Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

Air contaminants	Average Emissions (Lbs./Hr.)	Maximum Emissions (Lbs./Hr.)	Concentration	Average Emissions (Ton/Yr.)	Potential Emissions (Ton/Yr.)	Emissions Estimation Method Code *	Control Devices *	Control Efficiency %
Particulate matter (PM)	15.5	15.5	**	0.293	3.88	3	000	0
Sulfur dioxide (SO ₂)	112	112	***	2.12	28.1	3	000	0
Carbon monoxide (CO)	189	189	PPM	3.57	47.3	3	000	0
Volatile organic compounds (VOC)	18.2	18.2	PPM	0.344	4.56	3	000	0
Nitrogen oxides (NO _x)	712	712	PPM	13.5	178	3	000	0
Hydrogen fluoride (HF)								
Hydrogen chloride (HCl)								
Lead (Pb)								
Greenhouse gases (CO ₂ equivalents)	36,404	36,404		688	9,101	5	000	0
Hazardous air pollutant (specify) Gas HAP Total	0.350	0.350		6.62E-03	8.76E-02	3	000	0
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Other (specify)								
Other (specify)								
Other (specify)								
Other (specify)								

11. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Hourly emissions based on rated heat input for all 5 generators. Average annual emissions based on all 5 generators operating on a 5 year average of 37.8 hours per year for each generator for years 2016 to 2020. This is not a permit restriction. Potential annual emissions based on all 5 generators each operating 500 hr/yr. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

12. Signature**Date**

June 17, 2022

Signer's name (type or print)**Title****Phone number with area code**

- * Refer to the tables in the instructions for estimation method and control device codes.
- ** Exit gas particulate matter concentration units: Process – Grains/Dry Standard Ft³ (70⁰F), Wood fired boilers - Grains/Dry Standard Ft³ (70⁰F), all other boilers – Lbs. /Million BTU heat input.
- *** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input



NON-TITLE V PERMIT APPLICATION
PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.			
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)		2. Emission Source Reference Number 72-0029-17	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes ☒ No ☐ If Yes, list rule citation, including Part, Subpart, and applicable Sections: NESHAP: 40 CFR Part 63 Subpart ZZZZ			
4. Unique Source ID (see instructions) Diesel Generators #1 through #5		5. Unique Emission Point ID (see instructions) DG-1 through DG-5	
6. Description of air contaminant source Five 4.7 MW (44.5 MMBtu/hr) emergency diesel generators.			
7. Type of air contaminant source (Check only one option to the right)			
Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14)			
Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14)			
Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14)			X
8. Type of operation: Continuous ☐ Batch ☐		Normal batch time	Normal batches/day
9. Process material inputs and In-process solid fuels	Diagram reference	Input rates (pounds/hour)	
		Design	Actual
A.			
B.			
C.			
D.			
E.			
F.			
G.			
Totals			

* A simple process flow diagram must be attached.

DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE							
10. Boiler or burner data: (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)							
Serial Number				Type of firing*** Internal Combustion			
Rated horsepower 6,357		Rated input capacity (10 ⁶ BTU/Hr.) 44.5		Other rating (specify capacity and units)			
Date constructed DG-1 thru DG-4 1978; DG5 1982		Date manufactured		Date of last modification (explain in comments below)			
** Source with a common stack will have the same stack number. *** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments)).							
11. Fuel data: (Complete for a process emission source with in process fuel or a non-process fuel burning source)							
Primary fuel type (specify)		#2 Fuel Oil		Standby fuel type(s) (specify)		N/A	
Fuels used	Annual usage	Hourly usage		% Sulfur	% Ash	BTU value of fuel	(For APC use only) SCC code
		Design	Average				
Natural gas:	10 ⁶ Cu. Ft.	Cu. Ft.	Cu. Ft.	///////// /////////	///// /////	1,000	
#2 Fuel oil: Each generator	10 ³ Gal. 12.3	Gal. 325	Gal. 325	0.5 max	///// /////	137,000	
#5 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////		
#6 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////		
Coal:	Tons	Lbs.	Lbs.				
Wood:	Tons	Lbs.	Lbs.	///////// /////////	///// /////		
Liquid propane:	10 ³ Gal.	Gal.	Gal.	///////// /////////	///// /////	85,000	
Other (specify type & units):							
12. If Wood is used as a fuel, specify types and estimate percent by weight of bark							
13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.							

14. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 37.8 hours per year for each generator (189 hours total) for years 2016 to 2020. This is not a permit restriction. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

15. Signature**Date**

June 17, 2022

Signer's name (type or print)

Title

Phone number with area code

Table 4. Watts Bar Nuclear Plant Estimated Emissions for Large Uncontrolled Stationary Emergency Diesel Engines Over 600 Horsepower

	DG-1 through DG-5 Diesel Generators #1 through #5				Combined Potential Emissions ton/yr****
	MMBtu/hr				
	222.5				
Diesel (137,000 Btu/gal), gal/hr	1,624				
hp, each generator	6,357				
Avg. Annual Hours of Operation CY16 to CY20, hr/yr	37.8				
	AP-42 Emission Factor*	Combined Actual Emissions			
	lb/MMBtu	lb/hr	ton/yr***		
PM	0.0697	15.5	0.293		3.88
SO ₂ **	0.505	112	2.12		28.1
NO _X	3.2	712	13.5		178
CO	0.85	189	3.57		47.3
VOC	0.0819	18.2	0.344		4.56
Benzene	7.76E-04	1.73E-01	3.26E-03		4.32E-02
Toluene	2.81E-04	6.25E-02	1.18E-03		1.56E-02
Xylenes	1.93E-04	4.29E-02	8.12E-04		1.07E-02
Formaldehyde	7.89E-05	1.76E-02	3.32E-04		4.39E-03
Acetaldehyde	2.52E-05	5.61E-03	1.06E-04		1.40E-03
Acrolein	7.88E-06	1.75E-03	3.31E-05		4.38E-04
Total POMs	2.12E-04	4.72E-02	8.92E-04		1.18E-02
Gaseous HAP Total	1.57E-03	3.50E-01	6.62E-03		8.76E-02
Carbon Dioxide Equivalent*****	163.6	36,404	688		9,101

Average brake-specific fuel consumption of 7,000 Btu/hp-hr was used to convert from MMBtu/hr to hp.

* AP-42, 5th edition, Section 3.4, 10/96.

** Sulfur content based on 0.5% sulfur or 5000 ppm sulfur (currently using 0.0015% sulfur or 15 ppm sulfur).

*** Annual emissions for DG-1 thru DG-5 based on average hours of operation for years 2016 to 2020 of 189 hr/yr total for all generators (37.8 hr/yr each). This is not a permit restriction.

Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

**** Potential annual emissions based on 500 hours per year operation for each engine. EPA definition of hours for an emergency engine.

***** CO₂ factor is 73.96 kg CO₂/MMBtu, CH₄ factor is 0.003 kg CH₄/MMBtu, N₂O factor is 0.0006 kg N₂O/MMBtu.

CO₂ equivalent factor for CO₂ is 1.0, CO₂ equivalent factor for CH₄ is 25, CO₂ equivalent factor for N₂O is 298.

Sample Calculations for DG-1

Particulates: 0.0697 lb/MMBtu x 222.5 MMBtu/hr = 15.5 lb/hr
15.5 lb/hr x 37.8 hr/yr x ton/2000 lb = 0.293 ton/yr

PM Potential: 15.5 lb/hr x 500 hr/yr x ton/2000 lb = 3.88 ton/yr for all five generators



**NON-TITLE V PERMIT APPLICATION
 EMISSION POINT DESCRIPTION**

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.												
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)												
2. Unique Source ID (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1) Diesel Generator #6												
3. Unique Emission Point ID (name/number/letter which uniquely identifies this emission point, like Stack #1) DG-6												
4. Brief description of air contaminant source (Attach a diagram if appropriate): One 400 kW (4.08 MMBtu/hr) Security emergency diesel generator.												
5. Emission point location	Latitude 35.6028	Longitude 84.7900	6. Distance to nearest property line (Ft.) N/A									
7. Stack or emission point data: →	Height above grade (Ft.) 24.8	Diameter (Ft.) 0.66	Temperature (°F) 900	% of time over 125°F 100	Direction of exit (Up, down or horizontal) horizontal							
Data at exit conditions: →	Flow (actual Ft. ³ /Min.) 4,000	Velocity (Ft. /Sec.) 191	Moisture (Grains/Ft. ³) N/A		Moisture (Percent) N/A							
Data at standard conditions: →	Flow (Dry std. Ft. ³ /Min.) 1,353	Velocity (Ft. /Sec.) 66	Moisture (Grains/Ft. ³) N/A		Moisture (Percent) N/A							
8. Monitoring device and recording instrument (check all that apply): <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">Opacity monitor</td> <td style="text-align: center;">SO₂ monitor</td> <td style="text-align: center;">NO_x monitor</td> <td style="text-align: center;">Strip chart</td> <td style="text-align: center;">Electronic data logger</td> <td style="text-align: center;">Other (specify in comments)</td> <td style="text-align: center;">No monitor (none) X</td> </tr> </table>						Opacity monitor	SO ₂ monitor	NO _x monitor	Strip chart	Electronic data logger	Other (specify in comments)	No monitor (none) X
Opacity monitor	SO ₂ monitor	NO _x monitor	Strip chart	Electronic data logger	Other (specify in comments)	No monitor (none) X						
9. Control device. Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.). N/A												

10. Air contaminants. Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

Air contaminants	Average Emissions (Lbs./Hr.)	Maximum Emissions (Lbs./Hr.)	Concentration	Average Emissions (Ton/Yr.)	Potential Emissions (Ton/Yr.)	Emissions Estimation Method Code *	Control Devices *	Control Efficiency %
Particulate matter (PM)	1.26	1.26	**	3.16E-03	0.316	3	000	0
Sulfur dioxide (SO ₂)	1.18	1.18	***	2.96E-03	0.296	3	000	0
Carbon monoxide (CO)	3.88	3.88	PPM	9.69E-03	0.969	3	000	0
Volatile organic compounds (VOC)	1.47	1.47	PPM	3.67E-03	0.367	3	000	0
Nitrogen oxides (NO _x)	18.0	18.0	PPM	4.50E-02	4.50	3	000	0
Hydrogen fluoride (HF)								
Hydrogen chloride (HCl)								
Lead (Pb)								
Greenhouse gases (CO ₂ equivalents)	668	668		1.67	167	5	000	0
Hazardous air pollutant (specify) Gas HAP Total	1.58E-02	1.58E-02		3.95E-05	3.95E-03	3	000	0
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Other (specify)								
Other (specify)								
Other (specify)								
Other (specify)								

11. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Average annual usage based on 5 year average of 5 hours per year for years 2016 to 2020. This is not a permit restriction. Potential annual emissions based on operating 500 hr/yr. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

12. Signature**Date**

June 17, 2022

Signer's name (type or print)

Title

Phone number with area code

- * Refer to the tables in the instructions for estimation method and control device codes.
- ** Exit gas particulate matter concentration units: Process – Grains/Dry Standard Ft³ (70⁰F), Wood fired boilers - Grains/Dry Standard Ft³ (70⁰F), all other boilers – Lbs. /Million BTU heat input.
- *** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input



DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor, Nashville, TN 37243
Telephone: (615) 532-0554, Email: Air.Pollution.Control@TN.gov

APC 102

NON-TITLE V PERMIT APPLICATION
PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.			
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)		2. Emission Source Reference Number 72-0029-21	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes ☒ No ☐ If Yes, list rule citation, including Part, Subpart, and applicable Sections: NESHAP: 40 CFR Part 63 Subpart ZZZZ			
4. Unique Source ID (see instructions) Diesel Generator #6		5. Unique Emission Point ID (see instructions) DG-6	
6. Description of air contaminant source One 400 kW (4.08 MMBtu/hr) Security emergency diesel generator.			
7. Type of air contaminant source (Check only one option to the right)			
Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14)			
Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14)			
Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14)			X
8. Type of operation: Continuous ☐ Batch ☐		Normal batch time	Normal batches/day
9. Process material inputs and In-process solid fuels	Diagram reference	Input rates (pounds/hour)	
		Design	Actual
A.			
B.			
C.			
D.			
E.			
F.			
G.			
Totals			

* A simple process flow diagram must be attached.

DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE							
10. Boiler or burner data: (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)							
Serial Number				Type of firing*** Internal Combustion			
Rated horsepower 583		Rated input capacity (10 ⁶ BTU/Hr.) 4.08		Other rating (specify capacity and units)			
Date constructed 1980		Date manufactured		Date of last modification (explain in comments below)			
** Source with a common stack will have the same stack number. *** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments)).							
11. Fuel data: (Complete for a process emission source with in process fuel or a non-process fuel burning source)							
Primary fuel type (specify)		#2 Fuel Oil		Standby fuel type(s) (specify)		N/A	
Fuels used	Annual usage	Hourly usage		% Sulfur	% Ash	BTU value of fuel	(For APC use only) SCC code
		Design	Average				
Natural gas:	10 ⁶ Cu. Ft.	Cu. Ft.	Cu. Ft.	///////// /////////	///// /////	1,000	
#2 Fuel oil:	10 ³ Gal. 0.149	Gal. 29.8	Gal. 29.8	0.29 max	///// /////	137,000	
#5 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////		
#6 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////		
Coal:	Tons	Lbs.	Lbs.				
Wood:	Tons	Lbs.	Lbs.	///////// /////////	///// /////		
Liquid propane:	10 ³ Gal.	Gal.	Gal.	///////// /////////	///// /////	85,000	
Other (specify type & units):							
12. If Wood is used as a fuel, specify types and estimate percent by weight of bark							
13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.							

14. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 5 hours per year for years 2016 to 2020. This is not a permit restriction. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

15. Signature**Date**

June 17, 2022

Signer's name (type or print)**Title****Phone number with area code**

Table 5. Watts Bar Nuclear Plant Actual Emissions for Uncontrolled Stationary Emergency Diesel Engine DG-6

		DG-6		
		Security Generator		
MMBtu/hr		4.08		
Diesel (137,000 Btu/gal), gal/hr		29.8		
hp		583		
Avg. Annual Hours of Operation CY16 to CY20, hr/yr		5		
	AP-42 Emission Factor*	Actual Emissions		Potential Emissions
	lb/MMBtu	lb/hr	ton/yr**	ton/yr***
PM	0.31	1.26	3.16E-03	0.316
SO2	0.29	1.18	2.96E-03	0.296
NOX	4.41	18.0	4.50E-02	4.50
CO	0.95	3.88	9.69E-03	0.969
VOC	0.36	1.47	3.67E-03	0.367
Benzene	9.33E-04	3.81E-03	9.52E-06	9.52E-04
Toluene	4.09E-04	1.67E-03	4.17E-06	4.17E-04
Xylenes	2.85E-04	1.16E-03	2.91E-06	2.91E-04
1,3-Butadiene	3.91E-05	1.60E-04	3.99E-07	3.99E-05
Formaldehyde	1.18E-03	4.81E-03	1.20E-05	1.20E-03
Acetaldehyde	7.67E-04	3.13E-03	7.82E-06	7.82E-04
Acrolein	9.25E-05	3.77E-04	9.44E-07	9.44E-05
Total POMs	1.68E-04	6.85E-04	1.71E-06	1.71E-04
Gaseous HAP Total	3.87E-03	1.58E-02	3.95E-05	3.95E-03
Carbon Dioxide Equivalent****	163.6	668	1.67	167

Average brake-specific fuel consumption of 7,000 Btu/hp-hr was used to convert from MMBtu/hr to hp.

* AP-42, 5th edition, Section 3.3, 10/96.

** Annual emissions for DG-6 based on average hours of operation for years 2016 to 2020 of 5 hr/yr.

This is not a permit restriction.

Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

*** Potential annual emissions based on 500 hours per year operation for each engine.

EPA definition of hours for an emergency engine.

**** CO2 factor is 73.96 kg CO2/MMBtu, CH4 factor is 0.003 kg CH4/MMBtu, N2O factor is 0.0006 kg N2O/MMBtu.

CO2 equivalent factor for CO2 is 1.0, CO2 equivalent factor for CH4 is 25, CO2 equivalent factor for N2O is 298.

Sample Calculations for DG-6

Particulates: $0.31 \text{ lb/MMBtu} \times 4.08 \text{ MMBtu/hr} = 1.26 \text{ lb/hr}$
 $1.26 \text{ lb/hr} \times 5 \text{ hr/yr} \times \text{ton}/2000 \text{ lb} = 3.16\text{E-}03 \text{ ton/yr}$

PM Potential: $1.26 \text{ lb/hr} \times 500 \text{ hr/yr} \times \text{ton}/2000 \text{ lb} = 0.316 \text{ ton/yr}$



**NON-TITLE V PERMIT APPLICATION
 EMISSION POINT DESCRIPTION**

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.												
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)												
2. Unique Source ID (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1) Fire Pump #1												
3. Unique Emission Point ID (name/number/letter which uniquely identifies this emission point, like Stack #1) FP-1												
4. Brief description of air contaminant source (Attach a diagram if appropriate): One 2.36 MMBtu/hr emergency diesel engine fire pump.												
5. Emission point location	Latitude 35.6028	Longitude 84.7900	6. Distance to nearest property line (Ft.) N/A									
7. Stack or emission point data: →	Height above grade (Ft.) N/A	Diameter (Ft.) N/A	Temperature (°F) N/A	% of time over 125°F 100	Direction of exit (Up, down or horizontal) N/A							
Data at exit conditions: →	Flow (actual Ft. ³ /Min.) N/A	Velocity (Ft. /Sec.) N/A	Moisture (Grains/Ft. ³) N/A		Moisture (Percent) N/A							
Data at standard conditions: →	Flow (Dry std. Ft. ³ /Min.) N/A	Velocity (Ft. /Sec.) N/A	Moisture (Grains/Ft. ³) N/A		Moisture (Percent) N/A							
8. Monitoring device and recording instrument (check all that apply): <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">Opacity monitor</td> <td style="text-align: center;">SO₂ monitor</td> <td style="text-align: center;">NO_x monitor</td> <td style="text-align: center;">Strip chart</td> <td style="text-align: center;">Electronic data logger</td> <td style="text-align: center;">Other (specify in comments)</td> <td style="text-align: center;">No monitor (none) X</td> </tr> </table>						Opacity monitor	SO ₂ monitor	NO _x monitor	Strip chart	Electronic data logger	Other (specify in comments)	No monitor (none) X
Opacity monitor	SO ₂ monitor	NO _x monitor	Strip chart	Electronic data logger	Other (specify in comments)	No monitor (none) X						
9. Control device. Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.). N/A												

10. Air contaminants. Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

Air contaminants	Average Emissions (Lbs./Hr.)	Maximum Emissions (Lbs./Hr.)	Concentration	Average Emissions (Ton/Yr.)	Potential Emissions (Ton/Yr.)	Emissions Estimation Method Code *	Control Devices *	Control Efficiency %
Particulate matter (PM)	0.732	0.732	**	7.32E-03	0.183	3	000	0
Sulfur dioxide (SO ₂)	0.684	0.684	***	6.84E-03	0.171	3	000	0
Carbon monoxide (CO)	2.24	2.24	PPM	2.24E-02	0.561	3	000	0
Volatile organic compounds (VOC)	0.850	0.850	PPM	8.50E-03	0.212	3	000	0
Nitrogen oxides (NO _x)	10.4	10.4	PPM	1.04E-01	2.60	3	000	0
Hydrogen fluoride (HF)								
Hydrogen chloride (HCl)								
Lead (Pb)								
Greenhouse gases (CO ₂ equivalents)	386	386		3.86	96.5	5	000	0
Hazardous air pollutant (specify) Gas HAP Total	9.14E-03	9.14E-03		9.14E-05	2.29E-03	3	000	0
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Other (specify)								
Other (specify)								
Other (specify)								
Other (specify)								

11. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 20 hours per year for years 2016 to 2020. This is not a permit restriction. Potential annual emissions based on operating 500 hr/yr. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

12. Signature**Date**

June 17, 2022

Signer's name (type or print)**Title****Phone number with area code**

- * Refer to the tables in the instructions for estimation method and control device codes.
- ** Exit gas particulate matter concentration units: Process – Grains/Dry Standard Ft³ (70⁰F), Wood fired boilers - Grains/Dry Standard Ft³ (70⁰F), all other boilers – Lbs. /Million BTU heat input.
- *** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input



DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
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APC 102

NON-TITLE V PERMIT APPLICATION
PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.			
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)		2. Emission Source Reference Number 72-0029-21	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes ☒ No ☐ If Yes, list rule citation, including Part, Subpart, and applicable Sections: NESHAP: 40 CFR Part 63 Subpart ZZZZ			
4. Unique Source ID (see instructions) Fire Pump #1		5. Unique Emission Point ID (see instructions) FP-1	
6. Description of air contaminant source One 2.36 MMBtu/hr emergency diesel engine fire pump.			
7. Type of air contaminant source (Check only one option to the right)			
Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14)			
Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14)			
Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14)			X
8. Type of operation: Continuous ☐ Batch ☐		Normal batch time	Normal batches/day
9. Process material inputs and In-process solid fuels	Diagram reference	Input rates (pounds/hour)	
		Design	Actual
A.			
B.			
C.			
D.			
E.			
F.			
G.			
Totals			

* A simple process flow diagram must be attached.

DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE							
10. Boiler or burner data: (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)							
Serial Number				Type of firing*** Internal Combustion			
Rated horsepower 337		Rated input capacity (10 ⁶ BTU/Hr.) 2.36		Other rating (specify capacity and units)			
Date constructed 1995		Date manufactured		Date of last modification (explain in comments below)			
** Source with a common stack will have the same stack number. *** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments)).							
11. Fuel data: (Complete for a process emission source with in process fuel or a non-process fuel burning source)							
Primary fuel type (specify)		#2 Fuel Oil		Standby fuel type(s) (specify)		N/A	
Fuels used	Annual usage	Hourly usage		% Sulfur	% Ash	BTU value of fuel	(For APC use only) SCC code
		Design	Average				
Natural gas:	10 ⁶ Cu. Ft.	Cu. Ft.	Cu. Ft.	///////// /////////	///// /////	1,000	
#2 Fuel oil:	10 ³ Gal. 0.344	Gal. 17.2	Gal. 17.2	0.29 max	///// /////	137,000	
#5 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////		
#6 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////		
Coal:	Tons	Lbs.	Lbs.				
Wood:	Tons	Lbs.	Lbs.	///////// /////////	///// /////		
Liquid propane:	10 ³ Gal.	Gal.	Gal.	///////// /////////	///// /////	85,000	
Other (specify type & units):							
12. If Wood is used as a fuel, specify types and estimate percent by weight of bark							
13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.							

14. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 20 hours per year for years 2016 to 2020. This is not a permit restriction.
Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

15. Signature**Date**

June 17, 2022

Signer's name (type or print)**Title****Phone number with area code**

Table 6. Watts Bar Nuclear Plant Actual Emissions for Uncontrolled Stationary Emergency Diesel Engine FP-1

		FP-1		
		Fire Pump #1		
MMBtu/hr		2.36		
Diesel (137,000 Btu/gal), gal/hr		17.2		
hp		337		
Avg. Annual Hours of Operation CY16 to CY20, hr/yr		20		
	AP-42 Emission Factor*	Actual Emissions		Potential Emissions
	lb/MMBtu	lb/hr	ton/yr**	ton/yr***
PM	0.31	0.732	7.32E-03	0.183
SO2	0.29	0.684	6.84E-03	0.171
NOX	4.41	10.4	1.04E-01	2.60
CO	0.95	2.24	2.24E-02	0.561
VOC	0.36	0.850	8.50E-03	0.212
Benzene	9.33E-04	2.20E-03	2.20E-05	5.50E-04
Toluene	4.09E-04	9.65E-04	9.65E-06	2.41E-04
Xylenes	2.85E-04	6.73E-04	6.73E-06	1.68E-04
1,3-Butadiene	3.91E-05	9.23E-05	9.23E-07	2.31E-05
Formaldehyde	1.18E-03	2.78E-03	2.78E-05	6.96E-04
Acetaldehyde	7.67E-04	1.81E-03	1.81E-05	4.53E-04
Acrolein	9.25E-05	2.18E-04	2.18E-06	5.46E-05
Total POMs	1.68E-04	3.96E-04	3.96E-06	9.91E-05
Gaseous HAP Total	3.87E-03	9.14E-03	9.14E-05	2.29E-03
Carbon Dioxide Equivalent****	163.6	386	3.86	96.5

Average brake-specific fuel consumption of 7,000 Btu/hp-hr was used to convert from MMBtu/hr to hp.

* AP-42, 5th edition, Section 3.3, 10/96.

** Annual emissions for FP-1 based on average hours of operation for years 2016 to 2020 of 20 hr/yr.

This is not a permit restriction.

Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

*** Potential annual emissions based on 500 hours per year operation for each engine.

EPA definition of hours for an emergency engine.

**** CO2 factor is 73.96 kg CO2/MMBtu, CH4 factor is 0.003 kg CH4/MMBtu, N2O factor is 0.0006 kg N2O/MMBtu.

CO2 equivalent factor for CO2 is 1.0, CO2 equivalent factor for CH4 is 25, CO2 equivalent factor for N2O is 298.

Sample Calculations for FP-1

Particulates: $0.31 \text{ lb/MMBtu} \times 2.36 \text{ MMBtu/hr} = 0.732 \text{ lb/hr}$
 $0.732 \text{ lb/hr} \times 20 \text{ hr/yr} \times \text{ton}/2000 \text{ lb} = 7.32\text{E-}03 \text{ ton/yr}$

PM Potential: $0.732 \text{ lb/hr} \times 500 \text{ hr/yr} \times \text{ton}/2000 \text{ lb} = 0.183 \text{ ton/yr}$



NON-TITLE V PERMIT APPLICATION EMISSION POINT DESCRIPTION

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.													
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)													
2. Unique Source ID (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1) Diesel Generator #13													
3. Unique Emission Point ID (name/number/letter which uniquely identifies this emission point, like Stack #1) DG-13													
4. Brief description of air contaminant source (Attach a diagram if appropriate): One 67 (0.47 MMBtu/hr) hp Radio Tower emergency diesel generator.													
5. Emission point location	Latitude 35.6028	Longitude 84.7900	6. Distance to nearest property line (Ft.) N/A										
7. Stack or emission point data: →	Height above grade (Ft.) N/A	Diameter (Ft.) N/A	Temperature (°F) N/A	% of time over 125°F 100	Direction of exit (Up, down or horizontal) N/A								
Data at exit conditions: →	Flow (actual Ft. ³ /Min.) N/A	Velocity (Ft. /Sec.) N/A	Moisture (Grains/Ft. ³) N/A		Moisture (Percent) N/A								
Data at standard conditions: →	Flow (Dry std. Ft. ³ /Min.) N/A	Velocity (Ft. /Sec.) N/A	Moisture (Grains/Ft. ³) N/A		Moisture (Percent) N/A								
8. Monitoring device and recording instrument (check all that apply): <table style="width: 100%; border: none;"> <tr> <td style="width: 12.5%;">Opacity monitor</td> <td style="width: 12.5%;">SO₂ monitor</td> <td style="width: 12.5%;">NO_x monitor</td> <td style="width: 12.5%;">Strip chart</td> <td style="width: 12.5%;">Electronic data logger</td> <td style="width: 12.5%;">Other (specify in comments)</td> <td style="width: 12.5%;">No monitor (none) X</td> </tr> </table>							Opacity monitor	SO ₂ monitor	NO _x monitor	Strip chart	Electronic data logger	Other (specify in comments)	No monitor (none) X
Opacity monitor	SO ₂ monitor	NO _x monitor	Strip chart	Electronic data logger	Other (specify in comments)	No monitor (none) X							
9. Control device. Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.). N/A													

10. Air contaminants. Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

Air contaminants	Average Emissions (Lbs./Hr.)	Maximum Emissions (Lbs./Hr.)	Concentration	Average Emissions (Ton/Yr.)	Potential Emissions (Ton/Yr.)	Emissions Estimation Method Code *	Control Devices *	Control Efficiency %
Particulate matter (PM)	0.145	0.145	**	1.96E-03	3.63E-02	3	000	0
Sulfur dioxide (SO ₂)	0.136	0.136	***	1.84E-03	3.40E-02	3	000	0
Carbon monoxide (CO)	0.446	0.446	PPM	6.01E-03	0.111	3	000	0
Volatile organic compounds (VOC)	0.169	0.169	PPM	2.28E-03	4.22E-02	3	000	0
Nitrogen oxides (NO _x)	2.07	2.07	PPM	2.79E-02	0.517	3	000	0
Hydrogen fluoride (HF)								
Hydrogen chloride (HCl)								
Lead (Pb)								
Greenhouse gases (CO ₂ equivalents)	76.7	76.7		1.04	19.2	5	000	0
Hazardous air pollutant (specify) Gas HAP Total	1.82E-03	1.82E-03		2.45E-05	4.54E-04	3	000	0
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Other (specify)								
Other (specify)								
Other (specify)								
Other (specify)								

11. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 27 hours per year for years 2016 to 2020. This is not a permit restriction. Potential annual emissions based on operating 500 hr/yr. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

12. Signature**Date**

June 17, 2022

Signer's name (type or print)

Title

Phone number with area code

- * Refer to the tables in the instructions for estimation method and control device codes.
- ** Exit gas particulate matter concentration units: Process – Grains/Dry Standard Ft³ (70⁰F), Wood fired boilers - Grains/Dry Standard Ft³ (70⁰F), all other boilers – Lbs. /Million BTU heat input.
- *** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input



DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
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Telephone: (615) 532-0554, Email: Air.Pollution.Control@TN.gov

APC 102

NON-TITLE V PERMIT APPLICATION
PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.			
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)		2. Emission Source Reference Number 72-0029-21	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes ☒ No ☐ If Yes, list rule citation, including Part, Subpart, and applicable Sections: NESHAP: 40 CFR Part 63 Subpart ZZZZ			
4. Unique Source ID (see instructions) Diesel Generator #13		5. Unique Emission Point ID (see instructions) DG-13	
6. Description of air contaminant source One 67 hp (0.47 MMBtu/hr) Radio Tower emergency diesel generator.			
7. Type of air contaminant source (Check only one option to the right)			
Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14)			
Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14)			
Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14)			X
8. Type of operation: Continuous ☐ Batch ☐		Normal batch time	Normal batches/day
9. Process material inputs and In-process solid fuels	Diagram reference	Input rates (pounds/hour)	
		Design	Actual
A.			
B.			
C.			
D.			
E.			
F.			
G.			
Totals			

* A simple process flow diagram must be attached.

DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE							
10. Boiler or burner data: (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)							
Serial Number				Type of firing*** Internal Combustion			
Rated horsepower 67		Rated input capacity (10 ⁶ BTU/Hr.) 0.469		Other rating (specify capacity and units)			
Date constructed 2013		Date manufactured		Date of last modification (explain in comments below)			
** Source with a common stack will have the same stack number. *** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments)).							
11. Fuel data: (Complete for a process emission source with in process fuel or a non-process fuel burning source)							
Primary fuel type (specify)		#2 Fuel Oil		Standby fuel type(s) (specify)		N/A	
Fuels used	Annual usage	Hourly usage		% Sulfur	% Ash	BTU value of fuel	(For APC use only) SCC code
		Design	Average				
Natural gas:	10 ⁶ Cu. Ft.	Cu. Ft.	Cu. Ft.	//////// ////////	//// ////	1,000	
#2 Fuel oil:	10 ³ Gal. 0.0923	Gal. 3.42	Gal. 3.42	0.29 max	//// ////	137,000	
#5 Fuel oil:	10 ³ Gal.	Gal.	Gal.		//// ////		
#6 Fuel oil:	10 ³ Gal.	Gal.	Gal.		//// ////		
Coal:	Tons	Lbs.	Lbs.				
Wood:	Tons	Lbs.	Lbs.	//////// ////////	//// ////		
Liquid propane:	10 ³ Gal.	Gal.	Gal.	//////// ////////	//// ////	85,000	
Other (specify type & units):							
12. If Wood is used as a fuel, specify types and estimate percent by weight of bark							
13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.							

14. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 27 hours per year for years 2016 to 2020. This is not a permit restriction.
Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

15. Signature**Date**

June 17, 2022

Signer's name (type or print)**Title****Phone number with area code**

Table 7. Watts Bar Nuclear Plant Actual Emissions for Uncontrolled Stationary Emergency Diesel Engine DG-13

		DG-13		
		Radio Tower		
MMBtu/hr		0.469		
Diesel (137,000 Btu/gal), gal/hr		3.42		
hp		67		
Avg. Annual Hours of Operation CY16 to CY20, hr/yr		27		
	AP-42 Emission Factor*	Actual Emissions		Potential Emissions
	lb/MMBtu	lb/hr	ton/yr**	ton/yr***
PM	0.31	0.145	1.96E-03	3.63E-02
SO ₂	0.29	0.136	1.84E-03	3.40E-02
NO _x	4.41	2.07	2.79E-02	0.517
CO	0.95	0.446	6.01E-03	0.111
VOC	0.36	0.169	2.28E-03	4.22E-02
Benzene	9.33E-04	4.38E-04	5.91E-06	1.09E-04
Toluene	4.09E-04	1.92E-04	2.59E-06	4.80E-05
Xylenes	2.85E-04	1.34E-04	1.80E-06	3.34E-05
1,3-Butadiene	3.91E-05	1.83E-05	2.48E-07	4.58E-06
Formaldehyde	1.18E-03	5.53E-04	7.47E-06	1.38E-04
Acetaldehyde	7.67E-04	3.60E-04	4.86E-06	8.99E-05
Acrolein	9.25E-05	4.34E-05	5.86E-07	1.08E-05
Total POMs	1.68E-04	7.88E-05	1.06E-06	1.97E-05
Gaseous HAP Total	3.87E-03	1.82E-03	2.45E-05	4.54E-04
Carbon Dioxide Equivalent****	163.6	76.7	1.04	19.2

Average brake-specific fuel consumption of 7,000 Btu/hp-hr was used to convert from MMBtu/hr to hp.

* AP-42, 5th edition, Section 3.3, 10/96.

** Annual emissions for DG-13 based on average hours of operation for years 2016 to 2020 of 27 hr/yr.

This is not a permit restriction.

Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

*** Potential annual emissions based on 500 hours per year operation for each engine.

EPA definition of hours for an emergency engine.

**** CO₂ factor is 73.96 kg CO₂/MMBtu, CH₄ factor is 0.003 kg CH₄/MMBtu, N₂O factor is 0.0006 kg N₂O/MMBtu.

CO₂ equivalent factor for CO₂ is 1.0, CO₂ equivalent factor for CH₄ is 25, CO₂ equivalent factor for N₂O is 298.

Sample Calculations for DG-13

Particulates: $0.31 \text{ lb/MMBtu} \times 0.469 \text{ MMBtu/hr} = 0.145 \text{ lb/hr}$
 $0.145 \text{ lb/hr} \times 27 \text{ hr/yr} \times \text{ton/2000 lb} = 1.96\text{E-}03 \text{ ton/yr}$

PM Potential: $0.145 \text{ lb/hr} \times 500 \text{ hr/yr} \times \text{ton/2000 lb} = 3.63\text{E-}02 \text{ ton/yr}$



**NON-TITLE V PERMIT APPLICATION
EMISSION POINT DESCRIPTION**

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.					
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)					
2. Unique Source ID (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1) Propane Generator #1					
3. Unique Emission Point ID (name/number/letter which uniquely identifies this emission point, like Stack #1) PG-1					
4. Brief description of air contaminant source (Attach a diagram if appropriate): One 100 hp Sewage Treatment emergency propane generator.					
5. Emission point location	Latitude 35.6028	Longitude 84.7900	6. Distance to nearest property line (Ft.) N/A		
7. Stack or emission point data: →	Height above grade (Ft.) N/A	Diameter (Ft.) N/A	Temperature (°F) N/A	% of time over 125°F 100	Direction of exit (Up, down or horizontal) N/A
Data at exit conditions: →	Flow (actual Ft. ³ /Min.) N/A	Velocity (Ft. /Sec.) N/A	Moisture (Grains/Ft. ³) N/A		Moisture (Percent) N/A
Data at standard conditions: →	Flow (Dry std. Ft. ³ /Min.) N/A	Velocity (Ft. /Sec.) N/A	Moisture (Grains/Ft. ³) N/A		Moisture (Percent) N/A
8. Monitoring device and recording instrument (check all that apply): Opacity monitor SO ₂ monitor NO _x monitor Strip chart Electronic data logger Other (specify in comments) No monitor (none) X					
9. Control device. Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.). N/A					

10. Air contaminants. Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

Air contaminants	Average Emissions (Lbs./Hr.)	Maximum Emissions (Lbs./Hr.)	Concentration	Average Emissions (Ton/Yr.)	Potential Emissions (Ton/Yr.)	Emissions Estimation Method Code *	Control Devices *	Control Efficiency %
Particulate matter (PM)	6.75E-02	6.75E-02	**	7.76E-04	1.69E-02	5	000	0
Sulfur dioxide (SO ₂)	4.73E-03	4.73E-03	***	5.43E-05	1.18E-03	5	000	0
Carbon monoxide (CO)	1.74	1.74	PPM	2.00E-02	0.435	5	000	0
Volatile organic compounds (VOC)	1.12	1.12	PPM	1.29E-02	0.280	5	000	0
Nitrogen oxides (NO _x)	1.88	1.88	PPM	2.16E-02	0.469	5	000	0
Hydrogen fluoride (HF)								
Hydrogen chloride (HCl)								
Lead (Pb)								
Greenhouse gases (CO ₂ equivalents)	168	168		1.93	42.0	5	000	0
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Other (specify)								
Other (specify)								
Other (specify)								
Other (specify)								

11. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 23 hours per year for years 2016 to 2020. This is not a permit restriction. Potential annual emissions based on operating 500 hr/yr. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

12. Signature**Date**

June 17, 2022

Signer's name (type or print)

Title

Phone number with area code

- * Refer to the tables in the instructions for estimation method and control device codes.
- ** Exit gas particulate matter concentration units: Process – Grains/Dry Standard Ft³ (70⁰F), Wood fired boilers - Grains/Dry Standard Ft³ (70⁰F), all other boilers – Lbs. /Million BTU heat input.
- *** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input



DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
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Telephone: (615) 532-0554, Email: Air.Pollution.Control@TN.gov

APC 102

NON-TITLE V PERMIT APPLICATION
PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.			
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)		2. Emission Source Reference Number 72-0029-21	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes ☒ No ☐ If Yes, list rule citation, including Part, Subpart, and applicable Sections: NESHAP: 40 CFR Part 63 Subpart ZZZZ			
4. Unique Source ID (see instructions) Propane Generator #1		5. Unique Emission Point ID (see instructions) PG-1	
6. Description of air contaminant source One 100 hp Sewage Treatment emergency propane generator.			
7. Type of air contaminant source (Check only one option to the right)			
Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14)			
Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14)			
Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14)			X
8. Type of operation: Continuous ☐ Batch ☐		Normal batch time	Normal batches/day
9. Process material inputs and In-process solid fuels	Diagram reference	Input rates (pounds/hour)	
		Design	Actual
A.			
B.			
C.			
D.			
E.			
F.			
G.			
Totals			

* A simple process flow diagram must be attached.

DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE							
10. Boiler or burner data: (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)							
Serial Number				Type of firing*** Internal Combustion			
Rated horsepower 100		Rated input capacity (10 ⁶ BTU/Hr.) 1.24		Other rating (specify capacity and units)			
Date constructed N/A		Date manufactured		Date of last modification (explain in comments below)			
** Source with a common stack will have the same stack number. *** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments)).							
11. Fuel data: (Complete for a process emission source with in process fuel or a non-process fuel burning source)							
Primary fuel type (specify) Propane				Standby fuel type(s) (specify) N/A			
Fuels used	Annual usage	Hourly usage		% Sulfur	% Ash	BTU value of fuel	(For APC use only) SCC code
		Design	Average				
Natural gas:	10 ⁶ Cu. Ft.	Cu. Ft.	Cu. Ft.	///////// /////////	//// ////	1,000	
#2 Fuel oil:	10 ³ Gal.	Gal.	Gal.		//// ////		
#5 Fuel oil:	10 ³ Gal.	Gal.	Gal.		//// ////		
#6 Fuel oil:	10 ³ Gal.	Gal.	Gal.		//// ////		
Coal:	Tons	Lbs.	Lbs.				
Wood:	Tons	Lbs.	Lbs.	///////// /////////	//// ////		
Liquid propane:	10 ³ Gal. 0.311	Gal. 13.5	Gal. 13.5	///////// /////////	//// ////	91,500	
Other (specify type & units):							
12. If Wood is used as a fuel, specify types and estimate percent by weight of bark							
13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.							

14. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 23 hours per year for years 2016 to 2020. This is not a permit restriction. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

15. Signature**Date**

June 17, 2022

Signer's name (type or print)

Title

Phone number with area code

Table 8. Watts Bar Nuclear Plant Actual Emissions for Uncontrolled Stationary Emergency Propane Engine PG-1

		PG-1		
		Sewage Treatment PG		
MMBtu/hr		1.24		
Propane (91,500 Btu/gal), gal/hr		13.5		
hp		100		
Avg. Annual Hours of Operation CY16 to CY20, hr/yr		23		
	Emission Factor*	Actual Emissions		Potential Emissions
	lb/1000 gal	lb/hr	tpy**	ton/yr***
Particulate Matter (PM)	5	6.75E-02	7.76E-04	1.69E-02
Sulfur Dioxide (SO ₂)	0.35	4.73E-03	5.43E-05	1.18E-03
Nitrogen Oxides (NO _x)	139	1.88	2.16E-02	0.469
Carbon Monoxide (CO)	129	1.74	2.00E-02	0.435
Volatile Organic Compounds (VOC)	83	1.12	1.29E-02	0.280
Carbon Dioxide Equivalent****		168	1.93	42.0

* Emission factors from San Diego Air Pollution Control District, Air Toxics Section (6/99), Uncontrolled Propane Fired Internal Combustion Engine.

** Annual emissions for Sewage Treatment Propane Generator based on average hours of operation for years 2016 to 2020 of 23 hr/yr. This is not a permit restriction.

Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

*** Potential annual emissions based on 500 hours per year operation for each engine.

EPA definition of hours for an emergency engine.

**** CO₂ factor is 61.46 kg CO₂/MMBtu, CH₄ factor is 0.003 kg CH₄/MMBtu, N₂O factor is 0.0006 kg N₂O/MMBtu.

CO₂ equivalent factor for CO₂ is 1.0, CO₂ equivalent factor for CH₄ is 25, CO₂ equivalent factor for N₂O is 298.

Sample Calculations for PG-1

Particulates: $5 \text{ lb/1000 gal} \times 13.5 \text{ gal/hr} = 6.75\text{E-}02 \text{ lb/hr}$
 $6.75\text{E-}02 \text{ lb/hr} \times 23 \text{ hr/yr} \times \text{ton/2000 lb} = 7.76\text{E-}04 \text{ ton/yr}$

CO₂ e: $(61.46 \times 1 + 0.003 \times 25 + 0.0006 \times 298) \text{ kg CO}_2\text{e /MMBtu} \times 2.20462 \text{ lb/kg} \times 1.24 \text{ MMBtu/hr} = 168 \text{ lb/hr}$
 $168 \text{ lb/hr} \times 23 \text{ hr/yr} \times \text{ton/2000 lb} = 1.93 \text{ ton/yr}$

PM Potential: $6.75\text{E-}02 \text{ lb/hr} \times 500 \text{ hr/yr} \times \text{ton/2000 lb} = 1.69\text{E-}02 \text{ ton/yr}$



NON-TITLE V PERMIT APPLICATION EMISSION POINT DESCRIPTION

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.													
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)													
2. Unique Source ID (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1) Propane Generator #2													
3. Unique Emission Point ID (name/number/letter which uniquely identifies this emission point, like Stack #1) PG-2													
4. Brief description of air contaminant source (Attach a diagram if appropriate): One 40 hp Met Tower emergency propane generator.													
5. Emission point location	Latitude 35.6028	Longitude 84.7900	6. Distance to nearest property line (Ft.) N/A										
7. Stack or emission point data: →	Height above grade (Ft.) N/A	Diameter (Ft.) N/A	Temperature (°F) N/A	% of time over 125°F 100	Direction of exit (Up, down or horizontal) N/A								
Data at exit conditions: →	Flow (actual Ft. ³ /Min.) N/A	Velocity (Ft. /Sec.) N/A	Moisture (Grains/Ft. ³) N/A		Moisture (Percent) N/A								
Data at standard conditions: →	Flow (Dry std. Ft. ³ /Min.) N/A	Velocity (Ft. /Sec.) N/A	Moisture (Grains/Ft. ³) N/A		Moisture (Percent) N/A								
8. Monitoring device and recording instrument (check all that apply): <table style="width: 100%; border: none;"> <tr> <td style="width: 12.5%;">Opacity monitor</td> <td style="width: 12.5%;">SO₂ monitor</td> <td style="width: 12.5%;">NO_x monitor</td> <td style="width: 12.5%;">Strip chart</td> <td style="width: 12.5%;">Electronic data logger</td> <td style="width: 12.5%;">Other (specify in comments)</td> <td style="width: 12.5%;">No monitor (none) X</td> </tr> </table>							Opacity monitor	SO ₂ monitor	NO _x monitor	Strip chart	Electronic data logger	Other (specify in comments)	No monitor (none) X
Opacity monitor	SO ₂ monitor	NO _x monitor	Strip chart	Electronic data logger	Other (specify in comments)	No monitor (none) X							
9. Control device. Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.). N/A													

10. Air contaminants. Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

Air contaminants	Average Emissions (Lbs./Hr.)	Maximum Emissions (Lbs./Hr.)	Concentration	Average Emissions (Ton/Yr.)	Potential Emissions (Ton/Yr.)	Emissions Estimation Method Code *	Control Devices *	Control Efficiency %
Particulate matter (PM)	2.70E-02	2.70E-02	**	5.12E-04	6.74E-03	5	000	0
Sulfur dioxide (SO ₂)	1.89E-03	1.89E-03	***	3.58E-05	4.72E-04	5	000	0
Carbon monoxide (CO)	0.695	0.695	PPM	1.32E-02	0.174	5	000	0
Volatile organic compounds (VOC)	0.447	0.447	PPM	8.50E-03	0.112	5	000	0
Nitrogen oxides (NO _x)	0.749	0.749	PPM	1.42E-02	0.187	5	000	0
Hydrogen fluoride (HF)								
Hydrogen chloride (HCl)								
Lead (Pb)								
Greenhouse gases (CO ₂ equivalents)	67.1	67.1		1.27	16.8	5	000	0
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Other (specify)								
Other (specify)								
Other (specify)								
Other (specify)								

11. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 38 hours per year for years 2016 to 2020. This is not a permit restriction. Potential annual emissions based on operating 500 hr/yr. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

12. Signature**Date**

June 17, 2022

Signer's name (type or print)

Title

Phone number with area code

- * Refer to the tables in the instructions for estimation method and control device codes.
- ** Exit gas particulate matter concentration units: Process – Grains/Dry Standard Ft³ (70⁰F), Wood fired boilers - Grains/Dry Standard Ft³ (70⁰F), all other boilers – Lbs. /Million BTU heat input.
- *** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input



DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor, Nashville, TN 37243
Telephone: (615) 532-0554, Email: Air.Pollution.Control@TN.gov

APC 102

NON-TITLE V PERMIT APPLICATION
PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.			
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)		2. Emission Source Reference Number 72-0029-21	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes ☒ No ☐ If Yes, list rule citation, including Part, Subpart, and applicable Sections: NESHAP: 40 CFR Part 63 Subpart ZZZZ			
4. Unique Source ID (see instructions) Propane Generator #2		5. Unique Emission Point ID (see instructions) PG-2	
6. Description of air contaminant source One 40 hp Met Tower emergency propane generator.			
7. Type of air contaminant source (Check only one option to the right)			
Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14)			
Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14)			
Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14)			X
8. Type of operation: Continuous ☐ Batch ☐		Normal batch time	Normal batches/day
9. Process material inputs and In-process solid fuels	Diagram reference	Input rates (pounds/hour)	
		Design	Actual
A.			
B.			
C.			
D.			
E.			
F.			
G.			
Totals			

* A simple process flow diagram must be attached.

DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE							
10. Boiler or burner data: (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)							
Serial Number				Type of firing*** Internal Combustion			
Rated horsepower 40		Rated input capacity (10 ⁶ BTU/Hr.) 0.493		Other rating (specify capacity and units)			
Date constructed N/A		Date manufactured		Date of last modification (explain in comments below)			
** Source with a common stack will have the same stack number. *** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments)).							
11. Fuel data: (Complete for a process emission source with in process fuel or a non-process fuel burning source)							
Primary fuel type (specify)		Propane		Standby fuel type(s) (specify)		N/A	
Fuels used	Annual usage	Hourly usage		% Sulfur	% Ash	BTU value of fuel	(For APC use only) SCC code
		Design	Average				
Natural gas:	10 ⁶ Cu. Ft.	Cu. Ft.	Cu. Ft.	///////// /////////	///// /////	1,000	
#2 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////		
#5 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////		
#6 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////		
Coal:	Tons	Lbs.	Lbs.				
Wood:	Tons	Lbs.	Lbs.	///////// /////////	///// /////		
Liquid propane:	10 ³ Gal. 0.205	Gal. 5.39	Gal. 5.39	///////// /////////	///// /////	91,500	
Other (specify type & units):							
12. If Wood is used as a fuel, specify types and estimate percent by weight of bark							
13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.							

14. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 38 hours per year for years 2016 to 2020. This is not a permit restriction. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

15. Signature**Date**

June 17, 2022

Signer's name (type or print)**Title****Phone number with area code**

Table 9. Watts Bar Nuclear Plant Actual Emissions for Uncontrolled Stationary Emergency Propane Engine PG-2

		PG-2 MET Tower PG		
MMBtu/hr		0.493		
Propane (91,500 Btu/gal), gal/hr		5.39		
hp		40		
Avg. Annual Hours of Operation CY16 to CY20, hr/yr		38		
	Emission Factor* lb/1000 gal	Actual Emissions lb/hr tpy**		Potential Emissions ton/yr***
Particulate Matter (PM)	5	2.70E-02	5.12E-04	6.74E-03
Sulfur Dioxide (SO ₂)	0.35	1.89E-03	3.58E-05	4.72E-04
Nitrogen Oxides (NO _x)	139	0.749	1.42E-02	0.187
Carbon Monoxide (CO)	129	0.695	1.32E-02	0.174
Volatile Organic Compounds (VOC)	83	0.447	8.50E-03	0.112
Carbon Dioxide Equivalent****		67.1	1.27	16.8

* Emission factors from San Diego Air Pollution Control District, Air Toxics Section (6/99), Uncontrolled Propane Fired Internal Combustion Engine.

** Annual emissions for Met Tower Propane Generator based on average hours of operation for years 2016 to 2020 of 38 hr/yr. This is not a permit restriction.

*** Potential annual emissions based on 500 hours per year operation for each engine.
EPA definition of hours for an emergency engine.

**** CO₂ factor is 61.46 kg CO₂/MMBtu, CH₄ factor is 0.003 kg CH₄/MMBtu, N₂O factor is 0.0006 kg N₂O/MMBtu.
CO₂ equivalent factor for CO₂ is 1.0, CO₂ equivalent factor for CH₄ is 25, CO₂ equivalent factor for N₂O is 298.

Sample Calculations for PG-2

Particulates: $5 \text{ lb/1000 gal} \times 5.39 \text{ gal/hr} = 2.70\text{E-}02 \text{ lb/hr}$
 $2.70\text{E-}02 \text{ lb/hr} \times 38 \text{ hr/yr} \times \text{ton/2000 lb} = 5.12\text{E-}04 \text{ ton/yr}$

CO₂ e: $(61.46 \times 1 + 0.003 \times 25 + 0.0006 \times 298) \text{ kg CO}_2\text{e/MMBtu} \times 2.20462 \text{ lb/kg} \times 0.493 \text{ MMBtu/hr} = 67.1 \text{ lb/hr}$
 $67.1 \text{ lb/hr} \times 38 \text{ hr/yr} \times \text{ton/2000 lb} = 1.27 \text{ ton/yr}$

PM Potential: $2.70\text{E-}02 \text{ lb/hr} \times 500 \text{ hr/yr} \times \text{ton/2000 lb} = 6.74\text{E-}03 \text{ ton/yr}$



NON-TITLE V PERMIT APPLICATION EMISSION POINT DESCRIPTION

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.												
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)												
2. Unique Source ID (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1) Diesel Generator #14												
3. Unique Emission Point ID (name/number/letter which uniquely identifies this emission point, like Stack #1) DG-14												
4. Brief description of air contaminant source (Attach a diagram if appropriate): One 3 MW Emergency Flex Generator (4,678 hp) installed due to Fukushima nuclear event.												
5. Emission point location	Latitude 35.6028	Longitude 84.7900	6. Distance to nearest property line (Ft.) N/A									
7. Stack or emission point data: →	Height above grade (Ft.)	Diameter (Ft.)	Temperature (°F) 977	% of time over 125°F 100	Direction of exit (Up, down or horizontal)							
Data at exit conditions: →	Flow (actual Ft. ³ /Min.) 24,971	Velocity (Ft. /Sec.)	Moisture (Grains/Ft. ³)		Moisture (Percent)							
Data at standard conditions: →	Flow (Dry std. Ft. ³ /Min.)	Velocity (Ft. /Sec.)	Moisture (Grains/Ft. ³)		Moisture (Percent)							
8. Monitoring device and recording instrument (check all that apply): <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">Opacity monitor</td> <td style="text-align: center;">SO₂ monitor</td> <td style="text-align: center;">NO_x monitor</td> <td style="text-align: center;">Strip chart</td> <td style="text-align: center;">Electronic data logger</td> <td style="text-align: center;">Other (specify in comments)</td> <td style="text-align: center;">No monitor (none) X</td> </tr> </table>						Opacity monitor	SO ₂ monitor	NO _x monitor	Strip chart	Electronic data logger	Other (specify in comments)	No monitor (none) X
Opacity monitor	SO ₂ monitor	NO _x monitor	Strip chart	Electronic data logger	Other (specify in comments)	No monitor (none) X						
9. Control device. Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.). N/A												

10. Air contaminants. Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

Air contaminants	Average Emissions (Lbs./Hr.)	Maximum Emissions (Lbs./Hr.)	Concentration	Average Emissions (Ton/Yr.)	Potential Emissions (Ton/Yr.)	Emissions Estimation Method Code *	Control Devices *	Control Efficiency %
Particulate matter (PM)	1.55	1.55	**	3.09E-03	0.387	5	000	0
Sulfur dioxide (SO ₂)	4.63E-02	4.63E-02	***	9.26E-05	1.16E-02	3	000	0
Carbon monoxide (CO)	26.8	26.8	PPM	5.36E-02	6.70	5	000	0
Volatile organic compounds (VOC)	3.09	3.09	PPM	6.19E-03	0.773	5	000	0
Nitrogen oxides (NO _x)	46.4	46.4	PPM	9.28E-02	11.6	5	000	0
Hydrogen fluoride (HF)								
Hydrogen chloride (HCl)								
Lead (Pb)								
Greenhouse gases (CO ₂ equivalents)	4,999	4,999		10.0	1,250	5	000	0
Hazardous air pollutant (specify) Gas HAP Total	4.81E-02	4.81E-02		9.62E-05	1.20E-02	3	000	0
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Other (specify)								
Other (specify)								
Other (specify)								
Other (specify)								

11. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 4 hours per year for years 2016 to 2020. This is not a permit restriction. Potential annual emissions based on operating 500 hr/yr. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

12. Signature**Date**

June 17, 2022

Signer's name (type or print)**Title****Phone number with area code**

* Refer to the tables in the instructions for estimation method and control device codes.

** Exit gas particulate matter concentration units: Process – Grains/Dry Standard Ft³ (70°F), Wood fired boilers - Grains/Dry Standard Ft³ (70°F), all other boilers – Lbs. /Million BTU heat input.

*** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input



NON-TITLE V PERMIT APPLICATION
PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.			
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)		2. Emission Source Reference Number 72-0029-22	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes ☒ No ☐ If Yes, list rule citation, including Part, Subpart, and applicable Sections: NESHAP: 40 CFR Part 63 Subpart ZZZZ and NSPS: 40 CFR Part 60 Subpart IIII			
4. Unique Source ID (see instructions) Diesel Generator #14		5. Unique Emission Point ID (see instructions) DG-14	
6. Description of air contaminant source One 3 MW Emergency Flex Generator (4,678 hp) installed due to Fukushima nuclear event.			
7. Type of air contaminant source (Check only one option to the right)			
Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14)			
Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14)			
Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14)			X
8. Type of operation: Continuous ☐ Batch ☐		Normal batch time	Normal batches/day
9. Process material inputs and In-process solid fuels	Diagram reference	Input rates (pounds/hour)	
		Design	Actual
A.			
B.			
C.			
D.			
E.			
F.			
G.			
Totals			

* A simple process flow diagram must be attached.

DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE							
10. Boiler or burner data: (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)							
Serial Number				Type of firing*** Internal Combustion			
Rated horsepower 4,678		Rated input capacity (10 ⁶ BTU/Hr.) 30.6		Other rating (specify capacity and units)			
Date constructed 2014		Date manufactured		Date of last modification (explain in comments below)			
** Source with a common stack will have the same stack number. *** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments)).							
11. Fuel data: (Complete for a process emission source with in process fuel or a non-process fuel burning source)							
Primary fuel type (specify)		#2 Fuel Oil		Standby fuel type(s) (specify)		N/A	
Fuels used	Annual usage	Hourly usage		% Sulfur	% Ash	BTU value of fuel	(For APC use only) SCC code
		Design	Average				
Natural gas:	10 ⁶ Cu. Ft.	Cu. Ft.	Cu. Ft.	///////// /////////	///// /////	1,000	
#2 Fuel oil:	10 ³ Gal. 0.892	Gal. 223	Gal. 223	0.0015	///// /////	137,000	
#5 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////		
#6 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////		
Coal:	Tons	Lbs.	Lbs.				
Wood:	Tons	Lbs.	Lbs.	///////// /////////	///// /////		
Liquid propane:	10 ³ Gal.	Gal.	Gal.	///////// /////////	///// /////	85,000	
Other (specify type & units):							
12. If Wood is used as a fuel, specify types and estimate percent by weight of bark							
13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.							

14. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 4 hours per year for years 2016 to 2020. This is not a permit restriction. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

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Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

15. Signature**Date**

June 17, 2022

Signer's name (type or print)**Title****Phone number with area code**

Table 10. Watts Bar Nuclear Plant Actual Emissions for Stationary Emergency Diesel Engine DG-14

				DG-14	
				3 MW Flex Generator	
MMBtu/hr				30.6	
Diesel (137,000 Btu/gal), gal/hr*				223	
hp*				4,678	
Avg. Annual Hours of Operation CY16 to CY20, hr/yr				4	
	Tier 2 Emission Standards g/hphr	AP-42 Emission Factor** lb/MMBtu	Actual Emissions		Potential Emissions ton/yr****
			lb/hr	ton/yr***	ton/yr****
Particulate Matter (PM ₁₀)	0.15		1.55	3.09E-03	0.387
Sulfur Dioxide (SO ₂)		0.001515	4.63E-02	9.26E-05	1.16E-02
Nitrogen Oxides (NO _x)	4.5		46.4	9.28E-02	11.6
Carbon Monoxide (CO)	2.60		26.8	5.36E-02	6.70
Hydrocarbons (HC)	0.30		3.09	6.19E-03	0.773
Benzene		7.76E-04	2.37E-02	4.74E-05	5.93E-03
Toluene		2.81E-04	8.58E-03	1.72E-05	2.15E-03
Xylenes		1.93E-04	5.90E-03	1.18E-05	1.47E-03
Formaldehyde		7.89E-05	2.41E-03	4.82E-06	6.03E-04
Acetaldehyde		2.52E-05	7.70E-04	1.54E-06	1.92E-04
Acrolein		7.88E-06	2.41E-04	4.81E-07	6.02E-05
Total POMs		2.12E-04	6.48E-03	1.30E-05	1.62E-03
Total HAPs		1.57E-03	4.81E-02	9.62E-05	1.20E-02
Carbon Dioxide Equivalent*****		163.6	4,999	10.0	1,250

* Based on information from manufacturer, MTU Diesel Engines.

** AP-42, 5th edition, Section 3.4, 10/96. Sulfur dioxide based on 15 ppm sulfur in diesel fuel.

*** Annual emissions for DG-14 based on average hours of operation for years 2016 to 2020 of 4 hr/yr. This is not a permit restriction.

Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

**** Potential annual emissions based on 500 hours per year operation for each engine. EPA definition of hours for an emergency engine.

***** CO₂ factor is 73.96 kg CO₂/MMBtu, CH₄ factor is 0.003 kg CH₄/MMBtu, N₂O factor is 0.0006 kg N₂O/MMBtu.

CO₂ equivalent factor for CO₂ is 1.0, CO₂ equivalent factor for CH₄ is 25, CO₂ equivalent factor for N₂O is 298.

Sample Calculations for DG-14

Particulates: 0.15 g/hphr x 4678 hp x lb/453.6 g = 1.55 lb/hr
1.55 lb/hr x 4 hr/yr x ton/2000 lb = 3.09E-03 ton/yr

Sulfur Dioxide: 15 ppm sulfur = 0.0015 %S
1.01 x 0.0015 lb/MMBtu x 30.6 MMBtu/hr = 4.63E-02 lb/hr
4.63E-02 lb/hr x 4 hr/yr x ton/2000 lb = 9.26E-05 ton/yr

PM Potential: 1.55 lb/hr x 500 hr/yr x ton/2000 lb = 0.387 ton/yr



**NON-TITLE V PERMIT APPLICATION
EMISSION POINT DESCRIPTION**

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.					
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)					
2. Unique Source ID (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1) Diesel Generator #15					
3. Unique Emission Point ID (name/number/letter which uniquely identifies this emission point, like Stack #1) DG-15					
4. Brief description of air contaminant source (Attach a diagram if appropriate): One 3 MW Emergency Flex Generator (4,678 hp) installed due to Fukushima nuclear event.					
5. Emission point location	Latitude 35.6028	Longitude 84.7900	6. Distance to nearest property line (Ft.) N/A		
7. Stack or emission point data: →	Height above grade (Ft.)	Diameter (Ft.)	Temperature (°F) 977	% of time over 125°F 100	Direction of exit (Up, down or horizontal)
Data at exit conditions: →	Flow (actual Ft. ³ /Min.) 24,971	Velocity (Ft. /Sec.)	Moisture (Grains/Ft. ³)		Moisture (Percent)
Data at standard conditions: →	Flow (Dry std. Ft. ³ /Min.)	Velocity (Ft. /Sec.)	Moisture (Grains/Ft. ³)		Moisture (Percent)
8. Monitoring device and recording instrument (check all that apply): Opacity monitor SO ₂ monitor NO _x monitor Strip chart Electronic data logger Other (specify in comments) No monitor (none) X					
9. Control device. Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.). N/A					

10. Air contaminants. Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)								
Air contaminants	Average Emissions (Lbs./Hr.)	Maximum Emissions (Lbs./Hr.)	Concentration	Average Emissions (Ton/Yr.)	Potential Emissions (Ton/Yr.)	Emissions Estimation Method Code *	Control Devices *	Control Efficiency %
Particulate matter (PM)	1.55	1.55	**	2.32E-03	0.387	5	000	0
Sulfur dioxide (SO ₂)	4.63E-02	4.63E-02	***	6.94E-05	1.16E-02	3	000	0
Carbon monoxide (CO)	26.8	26.8	PPM	4.02E-02	6.70	5	000	0
Volatile organic compounds (VOC)	3.09	3.09	PPM	4.64E-03	0.773	5	000	0
Nitrogen oxides (NO _x)	46.4	46.4	PPM	6.96E-02	11.6	5	000	0
Hydrogen fluoride (HF)								
Hydrogen chloride (HCl)								
Lead (Pb)								
Greenhouse gases (CO ₂ equivalents)	4,999	4,999		7.50	1,250	5	000	0
Hazardous air pollutant (specify) Gas HAP Total	4.81E-02	4.81E-02		7.21E-05	1.20E-02	3	000	0
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Other (specify)								
Other (specify)								
Other (specify)								
Other (specify)								

11. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 3 hours per year for years 2016 to 2020. This is not a permit restriction. Potential annual emissions based on operating 500 hr/yr. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

12. Signature**Date**

June 17, 2022

Signer's name (type or print)**Title****Phone number with area code**

- * Refer to the tables in the instructions for estimation method and control device codes.
- ** Exit gas particulate matter concentration units: Process – Grains/Dry Standard Ft³ (70⁰F), Wood fired boilers - Grains/Dry Standard Ft³ (70⁰F), all other boilers – Lbs. /Million BTU heat input.
- *** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input



NON-TITLE V PERMIT APPLICATION
PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.			
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)		2. Emission Source Reference Number 72-0029-23	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes ☒ No ☐ If Yes, list rule citation, including Part, Subpart, and applicable Sections: NESHAP: 40 CFR Part 63 Subpart ZZZZ and NSPS: 40 CFR Part 60 Subpart IIII			
4. Unique Source ID (see instructions) Diesel Generator #15		5. Unique Emission Point ID (see instructions) DG-15	
6. Description of air contaminant source One 3 MW Emergency Flex Generator (4,678 hp) installed due to Fukushima nuclear event.			
7. Type of air contaminant source (Check only one option to the right)			
Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14)			
Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14)			
Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14)			X
8. Type of operation: Continuous ☐ Batch ☐		Normal batch time	Normal batches/day
9. Process material inputs and In-process solid fuels	Diagram reference	Input rates (pounds/hour)	
		Design	Actual
A.			
B.			
C.			
D.			
E.			
F.			
G.			
Totals			

* A simple process flow diagram must be attached.

DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE							
10. Boiler or burner data: (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)							
Serial Number				Type of firing*** Internal Combustion			
Rated horsepower 4,678		Rated input capacity (10 ⁶ BTU/Hr.) 30.6		Other rating (specify capacity and units)			
Date constructed 2014		Date manufactured		Date of last modification (explain in comments below)			
** Source with a common stack will have the same stack number. *** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments)).							
11. Fuel data: (Complete for a process emission source with in process fuel or a non-process fuel burning source)							
Primary fuel type (specify)		#2 Fuel Oil		Standby fuel type(s) (specify)		N/A	
Fuels used	Annual usage	Hourly usage		% Sulfur	% Ash	BTU value of fuel	(For APC use only) SCC code
		Design	Average				
Natural gas:	10 ⁶ Cu. Ft.	Cu. Ft.	Cu. Ft.	///////// /////////	//// ////	1,000	
#2 Fuel oil:	10 ³ Gal. 0.669	Gal. 223	Gal. 223	0.0015	//// ////	137,000	
#5 Fuel oil:	10 ³ Gal.	Gal.	Gal.		//// ////		
#6 Fuel oil:	10 ³ Gal.	Gal.	Gal.		//// ////		
Coal:	Tons	Lbs.	Lbs.				
Wood:	Tons	Lbs.	Lbs.	///////// /////////	//// ////		
Liquid propane:	10 ³ Gal.	Gal.	Gal.	///////// /////////	//// ////	85,000	
Other (specify type & units):							
12. If Wood is used as a fuel, specify types and estimate percent by weight of bark							
13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.							

14. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 3 hours per year for years 2016 to 2020. This is not a permit restriction. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

15. Signature**Date**

June 17, 2022

Signer's name (type or print)**Title****Phone number with area code**

Table 11. Watts Bar Nuclear Plant Actual Emissions for Stationary Emergency Diesel Engine DG-15

				DG-15	
				3 MW Flex Generator	
MMBtu/hr				30.6	
Diesel (137,000 Btu/gal), gal/hr*				223	
hp*				4,678	
Avg. Annual Hours of Operation CY16 to CY20, hr/yr				3	
	Tier 2 Emission Standards g/hphr	AP-42 Emission Factor** lb/MMBtu	Actual Emissions		Potential Emissions ton/yr****
			lb/hr	ton/yr***	ton/yr****
Particulate Matter (PM ₁₀)	0.15		1.55	2.32E-03	0.387
Sulfur Dioxide (SO ₂)		0.001515	4.63E-02	6.94E-05	1.16E-02
Nitrogen Oxides (NOx)	4.5		46.4	6.96E-02	11.6
Carbon Monoxide (CO)	2.60		26.8	4.02E-02	6.70
Hydrocarbons (HC)	0.30		3.09	4.64E-03	0.773
Benzene		7.76E-04	2.37E-02	3.56E-05	5.93E-03
Toluene		2.81E-04	8.58E-03	1.29E-05	2.15E-03
Xylenes		1.93E-04	5.90E-03	8.84E-06	1.47E-03
Formaldehyde		7.89E-05	2.41E-03	3.62E-06	6.03E-04
Acetaldehyde		2.52E-05	7.70E-04	1.15E-06	1.92E-04
Acrolein		7.88E-06	2.41E-04	3.61E-07	6.02E-05
Total POMs		2.12E-04	6.48E-03	9.72E-06	1.62E-03
Total HAPs		1.57E-03	4.81E-02	7.21E-05	1.20E-02
Carbon Dioxide Equivalent*****		163.6	4,999	7.50	1,250

* Based on information from manufacturer, MTU Diesel Engines.

** AP-42, 5th edition, Section 3.4, 10/96. Sulfur dioxide based on 15 ppm sulfur in diesel fuel.

*** Annual emissions for DG-15 based on average hours of operation for years 2016 to 2020 of 3 hr/yr. This is not a permit restriction.

Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

**** Potential annual emissions based on 500 hours per year operation for each engine. EPA definition of hours for an emergency engine.

***** CO₂ factor is 73.96 kg CO₂/MMBtu, CH₄ factor is 0.003 kg CH₄/MMBtu, N₂O factor is 0.0006 kg N₂O/MMBtu.

CO₂ equivalent factor for CO₂ is 1.0, CO₂ equivalent factor for CH₄ is 25, CO₂ equivalent factor for N₂O is 298.

Sample Calculations for DG-15

Particulates: 0.15 g/hphr x 4678 hp x lb/453.6 g = 1.55 lb/hr
1.55 lb/hr x 3 hr/yr x ton/2000 lb = 2.32E-03 ton/yr

Sulfur Dioxide: 15 ppm sulfur = 0.0015 %S
1.01 x 0.0015 lb/MMBtu x 30.6 MMBtu/hr = 4.63E-02 lb/hr
4.63E-02 lb/hr x 3 hr/yr x ton/2000 lb = 6.94E-05 ton/yr

PM Potential: 1.55 lb/hr x 500 hr/yr x ton/2000 lb = 0.387 ton/yr



**NON-TITLE V PERMIT APPLICATION
EMISSION POINT DESCRIPTION**

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.					
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)					
2. Unique Source ID (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1) Diesel Generator #16					
3. Unique Emission Point ID (name/number/letter which uniquely identifies this emission point, like Stack #1) DG-16					
4. Brief description of air contaminant source (Attach a diagram if appropriate): One 180 kW Emergency Flex Generator (315 hp) installed due to Fukushima nuclear event.					
5. Emission point location	Latitude 35.6028	Longitude 84.7900	6. Distance to nearest property line (Ft.) N/A		
7. Stack or emission point data: →	Height above grade (Ft.)	Diameter (Ft.)	Temperature (°F) 982	% of time over 125°F 100	Direction of exit (Up, down or horizontal)
Data at exit conditions: →	Flow (actual Ft. ³ /Min.) 1,371	Velocity (Ft. /Sec.)	Moisture (Grains/Ft. ³)		Moisture (Percent)
Data at standard conditions: →	Flow (Dry std. Ft. ³ /Min.)	Velocity (Ft. /Sec.)	Moisture (Grains/Ft. ³)		Moisture (Percent)
8. Monitoring device and recording instrument (check all that apply): Opacity monitor SO ₂ monitor NO _x monitor Strip chart Electronic data logger Other (specify in comments) No monitor (none) X					
9. Control device. Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.). N/A					

10. Air contaminants. Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

Air contaminants	Average Emissions (Lbs./Hr.)	Maximum Emissions (Lbs./Hr.)	Concentration	Average Emissions (Ton/Yr.)	Potential Emissions (Ton/Yr.)	Emissions Estimation Method Code *	Control Devices *	Control Efficiency %
Particulate matter (PM)	0.104	0.104	**	1.56E-04	2.60E-02	5	000	0
Sulfur dioxide (SO ₂)	2.80E-03	2.80E-03	***	4.20E-06	7.00E-04	3	000	0
Carbon monoxide (CO)	1.81	1.81	PPM	2.71E-03	0.451	5	000	0
Volatile organic compounds (VOC)	0.139	0.139	PPM	2.08E-04	3.47E-02	5	000	0
Nitrogen oxides (NO _x)	1.94	1.94	PPM	2.92E-03	0.486	5	000	0
Hydrogen fluoride (HF)								
Hydrogen chloride (HCl)								
Lead (Pb)								
Greenhouse gases (CO ₂ equivalents)	303	303		0.454	75.7	5	000	0
Hazardous air pollutant (specify) Gas HAP Total	7.16E-03	7.16E-03		1.07E-05	1.79E-03	3	000	0
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Other (specify)								
Other (specify)								
Other (specify)								
Other (specify)								

11. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 3 hours per year for years 2016 to 2020. This is not a permit restriction. Potential annual emissions based on operating 500 hr/yr. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

12. Signature**Date**

June 17, 2022

Signer's name (type or print)

Title

Phone number with area code

- * Refer to the tables in the instructions for estimation method and control device codes.
- ** Exit gas particulate matter concentration units: Process – Grains/Dry Standard Ft³ (70⁰F), Wood fired boilers - Grains/Dry Standard Ft³ (70⁰F), all other boilers – Lbs. /Million BTU heat input.
- *** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input



DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor, Nashville, TN 37243
Telephone: (615) 532-0554, Email: Air.Pollution.Control@TN.gov

APC 102

NON-TITLE V PERMIT APPLICATION
PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.			
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)		2. Emission Source Reference Number 72-0029-24	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes ☒ No ☐ If Yes, list rule citation, including Part, Subpart, and applicable Sections: NESHAP: 40 CFR Part 63 Subpart ZZZZ and NSPS: 40 CFR Part 60 Subpart IIII			
4. Unique Source ID (see instructions) Diesel Generator #16		5. Unique Emission Point ID (see instructions) DG-16	
6. Description of air contaminant source One 180 kW Emergency Flex Generator (315 hp) installed due to Fukushima nuclear event.			
7. Type of air contaminant source (Check only one option to the right)			
Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14)			
Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14)			
Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14)			X
8. Type of operation: Continuous ☐ Batch ☐		Normal batch time	Normal batches/day
9. Process material inputs and In-process solid fuels	Diagram reference	Input rates (pounds/hour)	
		Design	Actual
A.			
B.			
C.			
D.			
E.			
F.			
G.			
Totals			

* A simple process flow diagram must be attached.

DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE							
10. Boiler or burner data: (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)							
Serial Number				Type of firing*** Internal Combustion			
Rated horsepower 315		Rated input capacity (10 ⁶ BTU/Hr.) 1.85		Other rating (specify capacity and units)			
Date constructed 2014		Date manufactured		Date of last modification (explain in comments below)			
** Source with a common stack will have the same stack number. *** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments)).							
11. Fuel data: (Complete for a process emission source with in process fuel or a non-process fuel burning source)							
Primary fuel type (specify)		#2 Fuel Oil		Standby fuel type(s) (specify)		N/A	
Fuels used	Annual usage	Hourly usage		% Sulfur	% Ash	BTU value of fuel	(For APC use only) SCC code
		Design	Average				
Natural gas:	10 ⁶ Cu. Ft.	Cu. Ft.	Cu. Ft.	///////// /////////	//// ////	1,000	
#2 Fuel oil:	10 ³ Gal. 0.0405	Gal. 13.5	Gal. 13.5	0.0015	//// ////	137,000	
#5 Fuel oil:	10 ³ Gal.	Gal.	Gal.		//// ////		
#6 Fuel oil:	10 ³ Gal.	Gal.	Gal.		//// ////		
Coal:	Tons	Lbs.	Lbs.				
Wood:	Tons	Lbs.	Lbs.	///////// /////////	//// ////		
Liquid propane:	10 ³ Gal.	Gal.	Gal.	///////// /////////	//// ////	85,000	
Other (specify type & units):							
12. If Wood is used as a fuel, specify types and estimate percent by weight of bark							
13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.							

14. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 3 hours per year for years 2016 to 2020. This is not a permit restriction. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

15. Signature**Date**

June 17, 2022

Signer's name (type or print)

Title

Phone number with area code

Table 12. Watts Bar Nuclear Plant Actual Emissions for Stationary Emergency Diesel Engine DG-16

				DG-16	
				180 kW Flex Generator	
MMBtu/hr				1.85	
Diesel (137,000 Btu/gal), gal/hr*				13.5	
hp*				315	
Avg. Annual Hours of Operation CY16 to CY20, hr/yr				3	
	Tier 3	AP-42			Potential
	Emission Standards	Emission Factor**	Actual Emissions		Emissions
	g/hphr	lb/MMBtu	lb/hr	ton/yr***	ton/yr****
Particulate Matter (PM ₁₀)	0.15		0.104	1.56E-04	2.60E-02
Sulfur Dioxide (SO ₂)		0.001515	2.80E-03	4.20E-06	7.00E-04
Nitrogen Oxides (NO _x)	2.8		1.94	2.92E-03	0.486
Carbon Monoxide (CO)	2.60		1.81	2.71E-03	0.451
Hydrocarbons (HC)	0.20		0.139	2.08E-04	3.47E-02
Benzene		9.33E-04	1.73E-03	2.59E-06	4.31E-04
Toluene		4.09E-04	7.56E-04	1.13E-06	1.89E-04
Xylenes		2.85E-04	5.27E-04	7.91E-07	1.32E-04
1,3-Butadiene		3.91E-05	7.23E-05	1.08E-07	1.81E-05
Formaldehyde		1.18E-03	2.18E-03	3.27E-06	5.46E-04
Acetaldehyde		7.67E-04	1.42E-03	2.13E-06	3.55E-04
Acrolein		9.25E-05	1.71E-04	2.57E-07	4.28E-05
Total POMs		1.68E-04	3.11E-04	4.66E-07	7.77E-05
Total HAPs		3.87E-03	7.16E-03	1.07E-05	1.79E-03
Carbon Dioxide Equivalent****		163.6	303	0.454	75.7

* Based on information from manufacturer, John Deere Engines.

** AP-42, 5th edition, Section 3.3, 10/96. Sulfur dioxide based on 15 ppm sulfur in diesel fuel.

*** Annual emissions for DG-16 based on average hours of operation for years 2016 to 2020 of 3 hr/yr. This is not a permit restriction.

Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

**** Potential annual emissions based on 500 hours per year operation for each engine. EPA definition of hours for an emergency engine.

***** CO₂ factor is 73.96 kg CO₂/MMBtu, CH₄ factor is 0.003 kg CH₄/MMBtu, N₂O factor is 0.0006 kg N₂O/MMBtu.

CO₂ equivalent factor for CO₂ is 1.0, CO₂ equivalent factor for CH₄ is 25, CO₂ equivalent factor for N₂O is 298.

Sample Calculations for DG-16

Particulates: $0.15 \text{ g/hphr} \times 315 \text{ hp} \times \text{lb}/453.6 \text{ g} = 0.104 \text{ lb/hr}$
 $0.104 \text{ lb/hr} \times 3 \text{ hr/yr} \times \text{ton}/2000 \text{ lb} = 1.56\text{E-}04 \text{ ton/yr}$

Sulfur Dioxide: $15 \text{ ppm sulfur} = 0.0015 \% \text{S}$
 $1.01 \times 0.0015 \text{ lb/MMBtu} \times 1.85 \text{ MMBtu/hr} = 2.80\text{E-}03 \text{ lb/hr}$
 $2.80\text{E-}03 \text{ lb/hr} \times 3 \text{ hr/yr} \times \text{ton}/2000 \text{ lb} = 4.20\text{E-}06 \text{ ton/yr}$

PM Potential: $0.104 \text{ lb/hr} \times 500 \text{ hr/yr} \times \text{ton}/2000 \text{ lb} = 2.60\text{E-}02 \text{ ton/yr}$



**NON-TITLE V PERMIT APPLICATION
 EMISSION POINT DESCRIPTION**

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.												
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)												
2. Unique Source ID (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1) Diesel Generator #17												
3. Unique Emission Point ID (name/number/letter which uniquely identifies this emission point, like Stack #1) DG-17												
4. Brief description of air contaminant source (Attach a diagram if appropriate): One 180 kW Emergency Flex Generator (315 hp) installed due to Fukushima nuclear event.												
5. Emission point location	Latitude 35.6028	Longitude 84.7900	6. Distance to nearest property line (Ft.) N/A									
7. Stack or emission point data: →	Height above grade (Ft.)	Diameter (Ft.)	Temperature (°F) 982	% of time over 125°F 100	Direction of exit (Up, down or horizontal)							
Data at exit conditions: →	Flow (actual Ft. ³ /Min.) 1,371	Velocity (Ft. /Sec.)	Moisture (Grains/Ft. ³)		Moisture (Percent)							
Data at standard conditions: →	Flow (Dry std. Ft. ³ /Min.)	Velocity (Ft. /Sec.)	Moisture (Grains/Ft. ³)		Moisture (Percent)							
8. Monitoring device and recording instrument (check all that apply): <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;">Opacity monitor</td> <td style="text-align: center;">SO₂ monitor</td> <td style="text-align: center;">NO_x monitor</td> <td style="text-align: center;">Strip chart</td> <td style="text-align: center;">Electronic data logger</td> <td style="text-align: center;">Other (specify in comments)</td> <td style="text-align: center;">No monitor (none) X</td> </tr> </table>						Opacity monitor	SO ₂ monitor	NO _x monitor	Strip chart	Electronic data logger	Other (specify in comments)	No monitor (none) X
Opacity monitor	SO ₂ monitor	NO _x monitor	Strip chart	Electronic data logger	Other (specify in comments)	No monitor (none) X						
9. Control device. Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.). N/A												

10. Air contaminants. Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

Air contaminants	Average Emissions (Lbs./Hr.)	Maximum Emissions (Lbs./Hr.)	Concentration	Average Emissions (Ton/Yr.)	Potential Emissions (Ton/Yr.)	Emissions Estimation Method Code *	Control Devices *	Control Efficiency %
Particulate matter (PM)	0.104	0.104	**	1.04E-04	2.60E-02	5	000	0
Sulfur dioxide (SO ₂)	2.80E-03	2.80E-03	***	2.80E-06	7.00E-04	3	000	0
Carbon monoxide (CO)	1.81	1.81	PPM	1.81E-03	0.451	5	000	0
Volatile organic compounds (VOC)	0.139	0.139	PPM	1.39E-04	3.47E-02	5	000	0
Nitrogen oxides (NO _x)	1.94	1.94	PPM	1.94E-03	0.486	5	000	0
Hydrogen fluoride (HF)								
Hydrogen chloride (HCl)								
Lead (Pb)								
Greenhouse gases (CO ₂ equivalents)	303	303		0.303	75.7	5	000	0
Hazardous air pollutant (specify) Gas HAP Total	7.16E-03	7.16E-03		7.16E-06	1.79E-03	3	000	0
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Other (specify)								
Other (specify)								
Other (specify)								
Other (specify)								

11. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 2 hours per year for years 2016 to 2020. This is not a permit restriction. Potential annual emissions based on operating 500 hr/yr. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

12. Signature**Date**

June 17, 2022

Signer's name (type or print)

Title

Phone number with area code

- * Refer to the tables in the instructions for estimation method and control device codes.
- ** Exit gas particulate matter concentration units: Process – Grains/Dry Standard Ft³ (70⁰F), Wood fired boilers - Grains/Dry Standard Ft³ (70⁰F), all other boilers – Lbs. /Million BTU heat input.
- *** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input



DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor, Nashville, TN 37243
Telephone: (615) 532-0554, Email: Air.Pollution.Control@TN.gov

APC 102

NON-TITLE V PERMIT APPLICATION
PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.			
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)		2. Emission Source Reference Number 72-0029-25	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes ☒ No ☐ If Yes, list rule citation, including Part, Subpart, and applicable Sections: NESHAP: 40 CFR Part 63 Subpart ZZZZ and NSPS: 40 CFR Part 60 Subpart IIII			
4. Unique Source ID (see instructions) Diesel Generator #17		5. Unique Emission Point ID (see instructions) DG-17	
6. Description of air contaminant source One 180 kW Emergency Flex Generator (315 hp) installed due to Fukushima nuclear event.			
7. Type of air contaminant source (Check only one option to the right)			
Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14)			
Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14)			
Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14)			X
8. Type of operation: Continuous ☐ Batch ☐		Normal batch time	Normal batches/day
9. Process material inputs and In-process solid fuels	Diagram reference	Input rates (pounds/hour)	
		Design	Actual
A.			
B.			
C.			
D.			
E.			
F.			
G.			
Totals			

* A simple process flow diagram must be attached.

DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE							
10. Boiler or burner data: (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)							
Serial Number				Type of firing*** Internal Combustion			
Rated horsepower 315		Rated input capacity (10 ⁶ BTU/Hr.) 1.85		Other rating (specify capacity and units)			
Date constructed 2014		Date manufactured		Date of last modification (explain in comments below)			
** Source with a common stack will have the same stack number. *** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments)).							
11. Fuel data: (Complete for a process emission source with in process fuel or a non-process fuel burning source)							
Primary fuel type (specify)		#2 Fuel Oil		Standby fuel type(s) (specify)		N/A	
Fuels used	Annual usage	Hourly usage		% Sulfur	% Ash	BTU value of fuel	(For APC use only) SCC code
		Design	Average				
Natural gas:	10 ⁶ Cu. Ft.	Cu. Ft.	Cu. Ft.	///////// /////////	///// /////	1,000	
#2 Fuel oil:	10 ³ Gal. 0.0270	Gal. 13.5	Gal. 13.5	0.0015	///// /////	137,000	
#5 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////		
#6 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////		
Coal:	Tons	Lbs.	Lbs.				
Wood:	Tons	Lbs.	Lbs.	///////// /////////	///// /////		
Liquid propane:	10 ³ Gal.	Gal.	Gal.	///////// /////////	///// /////	85,000	
Other (specify type & units):							
12. If Wood is used as a fuel, specify types and estimate percent by weight of bark							
13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.							

14. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 2 hours per year for years 2016 to 2020. This is not a permit restriction. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

15. Signature**Date**

June 17, 2022

Signer's name (type or print)

Title

Phone number with area code

Table 13. Watts Bar Nuclear Plant Actual Emissions for Stationary Emergency Diesel Engine DG-17

			DG-17		
			180 kW Flex Generator		
MMBtu/hr			1.85		
Diesel (137,000 Btu/gal), gal/hr*			13.5		
hp*			315		
Avg. Annual Hours of Operation CY16 to CY20, hr/yr			2		
	Tier 3 Emission Standards g/hphr	AP-42 Emission Factor** lb/MMBtu	Actual Emissions		Potential Emissions ton/yr****
			lb/hr	ton/yr***	ton/yr****
Particulate Matter (PM ₁₀)	0.15		0.104	1.04E-04	2.60E-02
Sulfur Dioxide (SO ₂)		0.001515	2.80E-03	2.80E-06	7.00E-04
Nitrogen Oxides (NO _x)	2.8		1.94	1.94E-03	0.486
Carbon Monoxide (CO)	2.60		1.81	1.81E-03	0.451
Hydrocarbons (HC)	0.20		0.139	1.39E-04	3.47E-02
Benzene		9.33E-04	1.73E-03	1.73E-06	4.31E-04
Toluene		4.09E-04	7.56E-04	7.56E-07	1.89E-04
Xylenes		2.85E-04	5.27E-04	5.27E-07	1.32E-04
1,3-Butadiene		3.91E-05	7.23E-05	7.23E-08	1.81E-05
Formaldehyde		1.18E-03	2.18E-03	2.18E-06	5.46E-04
Acetaldehyde		7.67E-04	1.42E-03	1.42E-06	3.55E-04
Acrolein		9.25E-05	1.71E-04	1.71E-07	4.28E-05
Total POMs		1.68E-04	3.11E-04	3.11E-07	7.77E-05
Total HAPs		3.87E-03	7.16E-03	7.16E-06	1.79E-03
Carbon Dioxide Equivalent****		163.6	303	0.303	75.7

* Based on information from manufacturer, John Deere Engines.

** AP-42, 5th edition, Section 3.3, 10/96. Sulfur dioxide based on 15 ppm sulfur in diesel fuel.

*** Annual emissions for DG-17 based on average hours of operation for years 2016 to 2020 of 2 hr/yr. This is not a permit restriction.

Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

**** Potential annual emissions based on 500 hours per year operation for each engine. EPA definition of hours for an emergency engine.

***** CO₂ factor is 73.96 kg CO₂/MMBtu, CH₄ factor is 0.003 kg CH₄/MMBtu, N₂O factor is 0.0006 kg N₂O/MMBtu.

CO₂ equivalent factor for CO₂ is 1.0, CO₂ equivalent factor for CH₄ is 25, CO₂ equivalent factor for N₂O is 298.

Sample Calculations for DG-17

Particulates: $0.15 \text{ g/hphr} \times 315 \text{ hp} \times \text{lb}/453.6 \text{ g} = 0.104 \text{ lb/hr}$
 $0.104 \text{ lb/hr} \times 2 \text{ hr/yr} \times \text{ton}/2000 \text{ lb} = 1.04\text{E-}04 \text{ ton/yr}$

Sulfur Dioxide: $15 \text{ ppm sulfur} = 0.0015 \% \text{S}$
 $1.01 \times 0.0015 \text{ lb/MMBtu} \times 1.85 \text{ MMBtu/hr} = 2.80\text{E-}03 \text{ lb/hr}$
 $2.80\text{E-}03 \text{ lb/hr} \times 2 \text{ hr/yr} \times \text{ton}/2000 \text{ lb} = 2.80\text{E-}06 \text{ ton/yr}$

PM Potential: $0.104 \text{ lb/hr} \times 500 \text{ hr/yr} \times \text{ton}/2000 \text{ lb} = 2.60\text{E-}02 \text{ ton/yr}$



**NON-TITLE V PERMIT APPLICATION
EMISSION POINT DESCRIPTION**

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.					
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)					
2. Unique Source ID (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1) Diesel Generator #8					
3. Unique Emission Point ID (name/number/letter which uniquely identifies this emission point, like Stack #1) DG-8					
4. Brief description of air contaminant source (Attach a diagram if appropriate): One 230 hp TSOB Building emergency diesel generator. Perkins 1106D-E66TAG3 diesel engine Tier 3.					
5. Emission point location	Latitude 35.6028	Longitude 84.7900	6. Distance to nearest property line (Ft.) N/A		
7. Stack or emission point data: →	Height above grade (Ft.) 5.2	Diameter (Ft.) 0.292	Temperature (°F) 1157	% of time over 125°F 100	Direction of exit (Up, down or horizontal) up
Data at exit conditions: →	Flow (actual Ft. ³ /Min.) 1,112	Velocity (Ft. /Sec.) 277	Moisture (Grains/Ft. ³) N/A		Moisture (Percent) N/A
Data at standard conditions: →	Flow (Dry std. Ft. ³ /Min.) N/A	Velocity (Ft. /Sec.) N/A	Moisture (Grains/Ft. ³) N/A		Moisture (Percent) N/A
8. Monitoring device and recording instrument (check all that apply): Opacity monitor SO ₂ monitor NO _x monitor Strip chart Electronic data logger Other (specify in comments) No monitor (none) X					
9. Control device. Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.). N/A					

10. Air contaminants. Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

Air contaminants	Average Emissions (Lbs./Hr.)	Maximum Emissions (Lbs./Hr.)	Concentration	Average Emissions (Ton/Yr.)	Potential Emissions (Ton/Yr.)	Emissions Estimation Method Code *	Control Devices *	Control Efficiency %
Particulate matter (PM)	7.61E-02	7.61E-02	**	5.32E-04	1.90E-02	5	000	0
Sulfur dioxide (SO ₂)	2.35E-03	2.35E-03	***	1.64E-05	5.86E-04	3	000	0
Carbon monoxide (CO)	1.32	1.32	PPM	9.23E-03	0.330	5	000	0
Volatile organic compounds (VOC)	1.01E-01	1.01E-01	PPM	7.10E-04	2.54E-02	5	000	0
Nitrogen oxides (NO _x)	1.42	1.42	PPM	9.94E-03	0.355	5	000	0
Hydrogen fluoride (HF)								
Hydrogen chloride (HCl)								
Lead (Pb)								
Greenhouse gases (CO ₂ equivalents)	253	253		1.77	63.3	5	000	0
Hazardous air pollutant (specify) Gas HAP Total	6.00E-03	6.00E-03		4.20E-05	1.50E-03	3	000	0
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Other (specify)								
Other (specify)								
Other (specify)								
Other (specify)								

11. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 14 hours per year for years 2016 to 2020. This is not a permit restriction. Potential annual emissions based on operating 500 hr/yr. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

12. Signature**Date**

June 17, 2022

Signer's name (type or print)

Title

Phone number with area code

- * Refer to the tables in the instructions for estimation method and control device codes.
- ** Exit gas particulate matter concentration units: Process – Grains/Dry Standard Ft³ (70⁰F), Wood fired boilers - Grains/Dry Standard Ft³ (70⁰F), all other boilers – Lbs. /Million BTU heat input.
- *** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input



NON-TITLE V PERMIT APPLICATION
PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.			
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)		2. Emission Source Reference Number 72-0029-26	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes ☒ No ☐ If Yes, list rule citation, including Part, Subpart, and applicable Sections: NESHAP: 40 CFR Part 63 Subpart ZZZZ; NSPS: 40 CFR Part 60 Subpart IIII			
4. Unique Source ID (see instructions) Diesel Generator #8		5. Unique Emission Point ID (see instructions) DG-8	
6. Description of air contaminant source One 230 hp TSOB Building emergency diesel generator. Perkins 1106D-E66TAG3 diesel engine Tier 3.			
7. Type of air contaminant source (Check only one option to the right)			
Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14)			
Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14)			
Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14)			X
8. Type of operation: Continuous ☐ Batch ☐		Normal batch time	Normal batches/day
9. Process material inputs and In-process solid fuels	Diagram reference	Input rates (pounds/hour)	
		Design	Actual
A.			
B.			
C.			
D.			
E.			
F.			
G.			
Totals			

* A simple process flow diagram must be attached.

DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE							
10. Boiler or burner data: (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)							
Serial Number				Type of firing*** Internal Combustion			
Rated horsepower 230		Rated input capacity (10 ⁶ BTU/Hr.) 1.55		Other rating (specify capacity and units)			
Date constructed 2016		Date manufactured		Date of last modification (explain in comments below)			
** Source with a common stack will have the same stack number. *** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments)).							
11. Fuel data: (Complete for a process emission source with in process fuel or a non-process fuel burning source)							
Primary fuel type (specify)		#2 Fuel Oil		Standby fuel type(s) (specify)		N/A	
Fuels used	Annual usage	Hourly usage		% Sulfur	% Ash	BTU value of fuel	(For APC use only) SCC code
		Design	Average				
Natural gas:	10 ⁶ Cu. Ft.	Cu. Ft.	Cu. Ft.	///////// /////////	//// ////	1,000	
#2 Fuel oil:	10 ³ Gal. 0.158	Gal. 11.3	Gal. 11.3	0.0015	//// ////	137,000	
#5 Fuel oil:	10 ³ Gal.	Gal.	Gal.		//// ////		
#6 Fuel oil:	10 ³ Gal.	Gal.	Gal.		//// ////		
Coal:	Tons	Lbs.	Lbs.				
Wood:	Tons	Lbs.	Lbs.	///////// /////////	//// ////		
Liquid propane:	10 ³ Gal.	Gal.	Gal.	///////// /////////	//// ////	85,000	
Other (specify type & units):							
12. If Wood is used as a fuel, specify types and estimate percent by weight of bark							
13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.							

14. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 14 hours per year for years 2016 to 2020. This is not a permit restriction.
Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

15. Signature**Date**

June 17, 2022

Signer's name (type or print)**Title****Phone number with area code**

Table 14. Watts Bar Nuclear Plant Actual Emissions for Stationary Emergency Diesel Engine DG-8

				DG-8 TSOB Building	
MMBtu/hr				1.55	
Diesel (137,000 Btu/gal), gal/hr*				11.3	
hp*				230	
Avg. Annual Hours of Operation CY16 to CY20, hr/yr				14	
	Tier 3 Emission Standards g/hphr	AP-42 Emission Factor** lb/MMBtu	Actual Emissions		Potential Emissions ton/yr****
			lb/hr	ton/yr***	ton/yr****
Particulate Matter (PM ₁₀)	0.15		7.61E-02	5.32E-04	1.90E-02
Sulfur Dioxide (SO ₂)		0.001515	2.35E-03	1.64E-05	5.86E-04
Nitrogen Oxides (NO _x)	2.8		1.42	9.94E-03	0.355
Carbon Monoxide (CO)	2.60		1.32	9.23E-03	0.330
Hydrocarbons (HC)	0.20		0.101	7.10E-04	2.54E-02
Benzene		9.33E-04	1.44E-03	1.01E-05	3.61E-04
Toluene		4.09E-04	6.33E-04	4.43E-06	1.58E-04
Xylenes		2.85E-04	4.41E-04	3.09E-06	1.10E-04
1,3-Butadiene		3.91E-05	6.05E-05	4.24E-07	1.51E-05
Formaldehyde		1.18E-03	1.83E-03	1.28E-05	4.57E-04
Acetaldehyde		7.67E-04	1.19E-03	8.31E-06	2.97E-04
Acrolein		9.25E-05	1.43E-04	1.00E-06	3.58E-05
Total POMs		1.68E-04	2.60E-04	1.82E-06	6.50E-05
Total HAPs		3.87E-03	6.00E-03	4.20E-05	1.50E-03
Carbon Dioxide Equivalent*****		163.6	253	1.77	63.3

* Based on information from manufacturer, Perkins Engine.

** AP-42, 5th edition, Section 3.3, 10/96. Sulfur dioxide based on 15 ppm sulfur in diesel fuel.

*** Annual emissions for DG-8 based on average hours of operation for years 2016 to 2020 of 14 hr/yr. This is not a permit restriction.

Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

**** Potential annual emissions based on 500 hours per year operation for each engine. EPA definition of hours for an emergency engine.

***** CO₂ factor is 73.96 kg CO₂/MMBtu, CH₄ factor is 0.003 kg CH₄/MMBtu, N₂O factor is 0.0006 kg N₂O/MMBtu.

CO₂ equivalent factor for CO₂ is 1.0, CO₂ equivalent factor for CH₄ is 25, CO₂ equivalent factor for N₂O is 298.

Sample Calculations for DG-8

Particulates: $0.15 \text{ g/hphr} \times 230 \text{ hp} \times \text{lb}/453.6 \text{ g} = 7.61\text{E-}02 \text{ lb/hr}$
 $7.61\text{E-}02 \text{ lb/hr} \times 14 \text{ hr/yr} \times \text{ton}/2000 \text{ lb} = 5.32\text{E-}04 \text{ ton/yr}$

Sulfur Dioxide: $15 \text{ ppm sulfur} = 0.0015 \% \text{S}$
 $1.01 \times 0.0015 \text{ lb/MMBtu} \times 1.55 \text{ MMBtu/hr} = 2.35\text{E-}03 \text{ lb/hr}$
 $2.35\text{E-}03 \text{ lb/hr} \times 14 \text{ hr/yr} \times \text{ton}/2000 \text{ lb} = 1.64\text{E-}05 \text{ ton/yr}$

PM Potential: $7.61\text{E-}02 \text{ lb/hr} \times 500 \text{ hr/yr} \times \text{ton}/2000 \text{ lb} = 1.90\text{E-}02 \text{ ton/yr}$



**NON-TITLE V PERMIT APPLICATION
EMISSION POINT DESCRIPTION**

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.						
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)						
2. Unique Source ID (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1) Diesel Generator #9						
3. Unique Emission Point ID (name/number/letter which uniquely identifies this emission point, like Stack #1) DG-9						
4. Brief description of air contaminant source (Attach a diagram if appropriate): One 176 hp NODE Building emergency diesel generator. Cummins QSB5-G5 diesel engine Tier 3.						
5. Emission point location	Latitude 35.6028	Longitude 84.7900	6. Distance to nearest property line (Ft.) N/A			
7. Stack or emission point data: →	Height above grade (Ft.) N/A	Diameter (Ft.) 0.25	Temperature (°F) N/A	% of time over 125°F 100	Direction of exit (Up, down or horizontal) up	
Data at exit conditions: →	Flow (actual Ft. ³ /Min.) N/A	Velocity (Ft. /Sec.) N/A	Moisture (Grains/Ft. ³) N/A		Moisture (Percent) N/A	
Data at standard conditions: →	Flow (Dry std. Ft. ³ /Min.) N/A	Velocity (Ft. /Sec.) N/A	Moisture (Grains/Ft. ³) N/A		Moisture (Percent) N/A	
8. Monitoring device and recording instrument (check all that apply): Opacity monitor SO ₂ monitor NO _x monitor Strip chart Electronic data logger Other (specify in comments) No monitor (none) X						
9. Control device. Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.). N/A						

10. Air contaminants. Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

Air contaminants	Average Emissions (Lbs./Hr.)	Maximum Emissions (Lbs./Hr.)	Concentration	Average Emissions (Ton/Yr.)	Potential Emissions (Ton/Yr.)	Emissions Estimation Method Code *	Control Devices *	Control Efficiency %
Particulate matter (PM)	5.82E-02	5.82E-02	**	4.95E-04	1.46E-02	5	000	0
Sulfur dioxide (SO ₂)	1.85E-03	1.85E-03	***	1.57E-05	4.62E-04	3	000	0
Carbon monoxide (CO)	1.01	1.01	PPM	8.57E-03	0.252	5	000	0
Volatile organic compounds (VOC)	7.76E-02	7.76E-02	PPM	6.60E-04	1.94E-02	5	000	0
Nitrogen oxides (NO _x)	1.09	1.09	PPM	9.23E-03	0.272	5	000	0
Hydrogen fluoride (HF)								
Hydrogen chloride (HCl)								
Lead (Pb)								
Greenhouse gases (CO ₂ equivalents)	199	199		1.70	49.9	5	000	0
Hazardous air pollutant (specify) Gas HAP Total	4.72E-03	4.72E-03		4.01E-05	1.18E-03	3	000	0
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Other (specify)								
Other (specify)								
Other (specify)								
Other (specify)								

11. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 17 hours per year for years 2016 to 2020. This is not a permit restriction. Potential annual emissions based on operating 500 hr/yr. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

12. Signature**Date**

June 17, 2022

Signer's name (type or print)**Title****Phone number with area code**

- * Refer to the tables in the instructions for estimation method and control device codes.
- ** Exit gas particulate matter concentration units: Process – Grains/Dry Standard Ft³ (70⁰F), Wood fired boilers - Grains/Dry Standard Ft³ (70⁰F), all other boilers – Lbs. /Million BTU heat input.
- *** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input



DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor, Nashville, TN 37243
Telephone: (615) 532-0554, Email: Air.Pollution.Control@TN.gov

APC 102

NON-TITLE V PERMIT APPLICATION
PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.			
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)		2. Emission Source Reference Number 72-0029-21	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes ☒ No ☐ If Yes, list rule citation, including Part, Subpart, and applicable Sections: NESHAP: 40 CFR Part 63 Subpart ZZZZ and NSPS: 40 CFR Part 60 Subpart IIII			
4. Unique Source ID (see instructions) Diesel Generator #9		5. Unique Emission Point ID (see instructions) DG-9	
6. Description of air contaminant source One 176 hp NODE Building emergency diesel generator. Cummins QSB5-G5 diesel engine Tier 3.			
7. Type of air contaminant source (Check only one option to the right)			
Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14)			
Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14)			
Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14)			X
8. Type of operation: Continuous ☐ Batch ☐		Normal batch time	Normal batches/day
9. Process material inputs and In-process solid fuels	Diagram reference	Input rates (pounds/hour)	
		Design	Actual
A.			
B.			
C.			
D.			
E.			
F.			
G.			
Totals			

* A simple process flow diagram must be attached.

DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE							
10. Boiler or burner data: (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)							
Serial Number				Type of firing*** Internal Combustion			
Rated horsepower 176		Rated input capacity (10 ⁶ BTU/Hr.) 1.22		Other rating (specify capacity and units)			
Date constructed 2018		Date manufactured		Date of last modification (explain in comments below)			
** Source with a common stack will have the same stack number. *** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments)).							
11. Fuel data: (Complete for a process emission source with in process fuel or a non-process fuel burning source)							
Primary fuel type (specify)		#2 Fuel Oil		Standby fuel type(s) (specify)		N/A	
Fuels used	Annual usage	Hourly usage		% Sulfur	% Ash	BTU value of fuel	(For APC use only) SCC code
		Design	Average				
Natural gas:	10 ⁶ Cu. Ft.	Cu. Ft.	Cu. Ft.	///////// /////////	//// ////	1,000	
#2 Fuel oil:	10 ³ Gal. 0.151	Gal. 8.9	Gal. 8.9	0.0015	//// ////	137,000	
#5 Fuel oil:	10 ³ Gal.	Gal.	Gal.		//// ////		
#6 Fuel oil:	10 ³ Gal.	Gal.	Gal.		//// ////		
Coal:	Tons	Lbs.	Lbs.				
Wood:	Tons	Lbs.	Lbs.	///////// /////////	//// ////		
Liquid propane:	10 ³ Gal.	Gal.	Gal.	///////// /////////	//// ////	85,000	
Other (specify type & units):							
12. If Wood is used as a fuel, specify types and estimate percent by weight of bark							
13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.							

14. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on 5 year average of 17 hours per year for years 2016 to 2020. This is not a permit restriction.
Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

15. Signature**Date**

June 17, 2022

Signer's name (type or print)

Title

Phone number with area code

Table 15. Watts Bar Nuclear Plant Actual Emissions for Stationary Emergency Diesel Engine DG-9

				DG-9	
				NODE Building	
MMBtu/hr				1.22	
Diesel (137,000 Btu/gal), gal/hr*				8.9	
hp*				176	
Avg. Annual Hours of Operation CY16 to CY20, hr/yr				17	
	Tier 3 Emission Standards g/hphr	AP-42 Emission Factor** lb/MMBtu	Actual Emissions		Potential Emissions ton/yr****
			lb/hr	ton/yr***	ton/yr****
Particulate Matter (PM ₁₀)	0.15		5.82E-02	4.95E-04	1.46E-02
Sulfur Dioxide (SO ₂)		0.001515	1.85E-03	1.57E-05	4.62E-04
Nitrogen Oxides (NO _x)	2.8		1.09	9.23E-03	0.272
Carbon Monoxide (CO)	2.60		1.01	8.57E-03	0.252
Hydrocarbons (HC)	0.20		7.76E-02	6.60E-04	1.94E-02
Benzene		9.33E-04	1.14E-03	9.67E-06	2.84E-04
Toluene		4.09E-04	4.99E-04	4.24E-06	1.25E-04
Xylenes		2.85E-04	3.48E-04	2.95E-06	8.69E-05
1,3-Butadiene		3.91E-05	4.77E-05	4.05E-07	1.19E-05
Formaldehyde		1.18E-03	1.44E-03	1.22E-05	3.60E-04
Acetaldehyde		7.67E-04	9.35E-04	7.95E-06	2.34E-04
Acrolein		9.25E-05	1.13E-04	9.59E-07	2.82E-05
Total POMs		1.68E-04	2.05E-04	1.74E-06	5.12E-05
Total HAPs		3.87E-03	4.72E-03	4.01E-05	1.18E-03
Carbon Dioxide Equivalent*****		163.6	199	1.70	49.9

* Based on information from manufacturer, Cummins Engine.

** AP-42, 5th edition, Section 3.3, 10/96. Sulfur dioxide based on 15 ppm sulfur in diesel fuel.

*** Annual emissions for DG-9 based on average hours of operation for years 2016 to 2020 of 17 hr/yr. This is not a permit restriction.

Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

**** Potential annual emissions based on 500 hours per year operation for each engine. EPA definition of hours for an emergency engine.

***** CO₂ factor is 73.96 kg CO₂/MMBtu, CH₄ factor is 0.003 kg CH₄/MMBtu, N₂O factor is 0.0006 kg N₂O/MMBtu.

CO₂ equivalent factor for CO₂ is 1.0, CO₂ equivalent factor for CH₄ is 25, CO₂ equivalent factor for N₂O is 298.

Sample Calculations for DG-9

Particulates: 0.15 g/hphr x 176 hp x lb/453.6 g = 5.82E-02 lb/hr
5.82E-02 lb/hr x 17 hr/yr x ton/2000 lb = 4.95E-04 ton/yr

Sulfur Dioxide: 15 ppm sulfur = 0.0015 %S
1.01 x 0.0015 lb/MMBtu x 1.22 MMBtu/hr = 1.85E-03 lb/hr
1.85E-03 lb/hr x 17 hr/yr x ton/2000 lb = 1.57E-05 ton/yr

PM Potential: 5.82E-02 lb/hr x 500 hr/yr x ton/2000 lb = 1.46E-02 ton/yr



**NON-TITLE V PERMIT APPLICATION
EMISSION POINT DESCRIPTION**

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.												
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)												
2. Unique Source ID (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1) Diesel Generator #18												
3. Unique Emission Point ID (name/number/letter which uniquely identifies this emission point, like Stack #1) DG-18												
4. Brief description of air contaminant source (Attach a diagram if appropriate): One 587 hp emergency diesel engine for chiller generator (Caterpillar Model 3406C, 1997 Model Year)												
5. Emission point location	Latitude 35.6028	Longitude 84.7900	6. Distance to nearest property line (Ft.) N/A									
7. Stack or emission point data: →	Height above grade (Ft.) 11	Diameter (Ft.) 0.417	Temperature (°F) 1,063	% of time over 125°F 100	Direction of exit (Up, down or horizontal) Up							
Data at exit conditions: →	Flow (actual Ft. ³ /Min.) N/A	Velocity (Ft. /Sec.) N/A	Moisture (Grains/Ft. ³) N/A		Moisture (Percent) N/A							
Data at standard conditions: →	Flow (Dry std. Ft. ³ /Min.) N/A	Velocity (Ft. /Sec.) N/A	Moisture (Grains/Ft. ³) N/A		Moisture (Percent) N/A							
8. Monitoring device and recording instrument (check all that apply): <table style="width: 100%; border: none;"> <tr> <td style="width: 15%;">Opacity monitor</td> <td style="width: 15%;">SO₂ monitor</td> <td style="width: 15%;">NO_x monitor</td> <td style="width: 15%;">Strip chart</td> <td style="width: 15%;">Electronic data logger</td> <td style="width: 15%;">Other (specify in comments)</td> <td style="width: 15%;">No monitor (none) X</td> </tr> </table>						Opacity monitor	SO ₂ monitor	NO _x monitor	Strip chart	Electronic data logger	Other (specify in comments)	No monitor (none) X
Opacity monitor	SO ₂ monitor	NO _x monitor	Strip chart	Electronic data logger	Other (specify in comments)	No monitor (none) X						
9. Control device. Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.). N/A												

10. Air contaminants. Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

Air contaminants	Average Emissions (Lbs./Hr.)	Maximum Emissions (Lbs./Hr.)	Concentration	Average Emissions (Ton/Yr.)	Potential Emissions (Ton/Yr.)	Emissions Estimation Method Code *	Control Devices *	Control Efficiency %
Particulate matter (PM)	0.518	0.518	**	0.129	0.129	5	000	0
Sulfur dioxide (SO ₂)	5.98E-03	5.98E-03	***	1.49E-03	1.49E-03	3	000	0
Carbon monoxide (CO)	11.0	11.0	PPM	2.75	2.75	5	000	0
Volatile organic compounds (VOC)	1.29	1.29	PPM	0.324	0.324	5	000	0
Nitrogen oxides (NO _x)	8.93	8.93	PPM	2.23	2.23	5	000	0
Hydrogen fluoride (HF)								
Hydrogen chloride (HCl)								
Lead (Pb)								
Greenhouse gases (CO ₂ equivalents)	646	646		161	161	5	000	0
Hazardous air pollutant (specify) Gas HAP Total	1.53E-02	1.53E-02		3.82E-03	3.82E-03	3	000	0
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Other (specify)								
Other (specify)								
Other (specify)								
Other (specify)								

11. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Emissions for PM, CO, VOC, and NOx based on Tier 1 emission standard for 587 hp engine.

Annual usage based on potential hours of operation of 500 hours per year. This is not a permit restriction. This generator is being installed in 2022 and has presently never been used. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

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Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

12. Signature**Date**

June 17, 2022

Signer's name (type or print)

Title

Phone number with area code

- * Refer to the tables in the instructions for estimation method and control device codes.
- ** Exit gas particulate matter concentration units: Process – Grains/Dry Standard Ft³ (70⁰F), Wood fired boilers - Grains/Dry Standard Ft³ (70⁰F), all other boilers – Lbs. /Million BTU heat input.
- *** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input



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APC 102

NON-TITLE V PERMIT APPLICATION
PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.			
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)		2. Emission Source Reference Number 72-0029	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes ☒ No ☐ If Yes, list rule citation, including Part, Subpart, and applicable Sections: NESHAP 40 CFR Part 63 Subpart ZZZZ			
4. Unique Source ID (see instructions) Diesel Generator #18		5. Unique Emission Point ID (see instructions) DG-18	
6. Description of air contaminant source One 587 hp emergency diesel engine for chiller generator (Caterpillar Model 3406C, 1997 Model Year)			
7. Type of air contaminant source (Check only one option to the right)			
Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14)			
Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14)			
Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14)			X
8. Type of operation: Continuous ☐ Batch ☐		Normal batch time	Normal batches/day
9. Process material inputs and In-process solid fuels	Diagram reference	Input rates (pounds/hour)	
		Design	Actual
A.			
B.			
C.			
D.			
E.			
F.			
G.			
Totals			

* A simple process flow diagram must be attached.

DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE							
10. Boiler or burner data: (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)							
Serial Number 4ZRO3551				Type of firing*** Internal Combustion			
Rated horsepower 587		Rated input capacity (10 ⁶ BTU/Hr.) 3.95		Other rating (specify capacity and units)			
Date constructed 2022		Date manufactured 1997		Date of last modification (explain in comments below)			
** Source with a common stack will have the same stack number. *** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments)).							
11. Fuel data: (Complete for a process emission source with in process fuel or a non-process fuel burning source)							
Primary fuel type (specify)		#2 Fuel Oil		Standby fuel type(s) (specify)		N/A	
Fuels used	Annual usage	Hourly usage		% Sulfur	% Ash	BTU value of fuel	(For APC use only) SCC code
		Design	Average				
Natural gas:	10 ⁶ Cu. Ft.	Cu. Ft.	Cu. Ft.	///////// /////////	///// /////	1,000	
#2 Fuel oil:	10 ³ Gal. 14.4	Gal. 28.8	Gal. 28.8	0.0015	///// /////	137,000	
#5 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////		
#6 Fuel oil:	10 ³ Gal.	Gal.	Gal.		///// /////		
Coal:	Tons	Lbs.	Lbs.				
Wood:	Tons	Lbs.	Lbs.	///////// /////////	///// /////		
Liquid propane:	10 ³ Gal.	Gal.	Gal.	///////// /////////	///// /////	85,000	
Other (specify type & units):							
12. If Wood is used as a fuel, specify types and estimate percent by weight of bark							
13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.							

14. Comments

Record hours of operation. Conduct periodic maintenance as described by manufacturer.

Annual usage based on potential hours of operation of 500 hours per year. This is not a permit restriction. This generator is being installed in 2022 and has presently never been used. Each criteria pollutant will be less than 99.9 tons for all emission sources during any period of 12 consecutive months.

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Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

15. Signature**Date**

June 17, 2022

Signer's name (type or print)**Title****Phone number with area code**

Table 16. Watts Bar Nuclear Plant Emissions for Stationary Emergency Diesel Engine DG-18

	DG-18 Chiller Generator 1997 (Tier 1)			
Engine Model Year	587			
Engine Horsepower Rating, hp	28.8			
Diesel Fuel Use, gal/hr	137,000			
Diesel Fuel Heat Content, Btu/gal	3.95			
Diesel Engine Heat Input Rating, MMBtu/hr	500			
Potential Annual Hours of Operation, hr*				
	Tier 1 Emission Standards g/hp-hr	AP-42 Emission Factor* lb/MMBtu	Potential Emissions lb/hr	ton/yr**
Particulate Matter (PM)	0.40		0.518	0.129
Sulfur Dioxide (SO ₂)		0.001515	5.98E-03	1.49E-03
Nitrogen Oxides (NO _x)	6.90		8.93	2.23
Carbon Monoxide (CO)	8.50		11.0	2.75
Non-Methane Hydrocarbons (NMHC)	1.00		1.29	0.324
Benzene		9.33E-04	3.68E-03	9.20E-04
Toluene		4.09E-04	1.61E-03	4.03E-04
Xylenes		2.85E-04	1.12E-03	2.81E-04
1,3-Butadiene		3.91E-05	1.54E-04	3.86E-05
Formaldehyde		1.18E-03	4.66E-03	1.16E-03
Acetaldehyde		7.67E-04	3.03E-03	7.57E-04
Acrolein		9.25E-05	3.65E-04	9.12E-05
Total POMs		1.68E-04	6.63E-04	1.66E-04
Total HAPs			1.53E-02	3.82E-03
Carbon Dioxide Equivalent***		163.6	646	161

* AP-42, 5th edition, Section 3.3, 10/96. Sulfur dioxide based on 15 ppm sulfur in diesel fuel.

** Potential annual emissions based on 500 hours per year operation. EPA definition of hours for an emergency engine.

*** CO₂ factor is 73.96 kg CO₂/MMBtu, CH₄ factor is 0.003 kg CH₄/MMBtu, N₂O factor is 0.0006 kg N₂O/MMBtu.

CO₂ equivalent factor for CO₂ is 1.0, CO₂ equivalent factor for CH₄ is 25, CO₂ equivalent factor for N₂O is 298.

Sample Calculations

Particulates: $0.4 \text{ g/hp-hr} \times 587 \text{ hp} \times \text{lb}/453.6 \text{ g} = 0.518 \text{ lb/hr}$
 $0.518 \text{ lb/hr} \times 500 \text{ hr/yr} \times \text{ton}/2000 \text{ lb} = 0.129 \text{ ton/yr}$

Sulfur Dioxide: $15 \text{ ppm sulfur} = 0.0015 \% \text{S}$
 $1.01 \times 0.0015 \text{ lb/MMBtu} \times 3.95 \text{ MMBtu/hr} = 0.00598 \text{ lb/hr}$
 $0.00598 \text{ lb/hr} \times 500 \text{ hr/yr} \times \text{ton}/2000 \text{ lb} = 0.00149 \text{ ton/yr}$



**NON-TITLE V PERMIT APPLICATION
 STORAGE TANK DESCRIPTION**

Type or print. Submit for each storage tank. Submit with the APC 100.							
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant						2. Emission Source Reference Number 72-0029-04	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes No X If Yes, list rule citation, including Part, Subpart, and applicable Sections:							
4. Tank identification number T-1				Construction date August 1978			
5. Tank diameter (Ft.) 27.5		Height (Ft.) 16		Capacity (gallons) 71,000		Capacity (barrels) 1,690	
6. Shape Cylinder (up) X Cylinder (horizontal) Sphere						Other (describe)	
7. Tank color: White		Aluminum Specular Diffuse		Gray Light Medium Dark		Other (describe)	
A. Roof: X							
B. Shell X							
8. Paint condition:		Good X			Poor		
9. Tank Check		Fixed roof X		Floating roof		Open top	
				Underground		Other (describe)	
10. Insulated and/or heated to: (°F) N/A				Pressurized to: (PSIA) N/A			
11. Loading type: Type _____		Bottom		Submerged X		Vapor balanced	
						Other (describe)	
12. List all liquids, vapors, gases, or mixtures to be stored in this tank. Give the percent by weight of each component. Fuel Oil (#2 distillate)							



**NON-TITLE V PERMIT APPLICATION
 STORAGE TANK DESCRIPTION**

Type or print. Submit for each storage tank. Submit with the APC 100.							
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant						2. Emission Source Reference Number 72-0029-04	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes No X If Yes, list rule citation, including Part, Subpart, and applicable Sections:							
4. Tank identification number T-2				Construction date August 1978			
5. Tank diameter (Ft.) 27.5		Height (Ft.) 16		Capacity (gallons) 71,000		Capacity (barrels) 1,690	
6. Shape	Cylinder (up) X	Cylinder (horizontal)		Sphere		Other (describe)	
7. Tank color:		Aluminum		Gray			Other (describe)
White		Specular	Diffuse	Light	Medium	Dark	
A. Roof:	X						
B. Shell	X						
8. Paint condition:		Good X			Poor		
9. Tank Check	Fixed roof X	Floating roof	Open top	Underground		Other (describe)	
10. Insulated and/or heated to: (°F) N/A				Pressurized to: (PSIA) N/A			
11. Loading type: Type _____		Bottom	Submerged X	Vapor balanced		Other (describe)	
12. List all liquids, vapors, gases, or mixtures to be stored in this tank. Give the percent by weight of each component. Fuel Oil (#2 distillate)							

Watts Bar Nuclear Plant - Insignificant Activity

Fixed Roof Tank Losses

Estimates based on AP-42, 5th Ed., Section 7.1, Organic Liquid Storage Tanks, 11/2006

Liquid stored	No. 2 Fuel Oil	
Number of tanks	2	
Tank capacity, gal	71,000	
Tank diameter, ft	27.5	
Tank shell height, ft	16	
Liquid height, ft	8	assumed one-half of tank shell height
Maximum number of tank turnovers per year	13	June 2011 Application
TLA, Daily average liquid surface temperature, °R	530	from Table 7.1-2, AP-42
PVA, Vapor pressure at the daily average liquid surface temperature, psia	0.009	from Table 7.1-2, AP-42
MV, Vapor molecular weight at 60°F, lb/lb-mole	130	from Table 7.1-2, AP-42
R, Ideal gas constant, psia ft ³ /lb-mole °R	10.731	
Annual net throughput (tank capacity times annual turnover rate), gal/tank	923,000	

Standing Storage Losses

for VV (vapor space volume)	
for a cone roof, HRO (roof outage) = 1/3 x 0.0625 x tank diameter/2	0.286
for a cone roof, HVO (vapor space outage) = tank shell height - liquid height + HRO	8.29
for a cone roof, VV (vapor space volume) = πD ² /4 x HVO	4,922
for WV (stock vapor density) =MV x PVA /(R x TLA)	0.000206
for KE (Vapor space expansion factor) from AP-42	0.04
for KS (vented vapor saturation factor) = 1/(1+0.053 x PVA x HVO)	0.996

Standing Storage Losses = 365 x VV x WV x KE x KS	14.7	lb VOC/tank yr
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Working Losses

Q, Annual net throughput (tank capacity times annual turnover rate), bbl	21,976	1 bbl = 42 gallons
KN, Working loss turnover factor	1	from AP-42
KP, Working loss product factor	1	from AP-42

Working Losses = 0.001 x MV x PVA x Q x KN x KP	25.7	lb VOC/tank yr
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Total Losses = (Standing Storage Losses + Working Losses) x Number of tanks	0.0404	ton VOC/yr
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Watts Bar Nuclear Plant - Insignificant Activity

Natural-draft hyperbolic cooling towers

see June 2011 Operating Permit Renewal Application

Each unit has a cooling tower with a condenser circulating water flow of 410,000 gal/min.

The total liquid-drift emission factor for natural-draft cooling towers from AP-42, Section 13.4, January 1995 is 0.073 lb/1,000 gallon flow.

The total dissolved solids (TDS) is based on a summertime average of 102 ppm in the Chickamauga Reservoir.

A concentration factor of 2.5 for the TDS in the condenser circulating water as compared to the reservoir TDS levels.

$$410,000 \text{ gal/min} \times 0.073 \text{ lb/1,000 gal} \times 60 \text{ min/hr} \times 102 \text{ lb/10}^6 \text{ lb} \times 2.5 = 0.46 \text{ lb/hr}$$

$$\text{Annual PM emissions for each unit} = 0.46 \text{ lb/hr} \times 8,760 \text{ hr/yr} \times 1 \text{ ton/2,000 lb} = 2.01 \text{ ton/yr}$$

Watts Bar Nuclear Plant - Insignificant Activity

Oil System Vapor Extractors see June 2011 Operating Permit Renewal Application

Each unit has a main turbine oil tank vapor extractor, a generator loop seal oil tank vapor extractor, and two main feedwater pump turbine oil tank vapor extractors.

Main turbine oil tank vapor extractor air flowrate is 6,100 lb/hr.

0.05 grain of oil mist per cubic foot of air flow, 70% control efficiency, and air density at 68 F of 0.075 lb/cubic ft.

$$6,100 \text{ lb/hr} \times 0.05 \text{ grains/cu ft} \times \text{cu ft}/0.075 \text{ lb} \times \text{lb}/7,000 \text{ grains} \times (1-.7) = 0.174 \text{ lb/hr}$$
$$0.174 \text{ lb/hr} \times 8,760 \text{ hr/yr} \times 1 \text{ ton}/2,000 \text{ lb} = 0.763 \text{ ton/yr}$$

Generator loop seal oil tank vapor extractor air flowrate is 280 lb/hr.

0.05 grain of oil mist per cubic foot of air flow, and air density at 68 F of 0.075 lb/cubic ft.

$$280 \text{ lb/hr} \times 0.05 \text{ grains/cu ft} \times \text{cu ft}/0.075 \text{ lb} \times \text{lb}/7,000 \text{ grains} = 0.0267 \text{ lb/hr}$$
$$0.0267 \text{ lb/hr} \times 8,760 \text{ hr/yr} \times 1 \text{ ton}/2,000 \text{ lb} = 0.117 \text{ ton/yr}$$

Main feedwater pump turbine oil tank vapor extractor flowrate is 280 lb/hr with 2 per unit.

0.05 grain of oil mist per cubic foot of air flow, and air density at 68 F of 0.075 lb/cubic ft.

$$2 \times 280 \text{ lb/hr} \times 0.05 \text{ grains/cu ft} \times \text{cu ft}/0.075 \text{ lb} \times \text{lb}/7,000 \text{ grains} = 0.0533 \text{ lb/hr}$$
$$0.0533 \text{ lb/hr} \times 8,760 \text{ hr/yr} \times 1 \text{ ton}/2,000 \text{ lb} = 0.234 \text{ ton/yr}$$

$$\text{Annual VOC emissions for each unit} = 0.763 \text{ ton/yr} + 0.117 \text{ ton/yr} + 0.234 \text{ ton/yr} = 1.11 \text{ ton/yr}$$

Watts Bar Nuclear Plant Actual Emissions for Sodium Hypochlorite Tank - Insignificant Activity

TANKS 4.0
Emissions Report - Summary Format

Tank Identification and Physical Characteristics

Identification

User Identification:WBN - Horizontal NaOCl Tank

City:Spring City

State:Tennessee

Company:Tennessee Valley Authority

Type of Tank:Horizontal Tank

Sodium hypochlorite storage tank

located at Watts Bar Nuclear

Description:

Tank Dimensions

Shell Length (ft):20.1

Diameter (ft):7.1

Volume (gallons):6,000.00

Turnovers:40

Net Throughput (gal/yr):240,000.00

Is Tank Heated (y/n):N

Is Tank Underground (y/n):N

Paint Characteristics

Shell Color/Shade:White/White

Shell Condition:Good

Breather Vent Settings

Vacuum Settings (psig):0

Pressure Settings (psig):0

Meteorological Data used in Emissions Calculations:

Chattanooga, Tennessee (Avg Atmospheric Pressure = 14.41 psia)

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Annual Emissions Report

Component	Losses (lbs)		
	Working Loss	Breathing Loss	Total Emissions
Sodium Hypochlorite	131.95	32.97	164.92

Sodium Hypochlorite

0.0825 tons per year

Watts Bar Nuclear Plant - Insignificant Activity

Carpenter Shop

see June 2011 Operating Permit Renewal Application

Based on typical inlet grain loading for fabric filters (10 grains/scf), air flowrate of 1,000 cfm, 96% capture efficiency of 30 micron particles, and 2,080 hr/yr operation.

$$10 \text{ grains/scf} \times 1,000 \text{ scfm} \times 1 \text{ lb}/7,000 \text{ grains} \times (1-.96) \times 60 \text{ min/hr} = 3.43 \text{ lb/hr}$$

$$3.43 \text{ lb/hr} \times 2,080 \text{ hr/yr} \times 1 \text{ ton}/2,000 \text{ lb} = 3.57 \text{ ton/yr}$$



**CONSTRUCTION PERMIT APPLICATION
NEW BLASTING AND PAINT SPRAY BOOTHS
WATTS BAR NUCLEAR PLANT
SPRING CITY, TENNESSEE**



DECEMBER 2023

Description for New Sandblasting and Surface Coating Operations

Watts Bar Nuclear Plant

Watts Bar Nuclear plans to add a new sandblasting booth and surface coating booth in a new building that will include both operations. The emission limits for the new equipment should be identical to existing operations. The amount of sandblasting and quantities of paint used will not change. The sandblasting with dust collector is limited to 1,000 lb/hr of abrasive with PM emission limit of 2.34 lb/hr. The surface coating with exhaust filters is limited to 0.02 gr/dscf and 0.43 lb/hr of PM. The VOC limit is 41 ton/yr. Both new operations will use filtration systems to control particulate matter and should provide better control than the existing operations. The existing sandblasting and surface coating operations will potentially be retired once the new operations prove to be satisfactory.



DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor, Nashville, TN 37243
Telephone: (615) 532-0554, Email: Air.Pollution.Control@TN.gov

APC 100

**NON-TITLE V PERMIT APPLICATION
FACILITY IDENTIFICATION**

Type or print and submit. Attach appropriate source description forms.				
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)				
2. Site name (if different from legal name)				
3. Is a construction permit application fee being submitted? Yes ☒ No ☐ (see instructions for appropriate fee to submit)				
4. Site address (St./Rd./Hwy.) 1270 Highway 68			County name Rhea	
City Spring City		Zip code 37381-2000		5. NAICS or SIC code 221113
6. Site location (in lat. /long.)	Latitude 35.604335		Longitude -84.789943	
7. Responsible person/Authorized contact Anthony L. Williams IV				
Mailing address (St./Rd./Hwy.) P. O. Box 2000, 1270 Highway 68			Phone number with area code 423-365-8767	
City Spring City	State TN	Zip code 37381-2000	Fax number with area code	
			Email address alwilliams12@tva.gov	
8. Principal technical contact Jennifer L. Grubb				
Mailing address (St./Rd./Hwy.) P. O. Box 2000, 1270 Highway 68			Phone number with area code 423-365-3191	
City Spring City	State TN	Zip code 37381-2000	Fax number with area code	
			Email address jlgrubb@tva.gov	
9. Billing contact Michael G. Tritapoe				
Mailing address (St./Rd./Hwy.) 1101 Market Street, BR 2C-C			Phone number with area code 423-751-2811	
City Chattanooga	State TN	Zip code 37402	Fax number with area code	
			Email address mtritapoe@tva.gov	

AIR CONTAMINANT SOURCE(S) INFORMATION

10. Description of air contaminant source(s) and Unique Source ID(s). List, identify, and briefly describe process emission sources, fuel burning installations, and incinerators that are contained in this application and include a Unique Source ID for each source. The Unique Source ID is a name/number/letter, which uniquely identifies the air contaminant source(s), like Boiler #1, Paint Line #1, Engine #1, etc. (see instructions for more details)

Sandblasting Operation	SB-2
Surface Coating Operation	SC-2

11. Is the air contaminant source(s) in a nonattainment area? If "Yes", then minor source BACT must be addressed. Yes No ☒

12. Normal operation:	Hours/Day 8	Days/Week 5	Weeks/Year 52	Days/Year 260
13. Percent annual throughput	Dec. – Feb. 25%	March – May 25%	June – August 25%	Sept. – Nov. 25%

14. Operating permit	Date construction started	Date completed	Date of ownership change (if applicable)
	Last permit number(s)	Emission Source Reference Number(s)	
Construction permit ☒	Last permit number(s) 480496	Emission Source Reference Number(s) 72-0029	

If you chose Construction permit above, then choose either New Construction, Modification, or Location Transfer

New Construction	Starting date February 2024	Completion date June 2024
Modification	Date modification started or will start	Date completed or will complete
Location Transfer	Transfer date	Address of last location

15. Describe changes that have been made to this equipment or operation(s) since the last construction or operating permit application:

N/A

16. Comments

SIGNATURE

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

17. Signature (application must be signed before it will be processed)

Date

Signer's name (type or print)

Anthony L. Williams IV

Title

Watts Bar Nuclear Vice President

Phone number with area code

423-365-8767



**NON-TITLE V PERMIT APPLICATION
EMISSION POINT DESCRIPTION**

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.					
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)					
2. Unique Source ID (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1) Sandblasting Operation SB-2					
3. Unique Emission Point ID (name/number/letter which uniquely identifies this emission point, like Stack #1) SB-2					
4. Brief description of air contaminant source (Attach a diagram if appropriate): The sandblasting operation (SB-2) and surface coating operation (SC-2), which are located in the same building, are used for ongoing construction and maintenance activities at WBN. A compressed-air blasting machine is the equipment that generates particulate emissions. Sandblasting operation is controlled by a bagfilter dust collector.					
5. Emission point location	Latitude 35.602142	Longitude 84.787064	6. Distance to nearest property line (Ft.) 2,600		
7. Stack or emission point data: →	Height above grade (Ft.) 20	Diameter (Ft.) to be determined	Temperature (°F) Ambient	% of time over 125°F 0	Direction of exit (Up, down or horizontal) Up
Data at exit conditions: →	Flow (actual Ft. ³ /Min.) 12,500	Velocity (Ft. /Sec.) to be determined	Moisture (Grains/Ft. ³) 0		Moisture (Percent) 0
Data at standard conditions: →	Flow (Dry std. Ft. ³ /Min.)	Velocity (Ft. /Sec.)	Moisture (Grains/Ft. ³)		Moisture (Percent)
8. Monitoring device and recording instrument (check all that apply): Opacity monitor SO ₂ monitor NO _x monitor Strip chart Electronic data logger Other (specify in comments) No monitor (none) X					
9. Control device. Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.). Bagfilter dust collector is a cartridge type, down flow, rated at 12,500 CFM at 50 fpm, reverse pulse air filter cleaning system, 24 filters, filter efficiency of 99.5% at 0.5 micron and a 2 to 1 air to cloth ratio.					

10. Air contaminants. Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

Air contaminants	Average Emissions (Lbs./Hr.)	Maximum Emissions (Lbs./Hr.)	Concentration	Average Emissions (Ton/Yr.)	Potential Emissions (Ton/Yr.)	Emissions Estimation Method Code *	Control Devices *	Control Efficiency %
Particulate matter (PM)	2.14	2.14	** 0.02	2.22	2.43	6	017	99.5
Sulfur dioxide (SO ₂)			***					
Carbon monoxide (CO)			PPM					
Volatile organic compounds (VOC)			PPM					
Nitrogen oxides (NO _x)			PPM					
Hydrogen fluoride (HF)								
Hydrogen chloride (HCl)								
Lead (Pb)								
Greenhouse gases (CO ₂ equivalents)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Other (specify)								
Other (specify)								
Other (specify)								
Other (specify)								

11. Comments

Conduct periodic maintenance as described by manufacturer.

Sandblasting operation emissions are estimated using two different methods: (1) based on air flowrate and typical outlet grain loading, and (2) based on manufacturer's guaranteed efficiency and assumed final particle size distribution (see Attachment A).

Facility is typically operated 8 hours/day, 5 days/week, 52 weeks/year. Expected operation is significantly less. Maximum annual emissions are calculated based on maximum possible possible operation (260 days/year) and the maximum hourly emission rate (2.14 lb/hr). Potential annual emissions are calculated on maximum possible operation (260 days/year) and particulate permit limit (2.34 lb/hr).

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

12. Signature**Date****Signer's name** (type or print)**Title****Phone number with area code**

* Refer to the tables in the instructions for estimation method and control device codes.

** Exit gas particulate matter concentration units: Process – Grains/Dry Standard Ft³ (70°F), Wood fired boilers - Grains/Dry Standard Ft³ (70°F), all other boilers – Lbs. /Million BTU heat input.

*** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input



DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor, Nashville, TN 37243
Telephone: (615) 532-0554, Email: Air.Pollution.Control@TN.gov

APC 102

NON-TITLE V PERMIT APPLICATION
PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.			
GENERAL IDENTIFICATION AND DESCRIPTION			
1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)		2. Emission Source Reference Number 72-0029-11	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes No ☒ X If Yes, list rule citation, including Part, Subpart, and applicable Sections:			
4. Unique Source ID (see instructions) Sandblasting Operation SB-2		5. Unique Emission Point ID (see instructions) SB-2	
6. Description of air contaminant source The sandblasting operation (SB-2) and surface coating operation (SC-2), which are located in the same building, are used for ongoing construction and maintenance activities at WBN. A compressed-air blasting machine is the equipment that generates particulate emissions. Sandblasting operation is controlled by a bagfilter dust collector.			
7. Type of air contaminant source (Check only one option to the right)			
Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14)			X
Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14)			
Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14)			
PROCESS EMISSION SOURCE DESCRIPTION AND DATA			
8. Type of operation: Continuous ☒ X Batch		Normal batch time	Normal batches/day
9. Process material inputs and In-process solid fuels	Diagram reference	Input rates (pounds/hour)	
		Design	Actual
A. Abrasive (Note 2)	1	1,000	(Note 3)
B.			
C.			
D.			
E.			
F.			
G.			
Totals		1,000	(Note 3)

* A simple process flow diagram must be attached.

DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE							
10. Boiler or burner data: (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)							
Serial Number				Type of firing***			
Rated horsepower		Rated input capacity (10 ⁶ BTU/Hr.)		Other rating (specify capacity and units)			
Date constructed		Date manufactured		Date of last modification (explain in comments below)			
** Source with a common stack will have the same stack number. *** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments)).							
FUEL USED IN BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE							
11. Fuel data: (Complete for a process emission source with in process fuel or a non-process fuel burning source)							
Primary fuel type (specify)				Standby fuel type(s) (specify)			
Fuels used	Annual usage	Hourly usage		% Sulfur	% Ash	BTU value of fuel	(For APC use only) SCC code
		Design	Average				
Natural gas:	10 ⁶ Cu. Ft.	Cu. Ft.	Cu. Ft.				
#2 Fuel oil:	10 ³ Gal.	Gal.	Gal.				
#5 Fuel oil:	10 ³ Gal.	Gal.	Gal.				
#6 Fuel oil:	10 ³ Gal.	Gal.	Gal.				
Coal:	Tons	Lbs.	Lbs.				
Wood:	Tons	Lbs.	Lbs.				
Liquid propane:	10 ³ Gal.	Gal.	Gal.				
Other (specify type & units):							
12. If Wood is used as a fuel, specify types and estimate percent by weight of bark							
13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.							

14. Comments

Note 1: Facility is typically operated 8 hours/day, 5 days/week, 52 weeks/year. Actual operation will be intermittent and variable, depending on construction/maintenance needs.

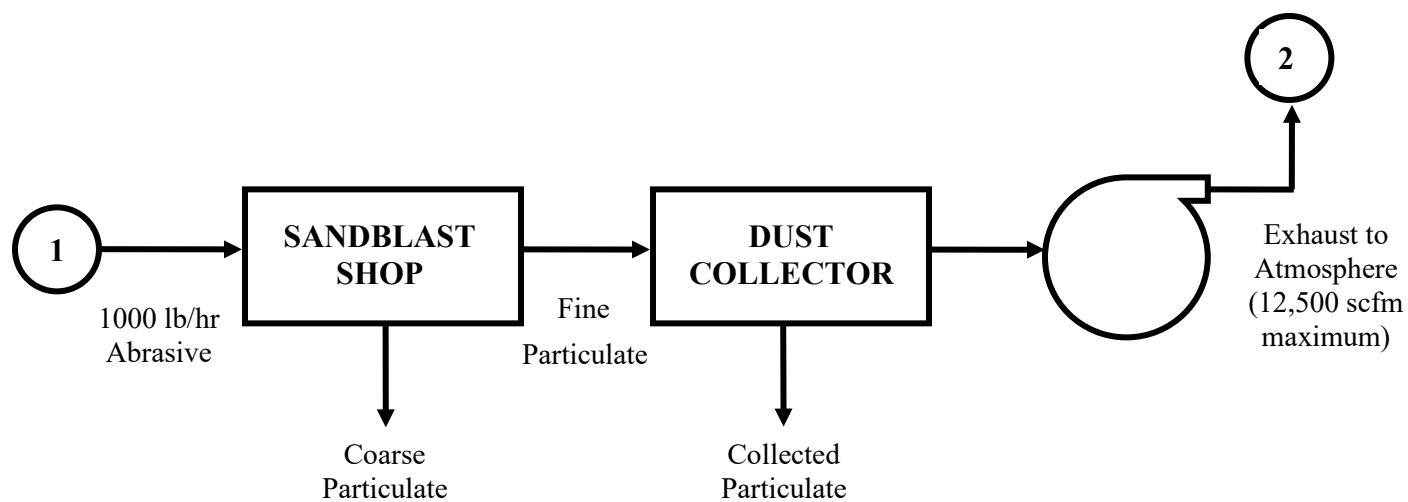
Note 2: Abrasive used varies depending on equipment being cleaned. Normally, either Dupont Starblast[®] CP-2-51 or Black Beauty abrasive is used. For cleaning stainless steel, glass beads are used.

Note 3: Actual input rates will vary depending on the condition of the equipment being cleaned. The maximum input rate will be 1,000 lb/hr.

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

15. Signature**Date****Signer's name** (type or print)**Title****Phone number with area code**



**WATTS BAR NUCLEAR PLANT
SANDBLAST SHOP (SB-2)
PROCESS FLOW DIAGRAM**

APC 101 (SB-2) ATTACHMENT
A EMISSION CALCULATIONS

1. Based on airflow rate and a typical outlet grain loading for fabric filters (0.02 gr/scf)
 - a. Maximum emission rate
 $(0.02 \text{ gr/scf})(12,500 \text{ scfm})(1 \text{ lb}/7,000 \text{ gr})(60 \text{ min}) = 2.14 \text{ lb/hr}$
 - b. Maximum annual emissions
 $(2.14 \text{ lb/hr})(8 \times 5 \times 52 \text{ hr/yr})(1 \text{ ton}/2,000 \text{ lb}) = 2.22 \text{ ton/yr}$
2. Based on manufacturer's guaranteed efficiency and assumed final sand size distribution
 - a. Guaranteed efficiency: 99.5% for particle size greater than 0.5 micron
 - b. Rate of usage: 1000 lb/hr, (400 to 900 microns initial size)
 - c. Typical particle size analysis of emissions from sandblasting operations
(from Air Pollution Engineering Manual, AP-40, Second Edition, May 1973):
100% of particles smaller than 150 microns
0.4% of particles smaller than 1.6 microns
 - d. Assumptions:
 - i. Final abrasive has size range 0 to 400 micron corresponding to fines and fine sand in COE Unified Soil Classification. Distribution is similar to filter sand (Perry's Chemical Engineering Handbook, 4th edition, Fig. 8-4). Less than 10% of total is smaller than 150 microns.
 - ii. All particles smaller than 1.6 microns are also smaller than 0.5 micron.
 - iii. Only particles smaller than 150 microns are carried over to dust collector. Coarser particles drop out inside facility.
 - e. Uncontrolled emission rate: $(0.10)(1000 \text{ lb/hr}) = 100 \text{ lb/hr}$
 - f. Controlled emission rate:
$$\begin{array}{lcl} (0.004)(100 \text{ lb/hr}) & + & (0.005)(0.996)(100) = 0.90 \text{ lb/hr} \\ \text{fraction smaller} & & \text{fraction larger than} \\ \text{than 0.5 micron} & & 0.5 \text{ micron which escapes} \end{array}$$



**NON-TITLE V PERMIT APPLICATION
SURFACE COATING DESCRIPTION**

Type or print. Submit for each spray booth, dip tank, or other surface coating equipment. Submit with the APC 100.							
GENERAL IDENTIFICATION AND DESCRIPTION							
1. Organization's legal name and SOS control number [as registered with the Tennessee Secretary of State (SOS)] Tennessee Valley Authority (TVA) - Watts Bar Nuclear Plant (WBN)						2. Emission Source Reference Number 72-0029-12	
3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes No X If Yes, list rule citation, including Part, Subpart, and applicable Sections:							
COATING OPERATION DATA							
4. Unique Source ID (name/number/letter that uniquely identifies this air contaminant source, like Paint Line 1) Source Coating Operation - SC-2							
5. Type of coating operation		Spray booth X		Dip tank		Other (describe)	
6. Spray booth dimensions		Width (ft.) 21		Height (ft.) 14.2		Depth (ft.) 26.3	
7. Method of spray:		Airless X		Air atomized X		Electrostatic Airless Disc Air atomized	
8. Exhaust data:		Number of fans		Total horsepower 7.5		Overspray (Percent) 4 to 6	
9. Exhaust control:		None Waterwash		Exhaust filters X		Baffle plates Adsorption **	
10. Exhaust stack data **		Diameter (Ft.) 3.5		Height (Ft.) Above Grade 20		Flow (CFM) 24,000	
11. Control device. Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.). Record all coatings, thinners, and solvents product name, usage, density, VOC and HAP content. The exhaust filters are RP Arrestor W-Series 5100 Ultra-Efficiency filtration roll media and FilterLoc filter management system capable of 99.8% particulate removal efficiency. The exhaust fan is rated for 24,000 cfm at 0.5 inches static pressure.							

* The actual surface coating equipment (spray gun, spray heads, etc.) and not the spray booth per se determines the status of the source (new or existing).

** Complete one line for each stack or vent. Attach additional sheets if necessary

12. Coatings, Thinners, and Clean-up Solvents used:

List all types of coatings, thinners, and clean-up solvents used and attach a statement of the chemical composition of each (i.e. Safety Data Sheet). This statement usually may be obtained from the coating, thinner, or clean-up solvent supplier. The minimum information required is the percent of solids by weight, the percent volatile by weight, the hydrocarbon composition and/or description of the volatile component, and the density of the coating, thinner, or clean-up solvent in pounds per gallon.

* Name Solvent Base type

CN-0747 (Rev. 12-17)

13. Air contaminants. Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

Air contaminants	Average Emissions (Lbs./Hr.)	Maximum Emissions (Lbs./Hr.)	Concentration	Average Emissions (Tons/Yr.)	Potential Emissions (Ton/Yr.)	Emissions Estimation Method Code *	Control Devices *	Control Efficiency %
Particulate matter (PM)		0.43**						
Sulfur dioxide (SO ₂)								
Carbon monoxide (CO)			PPM					
Volatile organic compounds (VOC)			PPM	1.00**	41.0**			
Nitrogen oxides (NO _x)			PPM					
Hydrogen fluoride (HF)								
Hydrogen chloride (HCl)								
Lead (Pb)								
Greenhouse gases (CO ₂ equivalents)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Other (specify)								
Other (specify)								

* Refer to the tables in the instructions for estimation method and control device codes.

** Permit limit of 0.43 lb/hr PM and 41.0 ton/yr VOC. Typical 12-month rolling average of less than 1 ton/yr VOC.

EQUIPMENT DESCRIPTION		
14. Equipment manufacturer HDM	Model number HDM-20-12-26-P-DT	Serial number (or plant ID)
Construction date February 2024		Modification date
Describe any modifications*		
15. Describe articles coated Miscellaneous steel construction items - plates, tube, pipe, unistrut, I-beams, clamps, etc.		
16. Comments Note 1: The spray equipment parts are replaced on an as-needed basis. Note 2: Facility is typically operated 8 hours/day, 5 days/week, 52 weeks/yr. Expected operation is significantly less. Note 3: Coatings listed are typical of the products used at the facility. Specific coatings may vary. Total usage should not vary. Note 4: Either Carboline thinner No. 26 (33) or Amercoat thinner No. 8 is used with the Carbozinc 11 primer, depending on the ambient temperature. Both thinners will not be used at the same time. Thinner No. 26 is used most often. Note 5: Amerlock 400 with thinner #8 and Keeler and Long P-Series Enamel Coating with thinner #1638 are used infrequently (i.e. approximately one day per month).		
SIGNATURE		
If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.		
Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.		
17. Signature		Date
Signer's name (type or print)	Title	Phone number with area code

APC 107 ATTACHMENT A

SAMPLE CALCULATIONS FOR WATTS BAR NUCLEAR PLANT PAINT BOOTH EMISSIONS

Coatings:

<u>Product Name</u>	<u>% Volatile by Weight</u>	<u>Density, lb/gal</u>
Carbozinc 11	74	8.8
SG Base		
Amerlock	11	12.7
400NT Resin		
Keeler and Long	45	11.0
P-Series Enamel		

$$\begin{aligned}\text{Average Coatings Volatiles (lb/gal)} &= [(0.74 \times 8.8 \text{ lb/gal}) + (0.11 \times 12.7 \text{ lb/gal}) + (0.45 \times 11.0 \text{ lb/gal})]/3 \\ &= 4.29 \text{ lb/gal}\end{aligned}$$

Thinners:

<u>Product Name</u>	<u>% Volatile by Weight</u>	<u>Density, lb/gal</u>
Carboline	100	7.4
Thinner #26 (33)		
Amercoat	100	6.9
Thinner #8		
Keeler and Long	100	6.5
Thinner #1638		

$$\begin{aligned}\text{Average Thinners Volatiles (lb/gal)} &= [(1.00 \times 7.4 \text{ lb/gal}) + (1.00 \times 6.9 \text{ lb/gal}) + (1.00 \times 6.5 \text{ lb/gal})]/3 \\ &= 6.93 \text{ lb/gal}\end{aligned}$$

Clean-up Solvent:

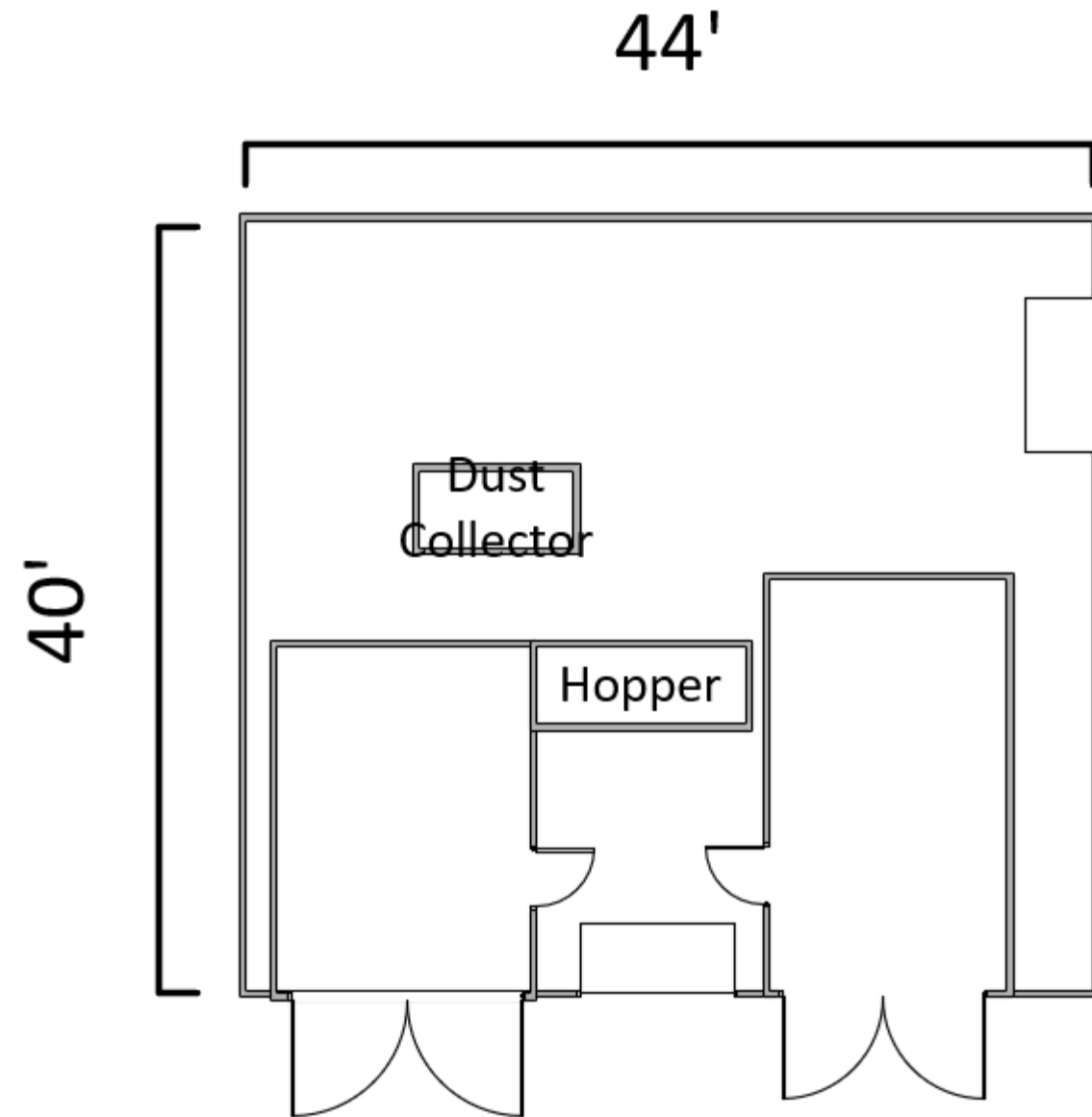
<u>Product Name</u>	<u>% Volatile by Weight</u>	<u>Density, lb/gal</u>
Carboline Thinner #26 (33)	100	7.4

$$\begin{aligned}\text{Average Clean-up Solvent Volatiles (lb/gal)} &= (1.00 \times 7.4 \text{ lb/gal})/1 \\ &= 7.4 \text{ lb/gal}\end{aligned}$$

VOC Maximum Annual Emissions

$$\begin{aligned}&[(365+243+152 \text{ gal/mo}) \times 12 \text{ mo/yr} \times 4.29 \text{ lb/gal} + (152+152+30 \text{ gal/mo}) \times 12 \text{ mo/yr} \times 6.93 \text{ lb/gal} + (152 \text{ gal/mo}) \\ &\times 12 \text{ mo/yr} \times 7.4 \text{ lb/gal}] \times \text{ton}/2000 \text{ lb} = 40.2 \text{ ton VOC/yr} \quad 41.0 \text{ ton/yr permit limit}\end{aligned}$$







**STATE OF TENNESSEE
AIR POLLUTION CONTROL BOARD
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
NASHVILLE, TENNESSEE**

PERMIT TO CONSTRUCT / MODIFY AND OPERATE AIR CONTAMINANT SOURCE(S)

Permit Number: 482013

Facility (Permittee): Tennessee Valley Authority – Watts Bar Nuclear Plant

Facility ID: 72-0029

Facility Address: 1270 Highway 68, Spring City
Rhea County

Facility Classification: Conditional Major

Federal Requirements: 40 CFR 60 Subpart IIII
40 CFR 63 Subpart ZZZZ
40 CFR 63 Subpart JJJJJ

Facility Description: Electric Generation Facility

Conditional Major Operating Permit 482013, consisting of 43 pages is hereby issued April 5, 2024, pursuant to the Tennessee Air Quality Act and by the Technical Secretary, Tennessee Air Pollution Control Board, Department of Environment and Conservation. This permit expires on September 1, 2033. The holder of this permit shall comply with the conditions contained in this permit as well as all applicable provisions of the Tennessee Air Pollution Control Regulations (TAPCR).

Michelle W. Owenby
Technical Secretary
Tennessee Air Pollution Control Board

No Authority is Granted by this Permit to Operate, Construct, or Maintain any Installation in Violation of any Law, Statute, Code, Ordinance, Rule, or Regulation of the State of Tennessee or any of its Political Subdivisions.

Section I – Sources Included in this Permit

FACILITY DESCRIPTION			
Source Number	Source Description	Status	Control Device/Equipment
08	Two 52.8 MMBtu/hr Auxiliary Boilers	Existing	None
11	Sandblasting Shop	Existing	Baghouse
12	Surface Coating Operation	Existing	Exhaust Filters
17	Five 44.5 MMBtu/hr (6,357 hp) Diesel Emergency Engines	Existing	None
22	One 30.6 MMBtu/hr (4,678 hp) Diesel Emergency Engine	Existing	None
23	One 30.6 MMBtu/hr (4,678 hp) Diesel Emergency Engine	Existing	None
29	Surface Coating Operation	New	Exhaust Filters
30	Abrasive Blasting Operation	New	Cartridge Filter

Section II – Permit Record

Permit Type	Description of Permit Action	Issue Date
Initial	Initial issuance of combined construction / operating permit	April 5, 2024

Section III - General Permit Conditions

G1. Responsible Person

The application that was utilized in the preparation of this permit is dated December 6, 2023, and is signed by Anthony L. Williams IV, Watts Bar Nuclear Vice President, the Responsible Person for the permittee. The Responsible Person may be the owner, president, vice-president, general partner, plant manager, environmental/health/safety coordinator, or other person that is able to represent and bind the facility in environmental permitting affairs. If this Responsible Person terminates their employment or is assigned different duties and is no longer the person to represent and bind the permittee in environmental permitting affairs, the new Responsible Person for the permittee shall notify the Technical Secretary of the change in writing. The Notification shall include the name and title of the new Responsible Person assigned by the permittee to represent and bind the permittee in environmental permitting affairs, and the date the new Responsible Person was assigned these duties.

Should a change in the Responsible Person occur, the new Responsible Person must submit the Notification provided in Appendix 1 of this permit no later than 30 days after being assigned as the Responsible Person. A separate notification shall be submitted for each subsequent change in Responsible Person.

TAPCR 1200-03-09-.03(8)

G2. Application and Agreement Letters

This source shall operate in accordance with the terms of this permit, the information submitted in the approved permit application referenced in **Condition G1**, and any documented agreements made with the Technical Secretary.

TAPCR 1200-03-09-.01(1)(d)

G3. Submittals

Unless otherwise specified within this permit, the permittee shall submit, preferably via email and in Adobe Portable Document format (PDF), all applicable plans, checklists, certifications, notifications, test protocols, reports, and applications to the attention of the following Division Programs at the email addresses indicated in the table below:

Permitting Program	Compliance Validation Program	Field Services Program
• Notifications • Startup certifications • Applications • NSPS reports • MACT/GACT/NESHAP reports • Emission statements	• Test protocols • Emission test reports • Visible emission evaluation reports	• Semiannual reports • Annual compliance certifications/status report
Division of Air Pollution Control William R. Snodgrass TN Tower, 15 th Floor 312 Rosa L. Parks Avenue Nashville, TN 37243 Air.Pollution.Control@tn.gov		Chattanooga Environmental Field Office Division of Air Pollution Control 1301 Riverfront Parkway, Suite 206 Chattanooga, TN 37402 APC.ChattEFO@tn.gov

The permittee shall submit the information identified above as requested in this permit. In lieu of submitting this information to the email addresses above, the permittee may submit the information to the attention of the respective Division Programs at the mailing addresses listed above.

TAPCR 1200-03-09-.03(8)

G4. Notification of Changes

The permittee shall notify the Technical Secretary for any of the following changes to a permitted air contaminant source which would not be a modification requiring a new construction permit:

- change in air pollution control equipment that does not result in an increase or otherwise meet the definition of a modification
- change in stack height or diameter
- change in exit velocity of more than 25 percent or exit temperature of more than 15 percent based on absolute temperature.

The permittee must submit the Notification provided in Appendix 2 of this permit 30 days before the change is commenced.

TAPCR 1200-03-09-.02(7)

G5. Permit Transference

- This permit is not transferable from one air contaminant source to another air contaminant source or from one location to another location. The permittee must submit a construction permit application for a new source to the Permitting Program not less than 90 days prior to the estimated starting date of these events. If the new source will be subject to major New Source Review, the application must be submitted not less than 120 days in advance of the estimated starting date of these events.

TAPCR 1200-03-09-.03(6)(b)

- B. In the event an ownership change occurs at this facility, the new owner must submit the notification provided in Appendix 3 of this permit. The written notification must be submitted by the new owner to the Permitting Program no later than 30 days after the ownership change occurs. If the change in ownership results in a change in Responsible Person for the facility, notification of the change in Responsible Person must also be submitted, as specified in **Condition G1**.

TAPCR 1200-03-09-.03(6)(a) and (b) and 1200-03-09-.01(1)(b)

G6. Operating Permit Renewal Application Submittal

- A. The permittee shall apply for renewal of this permit not less than 60 days prior to the permit's expiration date.

TAPCR 1200-03-09-.02(3)(a)

- B. Operation of each air contaminant source shall be in accordance with the provisions and stipulations set forth in this permit, all provisions of the Tennessee Division of Air Pollution Control Regulations, and all provisions of the Tennessee Air Quality Act.

TAPCR 1200-03-09-.02(6)

G7. Startup Certification for New or Modified Source(s)

The startup certification provided in Appendix 4 shall be submitted to the Permitting Program once an air contaminant source has started up. Startup of the air contaminant source shall be the date the new or modified air contaminant source began operation for the production of product for sale, use as raw materials, or steam or heat production under the terms of this permit. A separate startup certification must be submitted for each air contaminant source included in this permit.

TAPCR 1200-03-09-.03(8)

Compliance Method: The startup certification provided in Appendix 4 shall be submitted no later than 30 days after each air contaminant source has begun startup.

G8. Fees

The air contaminant source(s) identified in this permit shall comply with the requirements for payment of applicable annual emission fees and annual conditional major review fees to the Tennessee Division of Air Pollution Control based on the Administrative Fees Schedule I provided in Appendix 5 of this permit. The fee must be paid to the Division in full by the first day of the month that the fee is due (determined from Appendix 5). (Note: not all facilities are required to pay annual emission fees)

TAPCR 1200-03-26-.02

G9. General Recordkeeping Requirements

- A. All recordkeeping requirements for all data required to be recorded shall follow the following schedules:

For Daily Recordkeeping	For Weekly Recordkeeping	For Monthly Recordkeeping
No later than seven days from the end of the day for which the data is required.	No later than seven days from the end of the week for which the data is required.	No later than thirty days from the end of the month for which the data is required.

- B. The information contained in logs, records, and submittals required by this permit shall be kept at the facility's address, unless otherwise noted, and provided to the Technical Secretary or a Division representative upon request. Computer-generated logs are acceptable. Compliance is assured by retaining the logs, records, and submittals specified in this permit for a period of not less than five years at the facility's address.

TAPCR 1200-03-10-.02(2)(a)

G10. Routine Maintenance Requirements

The permittee shall maintain and repair the emission source, associated air pollution control device(s), and compliance assurance monitoring equipment as required to maintain and assure compliance with the specified emission limits.

TAPCR 1200-03-09-.03(8)

Compliance Method: Records of all repair and maintenance activities required above shall be recorded in a suitable permanent form and kept available for inspection by the Division. These records must be retained for a period of not less than five years. The date each maintenance and repair activity began shall be entered in the log no later than seven days following the start of the repair or maintenance activity, and the completion date shall be entered in the log no later than seven days after activity completion.

G11. Visible and Fugitive Emissions

- A. Unless otherwise specified, visible emissions from this facility shall not exhibit greater than 20% opacity, except for one six-minute period in any one-hour period, and for no more than four six-minute periods in any 24-hour period. A stack is defined as any chimney, flue, conduit, exhaust, vent, or opening of any kind whatsoever, capable of, or used for, the emission of air contaminants.

TAPCR 1200-03-05-.01(1) and 1200-03-05-.03(6)

Compliance Method: When required to demonstrate compliance, visible emissions shall be determined by EPA Method 9, as published in the current 40 CFR 60, Appendix A (six-minute average).

- B. The permittee shall not cause, suffer, allow, or permit any materials to be handled, transported, or stored; or a building, its appurtenances, or a road to be used, constructed, altered, repaired, or demolished without taking reasonable precautions to prevent particulate matter from becoming airborne. Reasonable precautions shall include, but are not limited to, the following:
- (a) Use, where possible, of water or chemicals for control of dust in demolition of existing buildings or structures, construction operations, grading of roads, or the clearing of land;
 - (b) Application of asphalt, water, or suitable chemicals on dirt roads, material stockpiles, and other surfaces which can create airborne dusts;
 - (c) Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials. Adequate containment methods shall be employed during sandblasting or other similar operations.

The permittee shall not cause, suffer, allow, or permit fugitive dust to be emitted in such manner to exceed five minutes per hour or 20 minutes per day as to produce a visible emission beyond the property line of the property on which the emission originates, excluding malfunction of equipment as provided in TAPCR 1200-03-20. A malfunction is defined as, any sudden and unavoidable failure of process equipment or for a process to operate in an abnormal and unusual manner. Failures that are caused by poor maintenance, careless operation, or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions.

TAPCR 1200-03-08-.01(1) and 1200-03-08-.01(2)

Compliance Method: When required to demonstrate compliance, fugitive emissions shall be determined by Tennessee Visible Emissions Evaluation Method 4 as adopted by the Tennessee Air Pollution Control Board on April 16, 1986.

C. Fugitive emissions from roads and parking areas shall not exhibit greater than 10% opacity.

TAPCR 1200-03-08-.03

Compliance Method: When required to demonstrate compliance, fugitive emissions from roads and parking areas shall be determined by utilizing Tennessee Visible Emissions Evaluation (TVEE) Method 1, as adopted by the Tennessee Air Pollution Control Board on April 29, 1982, as amended on September 15, 1982, and August 24, 1984.

G12. NSPS/NESHAP/MACT/GACT Standards

The following source(s) are subject to and shall comply with all applicable requirements of each NSPS/NESHAP/MACT/GACT standard as indicated in the table below, including the General Provisions identified in Appendices 10, 11, and 12.

Source Number	NESHAP/MACT/GACT	NSPS
08	40 CFR 63 Subpart JJJJJ	Not Applicable
11	Not Applicable	Not Applicable
12	Not Applicable	Not Applicable
17	40 CFR 63 Subpart ZZZZ	Not Applicable
22	40 CFR 63 Subpart ZZZZ	40 CFR 60 Subpart IIII
23	40 CFR 63 Subpart ZZZZ	40 CFR 60 Subpart IIII
29	Not Applicable	Not Applicable
30	Not Applicable	Not Applicable

TAPCR 1200-03-09-.03(8), 0400-30-38-.01, and 0400-30-39

Compliance Method: Compliance methods are provided in the conditions in **Section V** of this permit.

G13. VOC and NO_x Emission Statement

Not Applicable

G14. Facility-wide Limitations (Other Than Conditional Major)

Not Applicable

G15. Permit Supersedes Statement

This permit supersedes all previously issued permits for this/these source(s).

TAPCR 1200-03-09-.03(8)

G16. Source Testing Requirements

Not Applicable

G17. Hazardous Air Pollutant (HAP) Emissions

At the time of permit issuance, the potential to emit hazardous air pollutants (HAP) from this facility was less than the major source applicability thresholds of 10 tons per year of a single HAP and less than 25 tons per year of a combination of HAP. The permittee must apply for and receive a construction permit in accordance with the procedures in Chapter 1200-03-09 of the TAPCR prior to making any changes such that the potential to emit hazardous air pollutants from the facility will exceed these thresholds.

TAPCR 1200-03-09-.03(8)

Section IV – Conditional Major Conditions

C1. Major Source Opt-Out Requirements

The permittee has elected to opt-out of being issued a major source operating permit pursuant to TAPCR 1200-03-09-.02(11)(a). The permittee would be considered a major source because their potential to emit value(s) for Nitrogen oxides (NO_x) and Sulfur dioxide (SO₂) were greater than 100 tons per year at the time of application. The permittee has agreed to be subject to limitations in order to be below the major source applicability threshold for NO_x and SO₂ of 100 tons per year.

TAPCR 1200-03-09-.02(11)(a)

C2. Notification of Non-Compliance

Any non-compliance with any condition(s) of this permit set to restrain the potential to emit below the applicability threshold(s) of 1200-03-09-.02(11) of the Tennessee Air Pollution Control Regulations, shall be reported in writing to the Technical Secretary within 15 working days of such discovery. This notification, at a minimum, shall include the identification of the source, identification of the permit condition(s) violated, and details of the violation.

TAPCR 1200-03-09-.03(8) and 1200-03-09-.02(11)(a)

C3. Failure to Abide by Conditional Major Emission Limit(s)

The permittee is placed on notice that **Condition C4** of this permit contain(s) limitations that allow the permittee to opt-out of the major source operating permit program requirements specified in paragraph 1200-03-09-.02(11) of the Tennessee Air Pollution Control Regulations. Failure to abide by these limits will not only subject the permittee to enforcement action by the State of Tennessee, but it may also result in the imposition of federal enforcement action by the United States Environmental Protection Agency and the loss of being federally recognized as a conditional major source.

TAPCR 1200-03-09-.02(11)(e)1(vi)(I)

C4. Conditional Major Emission Limit(s)

Emissions from the entire facility shall not exceed the following federally enforceable maximum emission rate(s), including emissions from exempt and insignificant emission units:

Pollutant(s)	Maximum Emission Rate(s) (tons during any period of 12 consecutive months)
Sulfur dioxide (SO ₂)	99.9
Nitrogen oxides (NO _x)	99.9

TAPCR 1200-03-09-.02(11)(a) and the permittee's agreement letter(s) dated March 7, 2023 (Appendix 8)

Compliance Method: The permittee shall assure compliance with the/these emission rate(s) by calculating monthly and 12 consecutive month NO_x and SO₂ emissions from all permitted sources and insignificant/exempt activities at this facility. The permittee shall maintain the monthly and 12 consecutive month logs in the format in Appendix 9, or an alternative format that readily provides the same information. The log(s) shall be retained in accordance with **Condition G9**.

If the facility adds insignificant or exempt activities/emission units that emit SO₂ or NO_x, the permittee shall provide notification to the Division of the change in facility SO₂ and NO_x emissions at least 30 days prior to the installation of each insignificant activity/emission unit [TAPCR 1200-03-09-.04(4)(a)] or at least 30 days prior to the installation of each exempt air contaminant source [TAPCR 1200-03-09-.04(4)(b), (c), or (d)].

C5. Annual Compliance Status Report

The permittee shall submit a written report stating the compliance status of this facility with permit **Condition C4** by March 31 of every year. The report shall cover the preceding calendar year and shall include the records required by **Conditions C4 and S1-1D** (fuel use records only for **S1-1D**). The first report following issuance of this permit is due March 31, 2025, and shall cover the time period and permits specified in the following table. The report must include the compliance certification statement included in Appendix 7. Reports submitted with unsigned certification statements will be deemed incomplete.

Permit Number	Start of Reporting Period	End of Reporting Period
480496	January 1, 2024	April 4, 2024
482013	April 5, 2024	December 31, 2024

TAPCR 1200-03-09-.03(8), 1200-03-09-.02(11)(a), and 1200-03-10-.02(2)(a)

Section V - Source Specific Permit Conditions

Source Number	Source Description
08	Auxiliary Boilers: Two 52.8 MMBtu/hr No. 2 fuel oil-fired Auxiliary Boilers exhausting through shared stack AB-1 – These units have taken permit restrictions in order to qualify for the limited-use boiler subcategory as listed in 40 CFR 63 Subpart JJJJJ. These boilers provide steam for startup of the WBN nuclear generating units, other process steam needs, and building space heat, as needed. 40 CFR 63 Subpart JJJJJ

S1-1. Input Limitation(s) or Statement(s) of Design

- A. The stated design heat input capacity of each boiler is 52.8 million British thermal units per hour (MMBtu/hr, 105.6 MMBtu/hr total). If the permittee needs to increase the design or maximum heat input rate of this source, a construction permit must be applied for and received in accordance with TAPCR 1200-03-09-.01(1) prior to initiating the change.

TAPCR 1200-03-09-.01(1)(d) and the construction permit application dated December 17, 2013

Compliance Method: The permittee shall maintain documentation to substantiate the rated heat input capacity of each boiler. Documentation may include, but is not limited to, purchase records, manufacturer's specifications, operating manuals, or a tag affixed to the unit by the manufacturer. This information shall be kept readily accessible and made available upon request by the Technical Secretary or a Division representative.

- B. Only No. 2 fuel oil and diesel fuel shall be used as fuel for this source.

TAPCR 1200-03-09-.01(1)(d) and the construction permit application dated December 17, 2013

Compliance Method: The permittee shall maintain documentation to demonstrate the type(s) of fuel used by each boiler. Documentation shall include, but is not limited to, manufacturer's specifications, purchase records, operating manuals, or a tag affixed to the unit by the manufacturer. These documents shall be kept readily available/accessible and made available upon request by the Technical Secretary or a Division representative.

- C. The sulfur content of the No. 2 fuel oil and diesel shall be less than or equal to 0.5 percent by weight.

TAPCR 1200-03-09-.03(8)

Compliance Method: Fuel oil supplier certification shall be maintained for each batch of No. 2 fuel oil and diesel received and stored on site. This certification shall be maintained and kept available for inspection by the Technical Secretary or Division representative in accordance with **Condition G9**.

- D. The actual heat input for each boiler shall not exceed 10% of the maximum potential heat input of each boiler on an annual (calendar year) basis. The maximum No. 2 fuel oil and diesel fuel usage combined shall not exceed 337,612 gallons per calendar year per boiler. The permittee requested this annual capacity factor limit be placed on these boilers so that they meet the definition of *limited-use boiler* as defined in 40 CFR §63.11237.

TAPCR 0400-30-38-.01, 1200-03-10-.02(2)(a), and the agreement letter dated March 7, 2023 (Appendix 8)

Compliance Method: A monthly record of the No. 2 fuel oil and diesel combusted in each boiler must be maintained at the source location and kept readily available for inspection by the Technical Secretary or Division representative in accordance with **Condition G9**.

S1-2. Production Limitation(s)

Not Applicable

S1-3. Operating Hour Limitation(s)

Not Applicable

S1-4. Emission Limitation(s)

- A. Particulate matter (PM) emitted from this fuel burning installation shall not exceed 0.162 lb/MMBtu (17.1 pounds per hour [lbs/hr] on a daily average basis).

TAPCR 1200-03-06-.02(2)(a)

Compliance Method: Compliance with this condition is assured by compliance with **Conditions S1-1A, S1-1B**, and using the PM emission factor from AP-42 Chapter 1.3.

- B. SO₂ emitted from this fuel burning installation shall not exceed 4.0 lb/MMBtu (422.4 lbs/hr on a daily average basis) and the facility-wide limit specified in **Condition C4**.

TAPCR 1200-03-14-.02(2)(a) and 1200-03-09-.02(11)(a)

Compliance Method: Compliance with this condition is assured by compliance with **Conditions S1-1A, S1-1B, S1-1C**, and using the SO₂ emission factor from AP-42 Chapter 1.3. Actual emissions shall be calculated in accordance with **Condition C4**.

- C. Carbon monoxide (CO) emitted from this fuel burning installation shall not exceed 3.85 lbs/hr on a daily average basis.

TAPCR 1200-03-06-.03(2)

Compliance Method: Compliance with this condition is assured by compliance with **Conditions S1-1A, S1-1B**, and using the CO emission factor from AP-42 Chapter 1.3.

- D. NO_x emitted from this fuel burning installation shall not exceed 15.4 lbs/hr on a daily average basis and the facility-wide limit specified in **Condition C4**.

TAPCR 1200-03-06-.03(2) and 1200-03-09-.02(11)(a)

Compliance Method: Compliance with this condition is assured by compliance with **Conditions S1-1A, S1-1B**, and using the NO_x emission factor from AP-42 Chapter 1.3. Actual emissions shall be calculated in accordance with **Condition C4**.

- E. Volatile organic compounds (VOC) emitted from this fuel burning installation shall not exceed 0.15 lbs/hr on a daily average basis.

TAPCR 1200-03-06-.03(2)

Compliance Method: Compliance with this condition is assured by compliance with **Conditions S1-1A, S1-1B**, and using the VOC emission factor from AP-42 Chapter 1.3.

S1-5. Source-Specific Visible Emissions Limitation(s)

Not Applicable

F1. 40 CFR 63 Subpart JJJJJ Requirements

F1-1. This facility is subject to and shall comply with all applicable requirements of 40 CFR Part 63 Subpart JJJJJ-*National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boiler Area Sources* (Subpart JJJJJ). The boilers included in this source belong to the “limited-use boilers” subcategory as listed in §63.11200 and defined in §63.11237. Limited-use boilers are not subject to the emission limits in Table 1, the energy assessment requirements in Table 2, or the operating limits in Table 3 to Subpart JJJJJ.

40 CFR §63.11193, §63.11200, and §63.11223(f)

F1-2. At all times the permittee must operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. The general duty to minimize emissions does not require the permittee to make any further efforts to reduce emissions if levels required by this standard have been achieved. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Technical Secretary that may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the source.

40 CFR §63.11205(a)

F1-3. If the permittee switches fuel or makes a physical change to an affected boiler that results in the applicability of a different subcategory within Subpart JJJJJ, or if the permittee takes a permit limit that results in no longer being subject to Subpart JJJJJ, the permittee must demonstrate compliance within 180 days of the effective date of the fuel switch or physical change. The permittee shall provide notice to the Technical Secretary at the address listed in **Condition G3**, of the date upon which the permittee switched fuels, made the physical change, or took a permit limit within 30 days of the change. The notification must provide the information in paragraphs (a) and (b) below.

- (a) The name of the owner or operator of the affected source, the location of the source, the boiler(s) that have switched fuels, were physically changed, or took a permit limit, and the date of the notice.
- (b) The date upon which the fuel switch, the physical change, or permit limit occurred.

40 CFR §63.11210(i) and §63.11225(g)

F1-4. The permittee must conduct a tune-up of each boiler every five years as specified in paragraphs (a) through (g) of this condition. Each five-year tune-up must be conducted no more than 61 months after the previous tune-up.

- (a) As applicable, inspect the burner, and clean or replace any components of the burner as necessary (burner inspection may be delayed until the next scheduled unit shutdown, not to exceed 36 months from the previous inspection). Units that produce electricity for sale may delay the burner inspection until the first outage, not to exceed 36 months from the previous inspection.
- (b) Inspect the flame pattern, as applicable, and adjust the burner as necessary to optimize the flame pattern. The adjustment should be consistent with the manufacturer's specifications, if available.
- (c) Inspect the system controlling the air-to-fuel ratio, as applicable, and ensure that it is correctly calibrated and functioning properly (you may delay the inspection until the next scheduled unit shutdown, not to exceed 36 months from the previous inspection). Units that produce electricity for sale may delay the inspection until the first outage, not to exceed 36 months from the previous inspection.
- (d) Optimize total emissions of CO. This optimization should be consistent with the manufacturer's specifications, if available, and with any nitrogen oxide requirement to which the unit is subject.

- (e) Measure the concentrations in the effluent stream of CO in parts per million, by volume, and oxygen in volume percent, before and after the adjustments are made (measurements may be either on a dry or wet basis, as long as it is the same basis before and after the adjustments are made). Measurements may be taken using a portable CO analyzer.
- (f) Maintain on-site and submit, if requested by the Technical Secretary, a report containing the information in paragraphs (1) through (3) below.
 - (1) The concentrations of CO in the effluent stream in parts per million, by volume, and oxygen in volume percent, measured at high fire or typical operating load, before and after the tune-up of the boiler.
 - (2) A description of any corrective actions taken as a part of the tune-up of the boiler.
 - (3) The type and amount of fuel used over the 12 months prior to the tune-up of the boiler, but only if the unit was physically and legally capable of using more than one type of fuel during that period. Units sharing a fuel meter may estimate the fuel use by each unit.
- (g) If the unit is not operating on the required date for a tune-up, the tune-up must be conducted within 30 days of startup.

40 CFR §63.11223(f)

F1-5. The permittee shall prepare, by March 1 of the year immediately following the end of the 5-year reporting period, and submit to the Technical Secretary upon request, a 5-year compliance certification report. Each 5-year compliance report shall specify the reporting period covered and shall contain the information specified in paragraphs (a) and (b) of this condition.

- (a) Company name and address.
- (b) Statement by a responsible official, with the official's name, title, phone number, email address, and signature, certifying the truth, accuracy and completeness of the notification and a statement of whether the source has complied with all the relevant standards and other requirements of this subpart. The notification must include the following certification(s) of compliance, as applicable, and signed by a responsible official:
 - (1) "This facility complies with the requirements in §63.11223 to conduct a five-year tune-up of each boiler."

40 CFR §63.11225(b)

F1-6. The permittee shall maintain the records specified in paragraphs (a) through (e) of this condition.

- (a) As required in §63.10(b)(2)(xiv), the permittee must keep a copy of each notification and report that was submitted to comply with this subpart and all documentation supporting any Initial Notification or Notification of Compliance Status that was submitted.
- (b) The permittee must keep records to document conformance with the management practices (tune-ups) required by **Condition F1-4**. Records must identify each boiler, the date of tune-up, the procedures followed for tune-up, and the manufacturer's specifications to which the boiler was tuned.
- (c) For each boiler that meets the definition of a limited-use boiler, the permittee must keep a copy of the federally enforceable permit that limits the annual capacity factor to less than or equal to 10 percent and records of fuel use for the days the boiler is operating.
- (d) Records of the occurrence and duration of each malfunction of the boiler.
- (e) Records of actions taken during periods of malfunctions to minimize emissions in accordance with the general duty to minimize emissions in **Condition F1-2**, including corrective actions to restore the malfunctioning boiler to its normal or usual manner of operation.

40 CFR §63.11225(c)

- F1-7.** Records must be maintained in a form suitable and readily available for expeditious review. The permittee shall keep each record for 5 years following the date of each recorded action. The permittee must keep each record on-site or accessible from a central location by computer or other means that instantly provides access at the site for at least 2 years after the date of each recorded action. You may keep the records off site for the remaining 3 years.

40 CFR §63.11225(d)

Source Number	Source Description
11	Abrasive Blasting Operation: Sandblast shop with dust collector control. This source is used for ongoing construction and maintenance activities.

S2-1. Input Limitation(s) or Statement(s) of Design

The stated input capacity for this source is 1,000 pounds of abrasive per hour. If the permittee wishes to increase or modify the design capacity of this source, a construction permit shall be applied for and received in accordance with TAPCR 1200-03-09-.01(1) prior to making the change.

TAPCR 1200-03-09-.02(6) and the operating permit application dated June 17, 2022

Compliance Method: The permittee shall maintain documentation to substantiate the design capacity of the abrasive blasting operation. Documentation may include, but is not limited to, purchase records, manufacturer's specifications, operating manuals, or a tag affixed to the unit by the manufacturer. This information shall be kept readily accessible and made available upon request by the Technical Secretary or a Division representative.

S2-2. Production Limitation(s)

Not Applicable

S2-3. Operating Hour Limitation(s)

Not Applicable

S2-4. Emission Limitation(s)

PM emitted from this source shall not exceed 2.34 lbs/hr on a daily average basis.

TAPCR 1200-03-07-.03(1)

Compliance Method: Compliance with this condition shall be assured by compliance with **Condition S2-1** and by operating the control equipment at all times during operation of this source. The permittee shall perform and record weekly visual inspections of the exterior of the dust collector and the dust collector ductwork, including the dust collector exhaust. The permittee shall initiate, as well as record, corrective action within 24 hours and complete, as well as record, corrective action as expeditiously as practical if the permittee finds that an abrasion hole and/or emissions problem and/or plugging problem has developed during an inspection of the dust collector(s). Identification of an abrasion hole and/or emissions problem and/or plugging problem and corrective action(s) shall be noted in the weekly inspection records. Inspection records shall also include the initials of the person performing the inspection(s) and corrective action(s), along with the date, time, and any relevant comments. Weeks that the source is not in operation shall be noted. These records shall be retained in accordance with **Condition G9**.

S2-5. Source-Specific Visible Emissions Limitation(s)

Not Applicable

Source Number	Source Description
12	Surface Coating Operation: Surface coating of miscellaneous steel construction items. Spraying occurs in a room with two filtered exhaust fans.

S3-1. Input Limitation(s) or Statement(s) of Design

Not Applicable

S3-2. Production Limitation(s)

Not Applicable

S3-3. Operating Hour Limitation(s)

Not Applicable

S3-4. Emission Limitation(s)

- A. PM emitted from the surface coating operation shall not exceed 0.02 grains per dry standard cubic foot (gr/dscf) of exhaust gas (0.43 lbs/hr on a daily average basis).

TAPCR 1200-03-07-.04(1)

Compliance Method: The permittee shall install, operate, and maintain exhaust filtration for the exhaust fans serving this source. This source shall not operate unless the exhaust filters are in place and functioning properly. The permittee shall inspect the filter(s) on a weekly basis prior to starting the source. The permittee shall initiate, as well as record, corrective action within 24 hours and complete, as well as record, corrective action as expediently as practical if the permittee finds that a problem has developed during an inspection of the filters. Inspection records shall be kept and shall also include the initials of the person performing the inspection(s) and corrective action(s), along with the date, time, and any relevant comments. Weeks that the source is not in operation shall be noted. These records shall be retained in accordance with **Condition G9**.

- B. VOC emissions from this source shall not exceed 41.0 tons during any period of 12 consecutive months.

TAPCR 1200-03-07-.07(2)

Compliance Method: The permittee shall demonstrate compliance with this condition by calculating actual quantities of VOC, each individual HAP, and total HAP emitted each month and during each period of 12 consecutive months and maintaining a log of this information in a format similar to that contained in the example log in Appendix 9. The as-supplied VOC and HAP content of all VOC and/or HAP-containing materials (all coatings, inks, adhesives, thinners, and solvents) to be used by this source shall be determined from Safety Data Sheets (SDS) or manufacturer or vendor formulation data which explicitly list the VOC and HAP content by weight or volume. If new materials are used, or if material formulation is changed, the logs used to calculate emissions of VOC and HAP shall be updated within 30 days from the initial date of usage of the new or altered material. Purchase orders and/or invoices for all VOC and/or HAP-containing materials, along with current SDS or manufacturer or vendor formulation data, must be maintained and kept available for inspection by the Technical Secretary or a Division representative. These records shall be retained in accordance with **Condition G9**. Scanned documents (maintained electronically) may be used to fulfill this requirement.

S3-5. Source-Specific Visible Emissions Limitation(s)

Not Applicable

S3-6. This surface coating operation meets the definition of “facility maintenance” in 40 CFR §63.11180. Therefore, this source is not subject to 40 CFR 63 Subpart HHHHHH – *National Emission Standards for Hazardous Air Pollutants: Paint Stripping and Miscellaneous Surface Coating Operations at Area Sources* pursuant to §63.11170(a)(3).

TAPCR 1200-03-09-.03(8)

Source Number	Source Description
17	Emergency Engines: Five 44.5 MMBtu/hr emergency diesel engines (DG-1 through DG-5) 40 CFR 63 Subpart ZZZZ

S4-1. Input Limitation(s) or Statement(s) of Design

- A. The stated design heat input capacity of each engine is 44.5 MMBtu/hr (222.5 MMBtu/hr total). If the permittee needs to increase the design or maximum input rate of this source, a construction permit must be applied for and received in accordance with TAPCR 1200-03-09-.01(1) prior to initiating the change.

TAPCR 1200-03-09-.01(1)(d) and the construction permit application dated December 17, 2013

Compliance Method: The permittee shall maintain documentation to substantiate the rated heat input capacity of each engine. Documentation may include, but is not limited to, purchase records, manufacturer’s specifications, operating manuals, or a tag affixed to the unit by the manufacturer. This information shall be kept readily accessible and made available upon request by the Technical Secretary or a Division representative.

- B. Only No. 2 fuel oil and diesel fuel shall be used as fuel for this source.

TAPCR 1200-03-09-.01(1)(d) and the construction permit application dated December 17, 2013

Compliance Method: The permittee shall maintain documentation to demonstrate the type(s) of fuel used by each engine. Documentation shall include, but is not limited to, manufacturer’s specifications, purchase records, operating manuals, or a tag affixed to the unit by the manufacturer. These documents shall be kept readily available/accessible and made available upon request by the Technical Secretary or a Division representative.

- C. The sulfur content of the No. 2 fuel oil and diesel shall be less than or equal to 0.5 percent by weight.

TAPCR 1200-03-09-.03(8)

Compliance Method: Fuel oil supplier certification shall be maintained for each batch of No. 2 fuel oil and diesel received and stored on site. This certification shall be maintained and kept available for inspection by the Technical Secretary or Division representative in accordance with **Condition G9**.

S4-2. Production Limitation(s)

Not Applicable

S4-3. Operating Hour Limitation(s)

Not Applicable

S4-4. Emission Limitation(s)

- A. PM emitted from this source shall not exceed 0.0697 lb/MMBtu.

TAPCR 1200-03-06-.01(7) and the agreement letter dated March 7, 2023 (Appendix 8)

Compliance Method: Compliance with this condition is assured by compliance with **Conditions S4-1A, S4-1B**, and using the PM emission factor from AP-42 Chapter 3.4.

- B. SO₂ emitted from this source shall not exceed 112.4 lbs/hr on a daily average basis and the facility-wide limit specified in **Condition C4**.

TAPCR 1200-03-14-.03(5)

Compliance Method: Compliance with this condition is assured by compliance with **Conditions S4-1A, S4-1B, S4-1C**, and using the SO₂ emission factor from AP-42 Chapter 3.4. Actual emissions shall be calculated in accordance with **Condition C4**.

- C. CO emitted from this source shall not exceed 189.1 lbs/hr on a daily average basis.

TAPCR 1200-03-07-.07(2)

Compliance Method: Compliance with this condition is assured by compliance with **Conditions S4-1A, S4-1B**, and using the CO emission factor from AP-42 Chapter 3.4.

- D. NO_x emitted from this source shall not exceed 712.0 lbs/hr on a daily average basis and the facility-wide limit specified in **Condition C4**.

TAPCR 1200-03-07-.07(2)

Compliance Method: Compliance with this condition is assured by compliance with **Conditions S4-1A, S4-1B**, and using the NO_x emission factor from AP-42 Chapter 3.4. Actual emissions shall be calculated in accordance with **Condition C4**.

- E. VOC emitted from this source shall not exceed 18.2 lbs/hr on a daily average basis.

TAPCR 1200-03-07-.07(2)

Compliance Method: Compliance with this condition is assured by compliance with **Conditions S4-1A, S4-1B**, and using the VOC emission factor from AP-42 Chapter 3.4.

S4-5. Source-Specific Visible Emissions Limitation(s)

Not Applicable

F2. 40 CFR 63 Subpart ZZZZ Requirements

- F2-1.** This source is subject to and shall comply with all applicable requirements of 40 CFR Part 60 Subpart ZZZZ- *National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines* (Subpart ZZZZ). The stationary reciprocating internal combustion engines (RICE) included in this source are existing stationary RICE located at an area source of HAP emissions. The requirements applicable to these engines include, but are not limited to, the requirements specified in **Conditions F2-2 through F2-10**.

40 CFR §63.6590(a)(1)(iii)

- F2-2.** The permittee must meet the following requirements from Table 2d to Subpart ZZZZ for each emergency stationary compression ignition (CI) RICE:

- (a) Change oil and filter every 500 hours of operation or annually, whichever comes first (the permittee has the option to utilize an oil analysis program as described in 40 CFR §63.6625(i) in order to extend the specified oil change requirement);
- (b) Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first; and
- (c) Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.

40 CFR §63.6603(a)

- F2-3.** The permittee must be in compliance with the emission limitations, operating limitations, and other requirements in Subpart ZZZZ that apply to the permittee, at all times. At all times the permittee must operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. The general duty to minimize emissions does not require any further efforts to reduce emissions if levels required by this standard have been achieved. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Technical Secretary which may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the source.

40 CFR §63.6605

- F2-4.** The permittee must operate and maintain each existing emergency stationary RICE and after-treatment control device (if any) according to the manufacturer's emission-related written instructions or develop a maintenance plan which must provide to the extent practicable for the maintenance and operation of each engine in a manner consistent with good air pollution control practice for minimizing emissions.

40 CFR §§63.6625(e) and 63.6640(a)

- F2-5.** For each existing stationary RICE, the permittee must install a non-resettable hour meter if one is not already installed.

40 CFR §63.6625(f)

- F2-6.** The permittee shall minimize each engine's time spent at idle during startup and minimize the engine's startup time to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes.

40 CFR §63.6625(h)

- F2-7.** For each emergency stationary RICE, the permittee must operate the emergency stationary RICE according to the requirements in paragraphs (a) through (c) of this condition. In order for the engine to be considered an emergency stationary RICE under Subpart ZZZZ, any operation other than emergency operation, maintenance and testing, and operation in non-emergency situations for 50 hours per year, as described in paragraphs (a) through (c) of this condition, is prohibited. If an engine is not operated according to the requirements in paragraphs (a) through (c) of this condition, the engine will not be considered an emergency engine under Subpart ZZZZ and must meet all requirements for non-emergency engines.
- (a) There is no time limit on the use of emergency stationary RICE in emergency situations.
 - (b) The permittee may operate each emergency stationary RICE for the purpose specified in paragraph (b)(1) of this condition for a maximum of 100 hours per calendar year. Any operation for non-emergency situations as allowed by paragraph (c) of this condition counts as part of the 100 hours per calendar year allowed by this paragraph (b).
 - (1) Emergency stationary RICE may be operated for maintenance checks and readiness testing, provided that the tests are recommended by federal, state or local government, the manufacturer, the vendor, the regional transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the engine. The owner or operator may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that federal, state, or local standards require maintenance and testing of emergency RICE beyond 100 hours per calendar year.
 - (c) Emergency stationary RICE located at area sources of HAP may be operated for up to 50 hours per calendar year in non-emergency situations. The 50 hours of operation in non-emergency situations are counted as part of the 100 hours per calendar year for maintenance and testing provided in paragraph (b) of this condition. Except as provided in paragraph (c)(1) of this condition, the 50 hours per year for non-emergency situations cannot be used for peak shaving or non-emergency demand response, or to generate income for a facility to supply power to an electric grid or otherwise supply power as part of a financial arrangement with another entity.
 - (1) The 50 hours per year for non-emergency situations can be used to supply power as part of a financial arrangement with another entity if all of the following conditions are met:
 - (A) The engine is dispatched by the local balancing authority or local transmission and distribution system operator.
 - (B) The dispatch is intended to mitigate local transmission and/or distribution limitations so as to avert potential voltage collapse or line overloads that could lead to the interruption of power supply in a local area or region.
 - (C) The dispatch follows reliability, emergency operation or similar protocols that follow specific NERC, regional, state, public utility commission or local standards or guidelines.
 - (D) The power is provided only to the facility itself or to support the local transmission and distribution system.
 - (E) The owner or operator identifies and records the entity that dispatches the engine and the specific NERC, regional, state, public utility commission or local standards or guidelines that are being followed for dispatching the engine. The local balancing authority or local transmission and distribution system operator may keep these records on behalf of the engine owner or operator.

40 CFR §63.6640(f)

- F2-8.** If the permittee operates an emergency stationary RICE for the purpose specified in **Condition F2-7(c)(1)**, the permittee must submit an annual report according to the requirements in paragraphs (a) through (c) of this condition.
- (a) The report must contain the following information:
 - (1) Company name and address where the engine is located.
 - (2) Date of the report and beginning and ending dates of the reporting period.
 - (3) Engine site rating and model year.

- (4) Latitude and longitude of the engine in decimal degrees reported to the fifth decimal place.
- (5) Hours spent for operation for the purpose specified in **Condition F2-7(c)(1)**, including the date, start time, and end time for engine operation for the purposes specified in **Condition F2-7(c)(1)**. The report must also identify the entity that dispatched the engine and the situation that necessitated the dispatch of the engine.
- (6) If there were no deviations from the fuel requirements in 40 CFR §63.6604 that apply to the engine (if any), a statement that there were no deviations from the fuel requirements during the reporting period.
- (7) If there were deviations from the fuel requirements in 40 CFR §63.6604 that apply to the engine (if any), information on the number, duration, and cause of deviations, and the corrective action taken.
- (b) Annual reports must cover each calendar year during which an emergency stationary RICE was operated for the purpose specified in **Condition F2-7(c)(1)** and must be submitted no later than March 31 of the following calendar year.
- (c) The annual report must be submitted electronically using the subpart specific reporting form in the Compliance and Emissions Data Reporting Interface (CEDRI) that is accessed through EPA's Central Data Exchange (CDX) (www.epa.gov/cdx). However, if the reporting form specific to Subpart ZZZZ is not available in CEDRI at the time that the report is due, the written report must be submitted to EPA at the appropriate address listed in 40 CFR §63.13.

40 CFR §63.6650(a) and (h)

F2-9. The permittee shall keep records of the maintenance conducted on the stationary RICE in order to demonstrate that the permittee operated and maintained the stationary RICE and after-treatment control device (if any) according to the permittee's own maintenance plan.

40 CFR §63.6655(e)

F2-10. The permittee must keep records of the hours of operation of each existing emergency stationary RICE that are recorded through the non-resettable hour meter. The permittee must document how many hours are spent for emergency operation, including what classified the operation as emergency and how many hours are spent for non-emergency operation. If the engine is used for the purpose specified in **Condition F2-7(c)(1)**, the permittee must keep records of the notification of the emergency situation, and the date, start time, and end time of engine operation for these purposes. The permittee shall maintain a monthly log of operating hours for each existing emergency stationary RICE and calculate the operating hours during each calendar year. The permittee shall maintain the following log format or an alternative format which readily provides the same required information.

CALENDAR YEAR OPERATING HOUR LOG (or equivalent) for each single emergency stationary RICE				
Year:				
Month	Operating Hours per Calendar Year			Comments*
	Maintenance Checks and Readiness Testing	Other Non-Emergency Operation	Emergency Operation	
January				
February				
etc.				
Totals				

*The permittee must document how many hours are spent for emergency operation including what classified the operation as emergency and how many hours are spent for non-emergency operation.

40 CFR §63.6625(f) and §63.6655(f)

Source Number	Source Description
22 and 23	Emergency Engines: Two 30.6 MMBtu/hr (4,678 hp) emergency diesel engines (DG-14 and DG-15) 40 CFR 60 Subpart IIII 40 CFR 63 Subpart ZZZZ

S5-1. Input Limitation(s) or Statement(s) of Design

- A. The stated design heat input capacity of each engine is 30.6 MMBtu/hr (61.2 MMBtu/hr total). If the permittee needs to increase the design or maximum input rate of this source, a construction permit must be applied for and received in accordance with TAPCR 1200-03-09-.01(1) prior to initiating the change.

TAPCR 1200-03-09-.01(1)(d) and the construction permit application dated December 17, 2013

Compliance Method: The permittee shall maintain documentation to substantiate the rated heat input capacity of each engine. Documentation may include, but is not limited to, purchase records, manufacturer's specifications, operating manuals, or a tag affixed to the unit by the manufacturer. This information shall be kept readily accessible and made available upon request by the Technical Secretary or a Division representative.

- B. Only diesel fuel shall be used as fuel for this source.

TAPCR 1200-03-09-.01(1)(d) and the construction permit application dated December 17, 2013

Compliance Method: The permittee shall maintain documentation to demonstrate the type(s) of fuel used by each engine. Documentation shall include, but is not limited to, manufacturer's specifications, purchase records, operating manuals, or a tag affixed to the unit by the manufacturer. These documents shall be kept readily available/accessible and made available upon request by the Technical Secretary or a Division representative.

S5-2. Production Limitation(s)

Not Applicable

S5-3. Operating Hour Limitation(s)

Not Applicable

S5-4. Emission Limitation(s)

SO₂ emitted from this source shall not exceed 0.06 pounds per hour.

TAPCR 1200-03-14-.03(5)

Compliance Method: Compliance with this condition is assured by compliance with **Conditions S5-1A, S5-1B, F3-3**, and using the SO₂ emission factor from AP-42 Chapter 3.4. Actual emissions shall be calculated in accordance with **Condition C4**.

S5-5. Source-Specific Visible Emissions Limitation(s)

Not Applicable

F3. 40 CFR 63 Subpart IIII Requirements

F3-1. Stationary reciprocating internal combustion engines are subject to regulation under 40 CFR Part 63, Subpart ZZZZ - *National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines* (Subpart ZZZZ). New (manufactured after July 1, 2006) stationary compression ignition engines are subject to regulation under 40 CFR Part 60, Subpart IIII - *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines* (Subpart IIII). The permittee shall meet the requirements of 40 CFR Part 63, Subpart ZZZZ, by meeting the requirements of 40 CFR Part 60, Subpart IIII. The applicable requirements of Subpart IIII include, but are not limited to, the requirements specified in **Conditions F3-2** through **F3-7**.

40 CFR §63.6590(c)(1) and §60.4200(a)(2)

F3-2. Emissions from the subject units shall meet the following corresponding emissions standards for PM, CO, and non-methane hydrocarbons plus oxides of nitrogen (NMHC+NO_x), in grams per kilowatt-hour (g/kW-hr) as described in 40 CFR part 1039, appendix I. These units shall achieve these emission standards over the entire life of the engine.

Source Number	Limits (g/kW-hr)		
	PM	CO	NMHC + NO _x
22	0.20	3.5	6.4
23	0.20	3.5	6.4

Compliance Method: Compliance with this condition shall be assured by compliance with **Condition F3-4**.

40 CFR §60.4202(a)(2), §60.4205(b), and §60.4206

F3-3. The permittee must use diesel fuel that meets the requirements of 40 CFR §60.4207(b) and 40 CFR §1090.305. The diesel fuel used for this source is subject to the following per-gallon standards:

- (a) Sulfur content shall not exceed 15 ppm maximum for nonroad diesel fuel.
- (b) Cetane index or aromatic content, as follows:
 - (1) A minimum cetane index of 40; or
 - (2) A maximum aromatic content of 35 volume percent.

40 CFR §60.4207(b)

Compliance Method: The permittee shall maintain purchase receipts, vendor certifications, safety data sheets, or other records to demonstrate that all fuel purchased for this source meets the requirements of this condition (any fuel labeled as ultra-low sulfur non-highway diesel fuel or ultra-low sulfur highway diesel fuel meets these requirements). These records shall be made available to the Technical Secretary for inspection upon request. These records must be maintained as specified in **Condition G9**.

F3-4. The permittee must do all of the following, except as provided in **Condition F3-6**:

- (a) Operate and maintain the emergency stationary ICE and control device (if present) according to the manufacturer's emission-related written instructions;
- (b) Change only those emission-related settings that are permitted by the manufacturer; and
- (c) Meet the requirements of 40 CFR part 1068, as they apply.
- (d) Purchase an engine certified to the emission standards in §60.4204(b), or §60.4205(b) or (c), as applicable, for the same model year and maximum engine power. Install and configure the engine according to the manufacturer's emission-related specifications, except as permitted in **Condition F3-6**.

- (e) If the emergency stationary compression ignition internal combustion engine does not meet the standards applicable to non-emergency engines, the permittee must install a non-resettable hour meter prior to startup of the engine.
- (f) If the emergency engine does not meet the standards applicable to non-emergency engines in the applicable model year (as specified in Table 5 to Subpart IIII), the permittee must keep records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter. The permittee must record the time of operation of the engine and the reason the engine was in operation during that time.

40 CFR §60.4209(a), §60.4211(a) and (c), and §60.4214(b)

F3-5. The permittee must operate each emergency stationary ICE according to the requirements in paragraphs (a) through (c) of this condition. In order for the engine to be considered an emergency stationary ICE under Subpart IIII, any operation other than emergency operation, maintenance and testing, and operation in non-emergency situations for 50 hours per year, as described in paragraphs (a) through (c) of this condition, is prohibited. If the permittee does not operate each engine according to the requirements in paragraphs (a) through (c) of this condition, the engine will not be considered an emergency engine under Subpart IIII and must meet all requirements for non-emergency engines.

- (a) There is no time limit on the use of emergency stationary ICE in emergency situations.
- (b) The permittee may operate each emergency stationary ICE for the purpose specified in paragraph (b)(1) of this condition for a maximum of 100 hours per calendar year. Any operation for non-emergency situations as allowed by paragraph (c) of this condition counts as part of the 100 hours per calendar year allowed by this paragraph (b).
 - (1) Each emergency stationary ICE may be operated for maintenance checks and readiness testing, provided that the tests are recommended by federal, state or local government, the manufacturer, the vendor, the regional transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the engine. The owner or operator may petition the Technical Secretary for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that federal, state, or local standards require maintenance and testing of emergency ICE beyond 100 hours per calendar year.
- (c) Each emergency stationary ICE may be operated for up to 50 hours per calendar year in non-emergency situations. The 50 hours of operation in non-emergency situations are counted as part of the 100 hours per calendar year for maintenance and testing provided in paragraph (b) of this condition. Except as provided in paragraph (c)(1) of this condition, the 50 hours per calendar year for non-emergency situations cannot be used for peak shaving or non-emergency demand response, or to generate income for a facility to an electric grid or otherwise supply power as part of a financial arrangement with another entity.
 - (1) The 50 hours per year for non-emergency situations can be used to supply power as part of a financial arrangement with another entity if all of the following conditions are met:
 - (A) The engine is dispatched by the local balancing authority or local transmission and distribution system operator.
 - (B) The dispatch is intended to mitigate local transmission and/or distribution limitations so as to avert potential voltage collapse or line overloads that could lead to the interruption of power supply in a local area or region.
 - (C) The dispatch follows reliability, emergency operation or similar protocols that follow specific NERC, regional, state, public utility commission or local standards or guidelines.
 - (D) The power is provided only to the facility itself or to support the local transmission and distribution system.
 - (E) The owner or operator identifies and records the entity that dispatches the engine and the specific NERC, regional, state, public utility commission or local standards or guidelines that are being followed for dispatching the engine. The local balancing authority or local transmission and distribution system operator may keep these records on behalf of the engine owner or operator.

40 CFR §60.4211(f) and §60.4214(b)

Compliance Method: The permittee shall keep a log of the number of operating hours recorded through the non-resettable hour meter for each engine during each calendar year, in a form that readily demonstrates compliance with this condition (see example below). The permittee must document how many hours are spent for the following categories: (1) emergency operation, as specified in paragraph (a), including what classified the operation as emergency; (2) maintenance checks and readiness testing, as specified in paragraph (b); and (3) non-emergency operation, as specified in paragraph (c). The permittee shall keep these records available for inspection by the Technical Secretary or a Division representative. Records shall be maintained in accordance with **Condition G9**.

CALENDAR YEAR OPERATING HOUR LOG (or equivalent) for each single emergency stationary RICE				
Year:				
Month	Operating Hours per Calendar Year			Comments*
	Maintenance Checks and Readiness Testing	Other Non-Emergency Operation	Emergency Operation	
January				
February				
etc.				
Totals				

*The permittee must document how many hours are spent for emergency operation including what classified the operation as emergency and how many hours are spent for non-emergency operation.

- F3-6.** If the permittee does not install, configure, operate, and maintain each engine and control device according to the manufacturer's emission-related written instructions, or the permittee changes emission-related settings in a way that is not permitted by the manufacturer, the permittee must demonstrate compliance as follows:

For engines > 500 HP
Keep a maintenance plan and records of conducted maintenance and, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions.
Conduct an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of startup, or within 1 year after an engine and control device is no longer installed, configured, operated, and maintained in accordance with the manufacturer's emission-related written instructions, or within 1 year after a change to emission-related settings in a way that is not permitted by the manufacturer.
Conduct subsequent performance testing every 8,760 hours of engine operation or 3 years, whichever comes first, thereafter to demonstrate compliance with the applicable emission standards.

40 CFR §60.4211(g)

- F3-7.** If the permittee operates an emergency stationary CI RICE for the purpose specified in **Condition F3-5(c)(1)**, the permittee must submit an annual report according to the requirements in paragraphs (a) through (c) of this condition.

- (a) The report must contain the following information:
- (1) Company name and address where the engine is located.
 - (2) Date of the report and beginning and ending dates of the reporting period.
 - (3) Engine site rating and model year.
 - (4) Latitude and longitude of the engine in decimal degrees reported to the fifth decimal place.
 - (5) Hours spent for operation for the purpose specified in **Condition F3-5(c)(1)**, including the date, start time, and end time for engine operation for the purposes specified in **Condition F3-5(c)(1)**. The report must also identify the entity that dispatched the engine and the situation that necessitated the dispatch of the engine.

- (6) If there were no deviations from the fuel requirements in 40 CFR §63.6604 that apply to the engine (if any), a statement that there were no deviations from the fuel requirements during the reporting period.
- (7) If there were deviations from the fuel requirements in 40 CFR §63.6604 that apply to the engine (if any), information on the number, duration, and cause of deviations, and the corrective action taken.
- (b) Annual reports must cover each calendar year during which an emergency stationary CI RICE was operated for the purpose specified in **Condition F3-5(c)(1)** and must be submitted no later than March 31 of the following calendar year.
- (c) The annual report must be submitted electronically using the subpart specific reporting form in the Compliance and Emissions Data Reporting Interface (CEDRI) that is accessed through EPA's Central Data Exchange (CDX) (www.epa.gov/cdx). However, if the reporting form specific to Subpart ZZZZ is not available in CEDRI at the time that the report is due, the written report must be submitted to EPA at the appropriate address listed in 40 CFR §60.4.

40 CFR §60.4214(d)

Source Number	Source Description
29	Surface Coating Operation: Surface coating of miscellaneous steel construction items. Spraying occurs in a room with two filtered exhaust fans.

S6-1. Input Limitation(s) or Statement(s) of Design

Not Applicable

S6-2. Production Limitation(s)

Not Applicable

S6-3. Operating Hour Limitation(s)

Not Applicable

S6-4. Emission Limitation(s)

- A. PM emitted from the surface coating operation shall not exceed 0.02 grains per dry standard cubic foot (gr/dscf) of exhaust gas (4.11 lbs/hr on a daily average basis).

TAPCR 1200-03-07-.04(1)

Compliance Method: The permittee shall install, operate, and maintain exhaust filtration for the exhaust fans serving this source. This source shall not operate unless the exhaust filters are in place and functioning properly. The permittee shall inspect the filter(s) on a weekly basis prior to starting the source. The permittee shall initiate, as well as record, corrective action within 24 hours and complete, as well as record, corrective action as expeditiously as practical if the permittee finds that a problem has developed during an inspection of the filters. Inspection records shall be kept and shall also include the initials of the person performing the inspection(s) and corrective action(s), along with the date, time, and any relevant comments. Weeks that the source is not in operation shall be noted. These records shall be retained in accordance with **Condition G9**.

B. VOC emissions from this source shall not exceed 43.0 tons during any period of 12 consecutive months.

TAPCR 1200-03-07-.07(2)

Compliance Method: The permittee shall demonstrate compliance with this condition by calculating actual quantities of VOC, each individual hazardous air pollutant (HAP), and total HAP emitted each month and during each period of 12 consecutive months and maintaining a log of this information in a format similar to that contained in the example log in Appendix 9. The as-supplied VOC and HAP content of all VOC and/or HAP-containing materials (all coatings, inks, adhesives, thinners, and solvents) to be used by this source shall be determined from Safety Data Sheets (SDS) or manufacturer or vendor formulation data which explicitly list the VOC and HAP content by weight or volume. If new materials are used, or if material formulation is changed, the table shall be updated within 30 days from the initial date of usage of the new or altered material. Purchase orders and/or invoices for all VOC and/or HAP-containing materials, along with current SDS or manufacturer or vendor formulation data, must be maintained and kept available for inspection by the Technical Secretary or a Division representative. These records shall be retained in accordance with **Condition G9**.

S6-5. Source-Specific Visible Emissions Limitation(s)

Not Applicable

S6-6. This surface coating operation meets the definition of “facility maintenance” in 40 CFR §63.11180. Therefore, this source is not subject to 40 CFR 63 Subpart HHHHHH – *National Emission Standards for Hazardous Air Pollutants: Paint Stripping and Miscellaneous Surface Coating Operations at Area Sources* pursuant to §63.11170(a)(3).

TAPCR 1200-03-09-.03(8)

Source Number	Source Description
30	Abrasive Blasting Operation: Sandblast shop with cartridge filter control. This source is used for ongoing construction and maintenance activities.

S7-1. Input Limitation(s) or Statement(s) of Design

The stated input capacity for this source is 1,000 pounds of abrasive per hour. If the permittee wishes to increase or modify the design capacity of this source, a construction permit shall be applied for and received in accordance with TAPCR 1200-03-09-.01(1) prior to making the change.

TAPCR 1200-03-09-.02(6) and the application dated December 6, 2023

Compliance Method: The permittee shall maintain documentation to substantiate the design capacity of the abrasive blasting operation. Documentation may include, but is not limited to, purchase records, manufacturer’s specifications, operating manuals, or a tag affixed to the unit by the manufacturer. This information shall be kept readily accessible and made available upon request by the Technical Secretary or a Division representative.

S7-2. Production Limitation(s)

Not Applicable

S7-3. Operating Hour Limitation(s)

Not Applicable

S7-4. Emission Limitation(s)

PM emitted from this source shall not exceed 2.34 lbs/hr on a daily average basis.

TAPCR 1200-03-07-.03(1)

Compliance Method: Compliance with this condition shall be assured by compliance with **Condition S7-1** and by operating the control equipment at all times during operation of this source. The permittee shall perform and record weekly visual inspections of the exterior of the dust collector and the dust collector ductwork, including the dust collector exhaust. The permittee shall initiate, as well as record, corrective action within 24 hours and complete, as well as record, corrective action as expediently as practical if the permittee finds that an abrasion hole and/or emissions problem and/or plugging problem has developed during an inspection of the dust collector(s). Identification of an abrasion hole and/or emissions problem and/or plugging problem and corrective action(s) shall be noted in the weekly inspection records. Inspection records shall also include the initials of the person performing the inspection(s) and corrective action(s), along with the date, time, and any relevant comments. Weeks that the source is not in operation shall be noted. These records shall be retained in accordance with **Condition G9**.

S7-5. Source-Specific Visible Emissions Limitation(s)

Not Applicable

(end of conditions)

The permit application gives the location of this source as 35.604335 Latitude and -84.789943 Longitude.

Appendix 1: Notification of Change in Responsible Person

Facility (Permittee): Tennessee Valley Authority – Watts Bar Nuclear Plant

Facility ID: 72-0029

Former Responsible Person:

<u></u>	<u></u>
Name	Title

New Responsible Person:

<u></u>	<u></u>
Name	Title
<u></u>	
Email	
<u></u>	
Mailing Address	
<u></u>	<u></u>
Phone (Office)	Phone (cell)

Date New Responsible Person was assigned this duty:

I certify that the information contained in this Notification is accurate and true to the best of my knowledge. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

<u>Signature</u>		<u>Date</u>
<u>Signer’s name (print)</u>	<u>Title</u>	<u>Phone (with area code)</u>

Appendix 2: Notification of Changes

Facility (Permittee): Tennessee Valley Authority – Watts Bar Nuclear Plant

Facility ID: 72-0029

Source Number: _____

	Control Equipment	Stack Height (Feet)	Stack Diameter (Feet)	Exit Velocity (Feet/Second)	Exit Temperature (°F)
Current					
Proposed					
Current					
Proposed					
Current					
Proposed					

Comments:

As the Responsible Person of the above mentioned facility (permittee), I certify that the information contained in this Notification is accurate and true to the best of my knowledge. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

Signature		Date
Signer's name (print)	Title	Phone (with area code)

Appendix 3: Notification of Ownership Change

Facility (Permittee): Tennessee Valley Authority – Watts Bar Nuclear Plant (Previous Owner)

Facility ID: 72-0029

Facility (Permittee): _____ (New Owner) _____
Date of Ownership Change

Secretary of State Control Number: _____ [as registered with the TN Secretary of State (SOS)]

Responsible Person/Authorized Contact	Email Address
Mailing Address	Phone with area code
Principal Technical Contact	Email Address
Mailing Address	Phone with area code
Billing Contact	Email Address
Mailing Address	Phone with area code

As the responsible person for the new owner or operator of the above mentioned facility (permittee):

- I agree to not make any changes to the stationary source(s) that meet the definition of modification as defined in Division 1200-03 or Division 0400-30¹, and
- I agree to comply with the conditions contained in **the permits listed below**, Division 1200-03 and Division 0400-30 of the Tennessee Air Pollution Control Regulations, the Tennessee Air Quality Act, and any documented agreements made by the previous owner to the Technical Secretary.

List all active permits issued to the facility for which the owner wishes to assume ownership:

The information contained in this Notification is accurate and true to the best of my knowledge. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

Signature		Date
Signer's name (print)	Title	Phone (with area code)

¹ Appropriate application forms must be submitted prior to modification of the stationary source(s).

Appendix 4: Startup Certification

Facility (Permittee): Tennessee Valley Authority – Watts Bar Nuclear Plant

Facility ID: 72-0029

Startup Certification for Source Number: _____

The permittee shall certify the startup date for each new or modified air contaminant source regulated by Conditional Major permit 482013 by submitting this document.

Date of startup: _____ / _____ / _____
Month Day Year

As the Responsible Person of the above mentioned facility (permittee), I certify that the information contained in this Startup Certification is accurate and true to the best of my knowledge. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

Signature		Date
Signer's name (print)	Title	Phone (with area code)

Appendix 5: Fees

All minor and conditional major source annual emission fees are due and payable to the Division in full according to SCHEDULE I below². The county that a source is located in determines when the minor source annual emission fee is due. Fees are due the first day of the month listed. If a source is located on contiguous property in more than one county, the county appearing earliest in the calendar year shall be used to determine the due date of the annual emission fee.

SCHEDULE I Month the Annual Emissions Fee is Due (Accounting Period) Counties in the Monthly Grouping

January	Anderson, Bedford, Benton, Bledsoe, Blount, Bradley and Campbell
February	Cannon, Carroll, Carter, Cheatham, Chester, Claiborne, Clay and Cocke
March	Coffee, Crockett, Cumberland, Davidson, Decatur, DeKalb, Dickson, Dyer and Fayette
April	Fentress, Franklin, Gibson, Giles, Grainger, Greene and Grundy
May	Hamblen, Hamilton, Hancock, Hardeman, Hardin, Hawkins, Haywood and Henderson
June	Henry, Hickman, Houston, Humphreys, Jackson, Jefferson, Johnson, Knox, Lake, Lauderdale, Lawrence and Lewis
July	Lincoln, Loudon, McMinn, McNairy, Macon and Madison
August	Marion, Marshall, Maury, Meigs, Monroe, Montgomery, Moore and Morgan
September	Obion, Overton, Perry, Pickett, Polk, Putnam and Rhea
October	Roane, Robertson, Rutherford, Scott, Sequatchie, Sevier, and Shelby
November	Smith, Stewart, Sullivan, Sumner, Tipton, Trousdale, Unicoi and Union
December	Van Buren, Warren, Washington, Wayne, Weakley, White, Williamson and Wilson

² Note that some sources with allowable emissions below specific thresholds are not subject to the requirement to pay annual emission fees. Contact the Emission Inventory Program at apc.inventory@tn.gov if you have any questions.

Appendix 6: Emission Statement for VOC and NO_x

Not Applicable

Appendix 7: Compliance Certification Statement

Facility (Permittee): Tennessee Valley Authority – Watts Bar Nuclear Plant

Facility Address: _____

Facility ID: 72-0029

Conditional Major Permit Number	Reporting Period	Report Deadline

This report is required pursuant to TAPCR 1200-03-09-.02(11)(a).

Responsible Person Certification

I, the undersigned, am a Responsible Person (as described in **Condition G1**) of the facility for which this report is being submitted. This document consists of _____ pages and they are numbered from page ____ to _____. As a Responsible Person of the above mentioned facility (permittee), I certify that the information contained in this Annual Compliance Status Report is accurate and true to the best of my knowledge. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

Signature		Date
Signer's name (print)	Title	Phone (with area code)

Appendix 8: Agreement Letters



Post Office Box 2000, Spring City, Tennessee 37381

Sent Via Electronic Transmittal

March 7, 2023

Ms. Michelle Owenby, Director (Air.Pollution.Control@tn.gov)
Division of Air Pollution Control
Tennessee Department of Environment
and Conservation (TDEC)
Tennessee Tower William R. Snodgrass
312 Rosa L. Parks Avenue, 15th Floor
Nashville, Tennessee 37243

Dear Ms. Owenby:

TENNESSEE VALLEY AUTHORITY (TVA) – WATTS BAR NUCLEAR PLANT (WBN)
(FACILITY ID 72-0029) – FACILITY WIDE EMISSIONS LIMITS AGREEMENT FOR
CONDITIONAL MAJOR OPERATING PERMIT 480496

In order to finalize the renewal of WBN's Conditional Major Operating Permit, TVA agrees to limit the total facility wide emissions of Nitrogen Oxides (NO_x) and Sulfur Dioxide (SO₂) to 99.9 tons for each pollutant for any period of 12 consecutive months.

TVA also agrees to limit the heat input of the two (2) 52.8 MMBtu/hr Auxiliary Boilers (Source 08) to 10% of their maximum potential heat input on an annual (calendar year) basis by ensuring that a maximum amount of Number 2 fuel oil shall not exceed 337,612 gallons per calendar year per boiler.

Additionally, TVA agrees that the PM limit for the five (5) 44.5 MMBtu/hr emergency diesel engines, (Source 17, DG-1 through DG-5) shall not exceed the rate of 15.5 lb/hr (0.0697 lb/MMBtu) as was shown in the calculations contained within the permit renewal application.

If you have questions or need additional information, please contact Will Ross at (423) 751-3505 or by email at wtross@tva.gov.

Sincerely,


Anthony L. Williams
Site Vice President
Watts Bar Nuclear Plant

Appendix 9: Example Logs

Example Log for Condition C4

Monthly Facility-Wide Emissions Log		
Month/year:		
Emission Source	NO _x Emissions (tons/month)	SO ₂ Emissions (tons/month)
72-0029-08		
72-0029-11	--	--
72-0029-12	--	--
72-0029-17		
72-0029-22		
72-0029-23		
72-0029-29	--	--
72-0029-30	--	--
Insignificant/Exempt Activities		
Total:		

Facility Wide Emissions Log				
Month/Year	NO _x Emissions (tons/month)	12- Consecutive Month NO _x Total (tons)	SO ₂ Emissions (tons/month)	12- Consecutive Month SO ₂ Total (tons)

Note: The tons per 12-consecutive month values are the sum of the emissions in the 11 months preceding the month just completed + the emissions in the month just completed.

Example Logs for Conditions S3-4B and S6-4B

Monthly and 12 Consecutive Month VOC Calculation Table							
Month/Year:				Emissions			
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Material ID	Material Name	Material Usage (gal/month or lb/mo)	Material Density (lb/gal)	VOC Content (wt% or lb VOC/gal)	VOC (lb/mo)	VOC (ton/mo)	VOC ton/ 12 consecutive mo)
Total							

[6] VOC Emissions (lb/mo) = [3] Material Usage (gal/mo) * [4] Material Density (lb/gal) * [5] VOC Content (wt%), or
[6] VOC Emissions (lb/mo) = [3] Material Usage (gal/mo) * [5] VOC Content (lb/gal)

[7] VOC Emissions (ton/mo) = [6] VOC Emissions (lb/mo) / 2,000 lb/ton

[8] The tons per 12-consecutive month values are the sum of the emissions in the 11 months preceding the month just completed + the emissions in the month just completed. If data is not available for the 11 months preceding the initial use of this table, this value will be equal to the value for tons per month. For the second month, it will be the sum of the first month and the second month. Indicate in parentheses the number of months summed [i.e., 6 (2) represents 6 tons emitted in 2 months].

Monthly and 12 Consecutive Month HAP Calculation Table								
Month/Year:					Emissions			
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Material ID	Material Name	Material Usage (gal/month or lb/mo)	Material Density (lb/gal)	HAP _n Content (wt% or lb HAP _n /gal)	HAP _n (lb/mo)	HAP _n (ton/mo)	HAP _n (ton/12 consecutive mo)	Total HAP (ton/12 consecutive mo)
Total								

Note: n = the number of different hazardous air pollutants. Use columns as required for the number of different hazardous air pollutants.

[6] HAP_n Emissions (lb/mo) = [3] Material Usage (gal/mo) * [4] Material Density (lb/gal) * [5] HAP_n Content (wt%), or
[6] HAP_n Emissions (lb/mo) = [3] Material Usage (gal/mo) * [5] HAP_n Content (lb/gal)

[7] HAP_n Emissions (ton/mo) = [6] HAP_n Emissions (lb/mo) / 2,000 lb/ton

[8] The tons per 12-consecutive month values are the sum of the emissions in the 11 months preceding the month just completed + the emissions in the month just completed. If data is not available for the 11 months preceding the initial use of this table, this value will be equal to the value for tons per month. For the second month, it will be the sum of the first month and the second month. Indicate in parentheses the number of months summed [i.e., 6 (2) represents 6 tons emitted in 2 months].

[9] Total HAP Emissions = Sum of each HAP_n ton/12 consecutive month column

Appendix 10: General Provisions for 40 CFR 60, Subpart IIII

You are required to comply with the following General Provisions of the federal Standards of Performance for New Stationary Sources (NSPS):

General Provisions citation	Subject of citation	Applies to subpart	Explanation
§60.1	General applicability of the General Provisions	Yes	General/Initial applicability determination; applicability after standard established.
§60.2	Definitions	Yes	Additional terms defined in §60.4219.
§60.3	Units and abbreviations	Yes	General Units and Abbreviations.
§60.4	Address	Yes	Addresses for regional EPA offices and State/Local Agencies.
§60.5	Determination of construction or modification	Yes	Outlines Administrator's (Technical Secretary) authority on whether actions by the owner/operator are construction or modification.
§60.6	Review of plans	Yes	Outlines Administrator's (Technical Secretary) authority to review plans and provide technical advice to owner/operator due to construction or modification.
§60.7	Notification and Recordkeeping	Yes	Except that §60.7 only applies as specified in §60.4214(a).
§60.8	Performance tests	Yes	Except that §60.8 only applies to stationary CI ICE with a displacement of (≥30 liters per cylinder and engines that are not certified.
§60.9	Availability of information	Yes	General notification to the public of information obtained by the Administrator (Technical Secretary)
§60.10	State Authority	Yes	Outlines the State/local authority regarding emission standards, limitations, permit approvals, etc.
§60.11	Compliance with standards and maintenance requirements	No	Requirements are specified in subpart IIII.
§60.12	Circumvention	Yes	Circumventing standards applicable to a source.
§60.13	Monitoring requirements	Yes	Except that §60.13 only applies to stationary CI ICE with a displacement of (≥30 liters per cylinder.
§60.14	Modification	Yes	General requirements pertaining to modification of a source.
§60.15	Reconstruction	Yes	General requirements pertaining to reconstruction of a source.
§60.16	Priority list	Yes	Prioritized major source categories.
§60.17	Incorporations by reference	Yes	Outline of materials incorporated by reference per the Director of Federal Register.
§60.18	General control device requirements	No	General requirements for control devices used to comply with applicable subparts of 40 CFR parts 60 and 61.
§60.19	General notification and reporting requirements	Yes	General requirements for notification and reporting.

TAPCR 1200-03-09-.03(8)

Appendix 11: General Provisions for 40 CFR 60, Subpart ZZZZ

You are required to comply with the following General Provisions of the federal National Emission Standards for Hazardous Air Pollutants (NESHAP):

General provisions citation	Subject of citation	Applies to subpart	Explanation
§63.1	General applicability of the General Provisions	Yes.	
§63.2	Definitions	Yes	Additional terms defined in §63.6675.
§63.3	Units and abbreviations	Yes.	
§63.4	Prohibited activities and circumvention	Yes.	
§63.5	Construction and reconstruction	Yes.	
§63.6(a)	Applicability	Yes.	
§63.6(b)(1)-(4)	Compliance dates for new and reconstructed sources	Yes.	
§63.6(b)(5)	Notification	Yes.	
§63.6(b)(6)	[Reserved]		
§63.6(b)(7)	Compliance dates for new and reconstructed area sources that become major sources	Yes.	
§63.6(c)(1)-(2)	Compliance dates for existing sources	Yes.	
§63.6(c)(3)-(4)	[Reserved]		
§63.6(c)(5)	Compliance dates for existing area sources that become major sources	Yes.	
§63.6(d)	[Reserved]		
§63.6(e)	Operation and maintenance	No.	
§63.6(f)(1)	Applicability of standards	No.	
§63.6(f)(2)	Methods for determining compliance	Yes.	
§63.6(f)(3)	Finding of compliance	Yes.	
§63.6(g)(1)-(3)	Use of alternate standard	Yes.	
§63.6(h)	Opacity and visible emission standards	No	Subpart ZZZZ does not contain opacity or visible emission standards.
§63.6(i)	Compliance extension procedures and criteria	Yes.	
§63.6(j)	Presidential compliance exemption	Yes.	
§63.7(a)(1)-(2)	Performance test dates	Yes	Subpart ZZZZ contains performance test dates at §§63.6610, 63.6611, and 63.6612.
§63.7(a)(3)	CAA section 114 authority	Yes.	
§63.7(b)(1)	Notification of performance test	Yes	Except that §63.7(b)(1) only applies as specified in §63.6645.
§63.7(b)(2)	Notification of rescheduling	Yes	Except that §63.7(b)(2) only applies as specified in §63.6645.
§63.7(c)	Quality assurance/test plan	Yes	Except that §63.7(c) only applies as specified in §63.6645.
§63.7(d)	Testing facilities	Yes.	
§63.7(e)(1)	Conditions for conducting performance tests	No.	Subpart ZZZZ specifies conditions for conducting performance tests at §63.6620.
§63.7(e)(2)	Conduct of performance tests and reduction of data	Yes	Subpart ZZZZ specifies test methods at §63.6620.
§63.7(e)(3)	Test run duration	Yes.	
§63.7(e)(4)	Administrator may require other testing under section 114 of the CAA	Yes.	
§63.7(f)	Alternative test method provisions	Yes.	

General provisions citation	Subject of citation	Applies to subpart	Explanation
§63.7(g)	Performance test data analysis, recordkeeping, and reporting	Yes.	
§63.7(h)	Waiver of tests	Yes.	
§63.8(a)(1)	Applicability of monitoring requirements	Yes	Subpart ZZZZ contains specific requirements for monitoring at §63.6625.
§63.8(a)(2)	Performance specifications	Yes.	
§63.8(a)(3)	[Reserved]		
§63.8(a)(4)	Monitoring for control devices	No.	
§63.8(b)(1)	Monitoring	Yes.	
§63.8(b)(2)-(3)	Multiple effluents and multiple monitoring systems	Yes.	
§63.8(c)(1)	Monitoring system operation and maintenance	Yes.	
§63.8(c)(1)(i)	Routine and predictable SSM	No	
§63.8(c)(1)(ii)	SSM not in Startup Shutdown Malfunction Plan	Yes.	
§63.8(c)(1)(iii)	Compliance with operation and maintenance requirements	No	
§63.8(c)(2)-(3)	Monitoring system installation	Yes.	
§63.8(c)(4)	Continuous monitoring system (CMS) requirements	Yes	Except that subpart ZZZZ does not require Continuous Opacity Monitoring System (COMS).
§63.8(c)(5)	COMS minimum procedures	No	Subpart ZZZZ does not require COMS.
§63.8(c)(6)-(8)	CMS requirements	Yes	Except that subpart ZZZZ does not require COMS.
§63.8(d)	CMS quality control	Yes.	
§63.8(e)	CMS performance evaluation	Yes	Except for §63.8(e)(5)(ii), which applies to COMS.
		Except that §63.8(e) only applies as specified in §63.6645.	
§63.8(f)(1)-(5)	Alternative monitoring method	Yes	Except that §63.8(f)(4) only applies as specified in §63.6645.
§63.8(f)(6)	Alternative to relative accuracy test	Yes	Except that §63.8(f)(6) only applies as specified in §63.6645.
§63.8(g)	Data reduction	Yes	Except that provisions for COMS are not applicable. Averaging periods for demonstrating compliance are specified at §§63.6635 and 63.6640.
§63.9(a)	Applicability and State delegation of notification requirements	Yes.	
§63.9(b)(1)-(5)	Initial notifications	Yes	Except that §63.9(b)(3) is reserved.
		Except that §63.9(b) only applies as specified in §63.6645.	
§63.9(c)	Request for compliance extension	Yes	Except that §63.9(c) only applies as specified in §63.6645.
§63.9(d)	Notification of special compliance requirements for new sources	Yes	Except that §63.9(d) only applies as specified in §63.6645.
§63.9(e)	Notification of performance test	Yes	Except that §63.9(e) only applies as specified in §63.6645.
§63.9(f)	Notification of visible emission (VE)/opacity test	No	Subpart ZZZZ does not contain opacity or VE standards.

General provisions citation	Subject of citation	Applies to subpart	Explanation
§63.9(g)(1)	Notification of performance evaluation	Yes	Except that §63.9(g) only applies as specified in §63.6645.
§63.9(g)(2)	Notification of use of COMS data	No	Subpart ZZZZ does not contain opacity or VE standards.
§63.9(g)(3)	Notification that criterion for alternative to RATA is exceeded	Yes	If alternative is in use.
		Except that §63.9(g) only applies as specified in §63.6645.	
§63.9(h)(1)-(6)	Notification of compliance status	Yes	Except that notifications for sources using a CEMS are due 30 days after completion of performance evaluations. §63.9(h)(4) is reserved.
			Except that §63.9(h) only applies as specified in §63.6645.
§63.9(i)	Adjustment of submittal deadlines	Yes.	
§63.9(j)	Change in previous information	Yes.	
§63.10(a)	Administrative provisions for recordkeeping/reporting	Yes.	
§63.10(b)(1)	Record retention	Yes	Except that the most recent 2 years of data do not have to be retained on site.
§63.10(b)(2)(i)-(v)	Records related to SSM	No.	
§63.10(b)(2)(vi)-(xi)	Records	Yes.	
§63.10(b)(2)(xii)	Record when under waiver	Yes.	
§63.10(b)(2)(xiii)	Records when using alternative to RATA	Yes	For CO standard if using RATA alternative.
§63.10(b)(2)(xiv)	Records of supporting documentation	Yes.	
§63.10(b)(3)	Records of applicability determination	Yes.	
§63.10(c)	Additional records for sources using CEMS	Yes	Except that §63.10(c)(2)-(4) and (9) are reserved.
§63.10(d)(1)	General reporting requirements	Yes.	
§63.10(d)(2)	Report of performance test results	Yes.	
§63.10(d)(3)	Reporting opacity or VE observations	No	Subpart ZZZZ does not contain opacity or VE standards.
§63.10(d)(4)	Progress reports	Yes.	
§63.10(d)(5)	Startup, shutdown, and malfunction reports	No.	
§63.10(e)(1) and (2)(i)	Additional CMS Reports	Yes.	
§63.10(e)(2)(ii)	COMS-related report	No	Subpart ZZZZ does not require COMS.
§63.10(e)(3)	Excess emission and parameter exceedances reports	Yes.	Except that §63.10(e)(3)(i) (C) is reserved.
§63.10(e)(4)	Reporting COMS data	No	Subpart ZZZZ does not require COMS.
§63.10(f)	Waiver for recordkeeping/reporting	Yes.	
§63.11	Flares	No.	
§63.12	State authority and delegations	Yes.	
§63.13	Addresses	Yes.	
§63.14	Incorporation by reference	Yes.	
§63.15	Availability of information	Yes.	

Appendix 12: General Provisions for 40 CFR 63, Subpart JJJJJ

You are required to comply with the following General Provisions of the federal National Emission Standards for Hazardous Air Pollutants (NESHAP):

General Provisions Citation 40 CFR	Subject of Citation	Applies to Subpart	Explanation
§63.1	Applicability	Yes ☒ No ☐	
§63.2	Definitions	Yes ☒ No ☐	Additional terms defined in § 63.11237.
§63.3	Units and Abbreviations	Yes ☒ No ☐	
§63.4	Prohibited Activities and Circumvention	Yes ☒ No ☐	
§63.5	Preconstruction Review and Notification Requirements	Yes ☐ No ☒	
§63.6(a), (b)(1)-(b)(5), (b)(7), (c), (f)(2)-(3), (g), (i), (j)	Compliance with Standards and Maintenance Requirements	Yes ☒ No ☐	
§63.6(e)(1)(i)	General Duty to minimize emissions	Yes ☐ No ☒	See § 63.11205 for general duty requirement.
§63.6(e)(1)(ii)	Requirement to correct malfunctions ASAP	Yes ☐ No ☒	
§63.6(e)(3)	SSM Plan	Yes ☐ No ☒	
§63.6(f)(1)	SSM exemption	Yes ☐ No ☒	
§63.6(h)(1)	SSM exemption	Yes ☐ No ☒	
§63.6(h)(2) to (9)	Determining compliance with opacity emission standards	Yes ☒ No ☐	
§63.7(a), (b), (c), (d), (e)(2) -(e)(9), (f), (g), and (h)	Performance Testing Requirements	Yes ☒ No ☐	
§63.7(e)(1)	Performance testing	Yes ☐ No ☒	See § 63.11210.
§ 63.8(a), (b), (c)(1), (c)(1)(ii), (c)(2) to (c)(9), (d)(1) and (d)(2), (e), (f), and (g)	Monitoring Requirements	Yes ☒ No ☐	
§63.8(c)(1)(i)	General duty to minimize emissions and CMS operation	Yes ☐ No ☒	
§63.8(c)(1)(iii)	Requirement to develop SSM Plan for CMS	Yes ☐ No ☒	

General Provisions Citation 40 CFR	Subject of Citation	Applies to Subpart	Explanation
§63.8(d)(3)	Written procedures for CMS	Yes ☒ No ☐	Yes, except for the last sentence, which refers to an SSM plan. SSM plans are not required.
§63.9	Notification Requirements	Yes ☒ No ☐	Yes, excluding the information required in § 63.9(h)(2)(i)(B), (D), (E) and (F). See § 63.11225.
§63.10(a) and (b)(1)	Recordkeeping and Reporting Requirements	Yes ☒ No ☐	
§63.10(b)(2)(i)	Recordkeeping of occurrence and duration of startups or shutdowns	Yes ☐ No ☒	
§63.10(b)(2)(ii)	Recordkeeping of malfunctions	Yes ☐ No ☒	See § 63.11225 for recordkeeping of (1) occurrence and duration and (2) actions taken during malfunctions.
§63.10(b)(2)(iii)	Maintenance records	Yes ☒ No ☐	
§63.10(b)(2)(iv) and (v)	Actions taken to minimize emissions during SSM	Yes ☐ No ☒	
§63.10(b)(2)(vi)	Recordkeeping for CMS malfunctions	Yes ☒ No ☐	
§63.10(b)(2)(vii) to (xiv)	Other CMS requirements	Yes ☒ No ☐	
§63.10(b)(3)	Recordkeeping requirements for applicability determinations	Yes ☐ No ☒	
§63.10(c)(1) to (9)	Recordkeeping for sources with CMS	Yes ☒ No ☐	
§63.10(c)(10)	Recording nature and cause of malfunctions	Yes ☐ No ☒	See § 63.11225 for malfunction recordkeeping requirements.
§63.10(c)(11)	Recording corrective actions	Yes ☐ No ☒	See § 63.11225 for malfunction recordkeeping requirements.
§63.10(c)(12) and (13)	Recordkeeping for sources with CMS	Yes ☒ No ☐	
§63.10(c)(15)	Allows use of SSM plan	Yes ☐ No ☒	
§63.10(d)(1) and (2)	General reporting requirements	Yes ☒ No ☐	
§63.10(d)(3)	Reporting opacity or visible emission observation results	Yes ☐ No ☒	
§63.10(d)(4)	Progress reports under an extension of compliance	Yes ☒ No ☐	
§63.10(d)(5)	SSM reports	Yes ☐ No ☒	See § 63.11225 for malfunction reporting requirements.
§63.10(e)	Additional reporting requirements for sources with CMS	Yes ☒ No ☐	
§63.10(f)	Waiver of recordkeeping or reporting requirements	Yes ☒ No ☐	
§63.11	Control Device Requirements	Yes ☐ No ☒	

General Provisions Citation 40 CFR	Subject of Citation	Applies to Subpart	Explanation
§63.12	State Authorities and Delegations	Yes ☒ No ☐	
§63.13	Addresses	Yes ☒ No ☐	
§63.14	Incorporations by Reference	Yes ☒ No ☐	
§63.15	Availability of Information and Confidentiality	Yes ☒ No ☐	
§63.16	Performance Track Provisions	Yes ☒ No ☐	
§63.1(a)(5), (a)(7) - (a)(9), (b)(2), (c)(3)-(4), (d), 63.6(b)(6), (c)(3), (c)(4), (d), (e)(2), (e)(3)(ii), (h)(3), (h)(5)(iv), 63.8(a)(3), 63.9(b)(3), (h)(4), 63.10(c)(2)-(4), (c)(9)	Reserved	Yes ☐ No ☒	

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