Chapter 1 – PURPOSE, NEED, AND BACKGROUND FOR THE PROPOSED ACTION

1.1 Purpose and Need for the Proposed Action

TVA proposes to install additional air emission controls and to take other actions, including constructing a dry coal combustion residue (CCR) landfill, at its Gallatin Fossil Plant (GAF). This plant is located near the city of Gallatin in Sumner County, Tennessee (Figure 1-1). The purpose and need for the proposed actions are:

- Complying with U.S. Environmental Protection Agency's (USEPA or EPA) new Utility Mercury and Air Toxics Standards (MATS) and other anticipated regulations including requirements affecting the management of coal ash and other residues from the combustion of coal,
- Complying with a Federal Facilities Compliance Agreement (FFCA or "Compliance Agreement"), and
- Achieving and maintaining a more balanced portfolio of energy resources on the TVA power system.

The need to move to a more balanced portfolio was identified by TVA after completion of its most recent Integrated Resource Plan (IRP) in 2011 and associated Environmental Impact Statement.

USEPA's MATS requires the application of maximum achievable control technology (MACT) to reduce emissions of hazardous air pollutants (HAPS) from coal- and oil-fired electric generating units. Utilities have until April 16, 2015, to comply with the rule (USEPA 2012) with the possibility of a one-year extension to April 16, 2016. The USEPA has also tightened the National Ambient Air Quality Standards (NAAQS), and this is expected to result in additional emissions reductions at coal-fired power plants through 2020.

USEPA and the Tennessee Valley Authority (TVA) agreed to the FFCA on April 14, 2011 (USEPA 2011a). TVA also entered into a judicial consent decree with the States of Alabama, Kentucky, Tennessee, and North Carolina and three environmental advocacy groups: the Sierra Club, the National Parks Conservation Association, and Our Children's Earth Foundation (USEPA 2011b). The FFCA and the consent decree are substantively identical and were negotiated together. References to the FFCA in this document include the consent decree and its parties.

The FFCA resolved disputes over how the Clean Air Act's (CAA's) New Source Review (NSR) program applied to TVA's power plant maintenance and repair activities. As part of this resolution, the FFCA requires TVA to reduce emissions at GAF through one of the three specified methods—installing additional emissions controls (i.e., flue gas desulfurization [FGD] and selective catalytic reduction [SCR] technology), repowering the units to use renewable biomass, or retiring them—no later than December 31, 2017. As part of the FFCA, TVA agreed to retire 18 of its 59 coal-fired generating units. Under the FFCA, TVA has the discretion to decide how to reduce emissions at its other units. The parties to the consent decree, including the Sierra Club and other environmental advocacy groups, expressly recognized and stated that the agreement provided TVA a great deal of

flexibility to control its facilities to a greater or lesser decree, including closing them, and that this approach was "adequate and reasonable." EPA expressly observed that the compliance agreement allows TVA to make decisions regarding the best options for reducing emissions at its plants as TVA's business plan evolves in the future. As stated, one purpose of this environmental assessment (EA) is to help TVA decide how to exercise this discretion respecting reducing emissions at GAF in order to comply with the FFCA.

Specifically, TVA proposes to install and operate the following at GAF:

- Dry flue gas desulfurization (dry FGD) systems, or "dry scrubbers," to reduce sulfur dioxide (SO_2) emissions,
- SCR technology to reduce nitrogen oxide (NO_X) emissions, and
- Pulse jet fabric filters (PJFFs, or baghouses) to control particulate matter (PM) emissions.

In addition, activated carbon injection (ACI) systems would be integrated with the dry FGD and operated, as needed, to reduce mercury emissions.

Additional facilities required to support TVA's proposed action include a new onsite dry CCR (in this case, primarily fly ash and scrubber residue), landfill, electrical transmission lines (TLs), transformer yard, and switchyard upgrades; and ancillary facilities such as onsite haul roads. The dry CCR landfill would position TVA to better respond to future regulation of ash management activities.

TVA has previously announced a broad plan or goal to convert all of its coal plants to dry CCR management. Future developments, including evolving regulatory requirements, are expected to affect this plan. Although the TVA Board endorsed this plan, each dry conversion project has to be individually assessed and justified when it is proposed for approval in the future. Part of this assessement would include a National Environmental Policy Act (NEPA) review. The proposed dry CCR landfill would initially manage dry fly ash and dry FGD byproduct with the expectation that some time in the future the plant's bottom ash also would be dewatered and managed in the landfill. Activities to support bottom ash dewatering to complete the wet to dry conversion at GAF have not yet been proposed and are not included in the scope of this EA. Bottom ash will continue to be wet-sluiced for the time being.

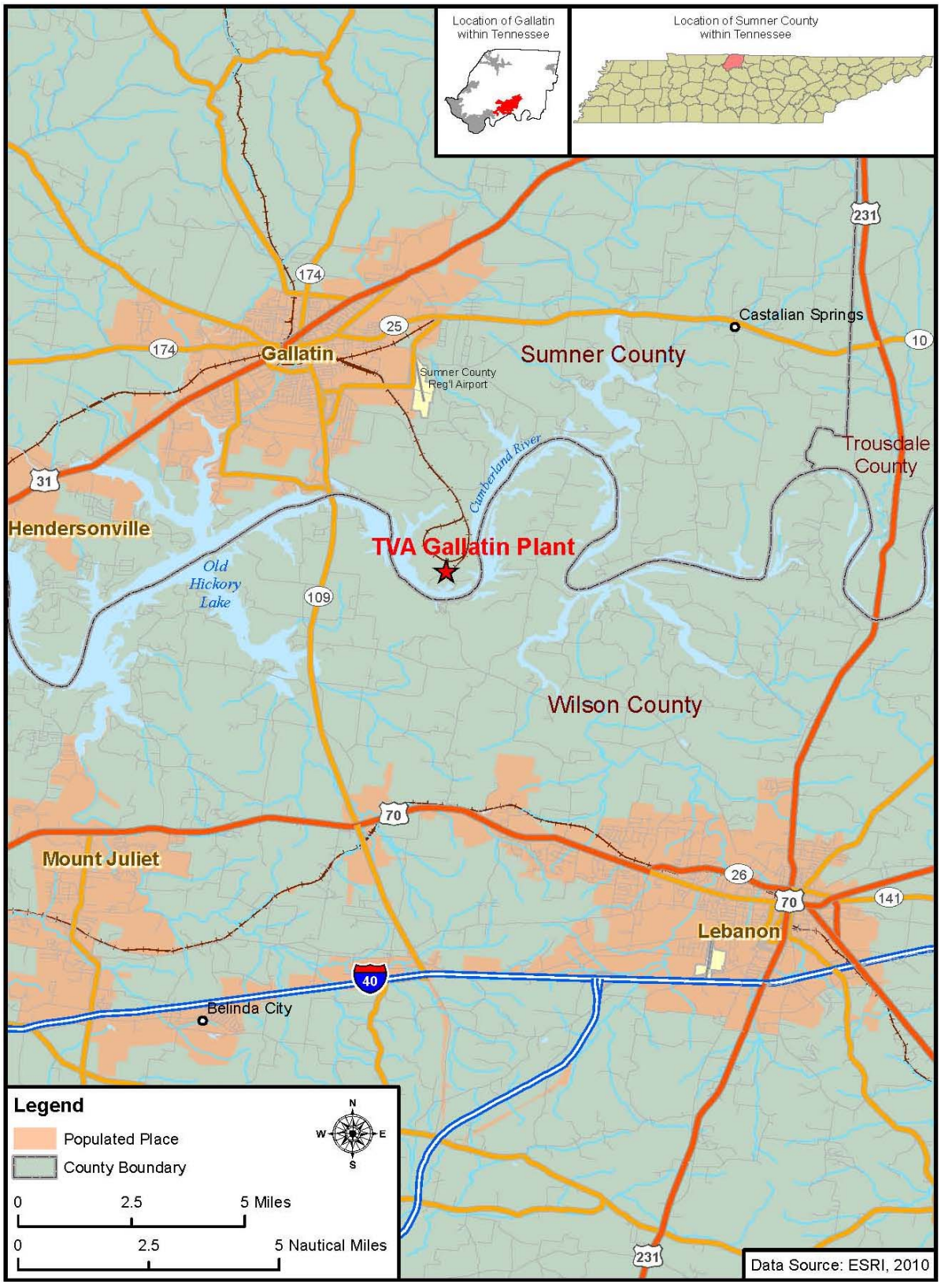

Figure 1-1. Location of Gallatin Fossil Plant

1.2 Background

TVA began construction of GAF in 1953, and began operating Unit 1 in 1956; all units were operating in 1959. GAF's powerhouse, coal yard, CCR surface impoundments, and additional facilities are located along the north bank of the Cumberland River (see Figure 1-2). GAF operates four coal-fired, steam-generating units and combusts an average of 12,350 tons of coal per day. Units 1 and 2 each have generator nameplate ratings of 300 megawatts (MW), and Units 3 and 4 each have generator nameplate ratings of 327.6 MW. In a typical year, GAF generates about seven billion kilowatt-hours (kWh) of electricity, enough to supply about 480,000 homes. Four combustion-turbine (CT) units were added to GAF in the early 1970s, and another four were added in 2000. They are primarily fueled with natural gas but have the capability to use fuel oil. The CT units support the TVA system's peak energy demand.

TVA has installed electrostatic precipitators (ESPs) at GAF to reduce particulate matter (PM) emissions and low-NO_X burners to reduce nitrogen oxide (NO_X) emissions. TVA also burns low-sulfur blend coal, primarily coal from the Powder River Basin (PRB), at GAF to reduce emissions of SO_2. Currently, approximately 185,000 dry tons of fly ash and approximately 46,500 dry tons of bottom ash are wet-sluiced to GAF's surface impoundments each year. Figure 1-2 shows the GAF powerhouse, the Cumberland River Aquatic Center (CRAC) facility, combustion turbines, current coal pile area, and current CCR (fly ash and bottom ash) management area at GAF.

The GAF reservation also supports non-power-related land uses, including a Tennessee Wildlife Resources Agency (TWRA) wildlife management area (WMA) designated for recreational/hunting uses and the CRAC. The CRAC is an aquatic species hatchery facility. TVA constructed and operated this hatchery initially, but it is now operated by the TWRA. The hatchery is located on the north side of GAF's discharge channel on Cumberland River Mile (RM) 242.4. TWRA operates the CRAC under a short-term (30-day) License Agreement from TVA. TVA supplies electricity and water to the facility. TWRA is responsible for CRAC facility operations, which include freshwater mussel holding and propagation.

1.3 Decisions to be Made

The decision before TVA is whether to install additional pollution control equipment and take other associated actions at GAF to meet the requirements of the FFCA, MATS, and other applicable regulatory requirements and to maintain GAF as part of TVA's more balanced portfolio of energy resources. Specifically, TVA must decide whether to undertake the following actions:

- Construct and operate a dry FGD system for each coal-fired unit at GAF (units 1-4) and associated calcium oxide (CaO, also referred to as quicklime and pebble lime) storage facilities.
- Construct ACI and PJFF systems for each unit and tie-in with dry FGD system.
- Construct and operate a SCR system for each individual coal-fired unit.
- Construct and operate ammonia storage facility to support SCR operations.

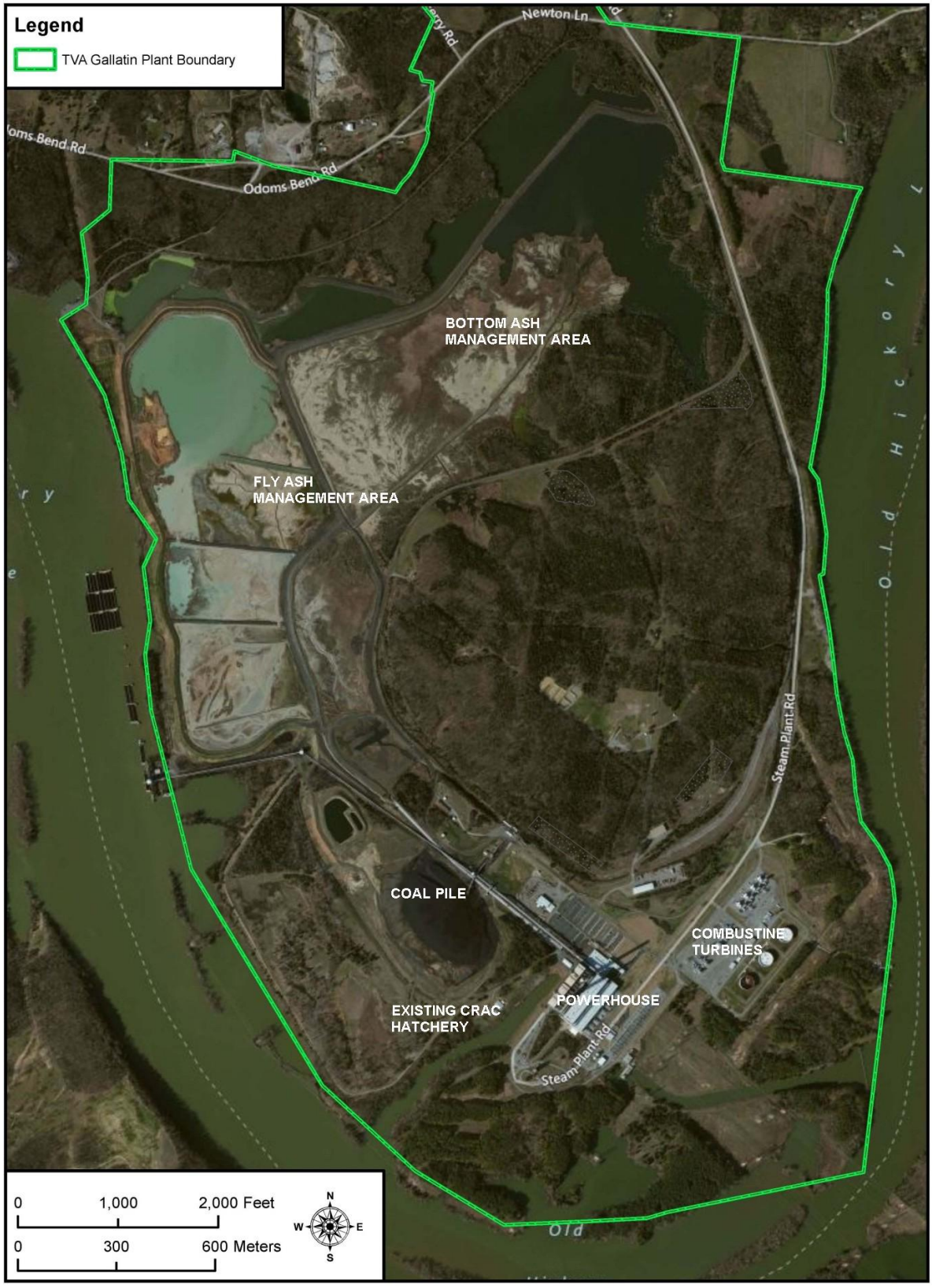

Figure 1-2. Gallatin Fossil Plant Existing Facilities

- Construct and operate a dry CCR handling, transport, and disposal facilities for fly ash and scrubber waste, to support pollution control equipment operations
- Construct and operate ancillary facilities, such as the electrical feeds, transmission lines (TLs), and transformer yard to support clean air equipment operations.

TVA also has two feasible locations for the proposed dry FGDs and it must decide which of these two locations to use if it proceeds with the proposed actions:

1. Across Discharge Channel Configuration (install and operate dry FGD across the discharge channel, SCR adjacent to the GAF powerhouse, and CCR disposal) (Alternative 2), or
2. Close Coupled Configuration (install and operate dry FGD and SCR adjacent to the GAF powerhouse, and CCR disposal) (Alternative 3).

If selected, the across discharge channel configuration (Alternative 2) would require relocation of the TWRA CRAC facility because it would interfere with the construction and operation of the proposed scrubbers. If TVA decides to do this, it would rebuild the CRAC on the GAF plant site away from the footprint of the proposed project components. TVA is coordinating plans to relocate and rebuild the hatchery with TWRA if Alternative 2 is selected. TVA anticipates entering into a Memorandum of Agreement with TWRA and the U.S. Fish and Wildlife Service (USFWS) to address the specifics of rebuilding the hatchery and its future operation if TVA decides to proceed with Alternative 2.

The proposed emissions control projects do not depend on closing the plant's existing future wet ash impoundment closures. Operation and closure of wet CCR impoundments typically are regulated under Clean Water Act permits in Tennessee and this is the regulatory situation at GAF. GAF holds National Pollutant Discharge Elimination System (NPDES) Permit TN0005428 (TDEC 2012b). When these impoundments are proposed for closure, TVA anticipates working closely with the Tennessee Department of Environment and Conservation (TDEC) to establish appropriate closure designs. Any proposed closure activities would be supported by an appropriate NEPA review.

1.4 Related Environmental Reviews

In 2011, TVA completed the IRP to describe how it would meet the electric power demands in its service area for the next 20 years while fulfilling its mission of providing low-cost, reliable power; environmental stewardship; and economic development *(*TVA 2011a). TVA released the accompanying environmental impact statement (EIS) for the IRP in March 2011 (TVA 2011b). This EA tiers from the 2011 IRP EIS providing a site-specific analysis of the potential impacts of installing air pollution control equipment and associated actions at GAF. In addition, the environmental reviews below are relevant to this EA and are hereby incorporated by reference:

- *Paradise Fossil Plant Units 1, 2, and 3, Selective Catalytic Reduction Systems for Nitrogen Oxide Control Final Environmental Assessment and Finding of No Significant Impact* (TVA 1999)
- *Bull Run Fossil Plant Unit 1, Selective Catalytic Reduction Systems for Nitrogen Oxide Control Final Environmental Assessment and Finding of No Significant Impact* (TVA 2002a)

- *Installation of Flue Gas Desulfurization System on Paradise Fossil Plant Unit 3, Muhlenberg County, Kentucky, Final Environmental Assessment and Finding of No Significant Impact,* March 2003 (TVA 2003b)
- *Replacement or Rejuvenation of Catalyst for Selective Catalytic Reduction for Nitrogen Oxides at Seven TVA Fossil Plants in the Tennessee Valley, Final Environmental Assessment and Finding of No Significant Impact,* January 2005 (TVA 2005a)
- *Installation of Flue Gas Desulfurization System on Bull Run Fossil Plant, Anderson County, Tennessee, Final Environmental Assessment and Finding of No Significant Impact,* March 2005 (TVA 2005b)
- *Installation of Flue Gas Desulfurization System on Kingston Fossil Plant, Roane County, Tennessee, Final Environmental Assessment,* April 2006 (TVA 2006a)
- *Operational Improvements to Optimize Selective Catalytic Reduction Systems at Five Fossil Plants Tennessee, Alabama, and Kentucky, Environmental Assessment and Finding of No Significant Impact,* April 2008 (TVA 2008)

1.5 Scope of the Environmental Assessment

NEPA requires federal agencies, including the TVA, to consider the potential environmental impacts of actions they propose to take that will impact the physical environment before making a final decision to proceed. See Appendix A for more information on the NEPA compliance process for this proposed action.

TVA has prepared this EA to evaluate the environmental effects of the proposed actions and determined that potential effects to the environmental resouces listed below are relevant to the decision to be made:

- Air quality and climate change
- Water resources (surface water, groundwater, floodplains)
- Biological resources (aquatics, vegetation, natural areas, terrestrial animals, and wetlands)
- Cultural and historic resources
- Geology, soils, and prime farmland
- Solid waste and utilities
- Socioeconomics and environmental justice
- Land use and recreation
- Aesthetics and visual resources
- Hazardous materials and waste
- Noise

- Public health and safety
- Transportation

1.6 Public and Agency Involvement

TVA issued a draft of this EA for public review and provided a 30-day comment period that was to end on November 17, 2012. Thirty days is TVA's standard comment period when it releases draft EAs for public review. At the request of a number of individuals and organizations, the comment period was extended until November 30 for a total period of 44 days. Subsequently, TVA agreed to accept late comments from the Sierra Club and other environmental advocacy groups until December 18, 2012. The notice of availability of the draft EA was published in two newspapers that serve the Sumner County area: *The Tennessean* and the *Gallatin News Examiner*. In addition, the draft EA was placed on TVA's public NEPA website. TVA also sent copies of the draft EA to the Gallatin Public Library, TDEC, the USFWS, the State Historic Preservation Officer (SHPO), the National Park Service (NPS), and TWRA for review and comment. Individuals and organizations who had previously expressed an interest in the proposed action were notified of the availability of the draft EA (refer to Chapter 6 for the list of recipients). A response to public and agency comments in provided in Appendix E.

1.7 Environmental Permits Required

Activities at coal-fired power plants are heavily regulated and require a number of different kinds of environmental permits. This regulation helps ensure that potential impacts from plant activities are kept to levels protective of human health and the environment. TVA already holds the permits necessary for the operation of GAF. Depending on the decisions made respecting the proposed actions, however, TVA may have to obtain or seek amendments to the following permits:

- New Solid Waste Class II Disposal Permit for the disposal of CCR from operating additional pollution control equipment and the four generating units. This permit would contain applicable groundwater protection measures.
- TDEC Aquatic Resource Alteration Permit (ARAP) for physical alteration of surface waters of the state (streams, wetlands, reservoirs, etc.).
- Air construction permit for new emissions sources.
- Modification of GAF's existing air operating permit to reflect the new plant configuration and associated emissions.
- NPDES Construction Storm Water Permit for storm water runoff from construction activities.
- Modification of GAF's existing NPDES permit to reflect the new plant configuration and any discharges associated with industrial activities.
- United States Army Corps of Engineers (USACE) Section 404 and Section 10 permit.
- Modifications to the Integrated Pollution Prevention Plan (IPPP) would be made for

the addition of new surface ponds, switchyards, and fuel tanks.

- A Risk Management Plan (RMP) would be developed for the addition of new ammonia handling facilities required for SCR operations.
- Modification to the Tennessee Multi-sector Permit for Industrial Storm Water discharges would be made for the addition of new storm water outfalls.
- Hydrostatic testing permit application would be submitted, if necessary, for pipe system integrity testing.
- The GAF site Storm Water Pollution Prevention Plan (SWPPP) would be revised to include management of precipitation into secondary containment for ammonia tanks.

1.8 Project-Specific Design Measures and Environmental Commitments

To help to further safeguard the environment and to better safeguard against potential environmental impacts, TVA would implement the environmental commitments summarized below, as necessary, if it proceeds with the proposed actions. The commitments include project specific design measures and best management practices (BMPs). Refer to Chapter 4 for additional information regarding environmental commitments.

1.8.1 Proposed Construction BMPs

- Appropriate BMPs for erosion control and stabilization of disturbed areas, including dust suppression, would be utilized, and all construction activities would be conducted in a manner to ensure that waste materials are contained and that introduction of polluting materials into receiving waters is minimized.
- All applicable permits, as described in Section 1.7, would be acquired. Consequently, associated permit-related mitigations and BMPs, determined at the time of the permitting process, would be implemented to further minimize impacts to water quality and wetlands.
- In addition to the proper operation of pollution control devices and dust suppression methods for controlling fugitive emissions as required by the GAF air operating permit, the following mitigation measures are being considered for maintaining air quality:
    - If necessary, potential emissions from construction areas, paved, and unpaved roads would be mitigated using wet suppression. From roadways and unpaved areas, wet suppression can reduce fugitive dust emissions by as much as 95 percent.
    - Specific haul roads would be paved, as required, to ensure no particulate emissions associated with industrial activity go beyond the GAF property boundary.
- Mitigations and BMPs for soil erosion would be developed as part of the legally required SWPPP Erosion Control Plan. All erosion and sediment controls would be installed, placed, implemented, or constructed in accordance with the

provisions of the Tennessee Erosion and Sediment Control Handbook.

- Proper management of hazardous materials/wastes would be conducted in accordance with established TVA procedures. TVA would comply with all TDEC regulations regarding disposal of waste materials, including asbestos and lead based paint (LBP) management activities prior to demolition.

1.8.2 Proposed Construction Design Measures

- TVA would ensure construction activities for areas that support Indiana bat habitat are performed in a manner to avoid conflicts and protect breeding habitat. TVA would notify USFWS prior to clearing/construction of proposed project areas supporting Indiana bat habitat, and remove trees that support Indiana bats during winter months only (outside of the maternity period).

- Protective buffers around historic cemeteries and archeological sites potentially eligible for listing on the National Register of Historic Places (NRHP) have been identified, flagged, and noted on project plans to ensure such sites are avoided during all phases of TVA's proposed action.

- In consultation with the SHPO and interested federally recognized Indian tribes, TVA has entered into a Programmatic Agreement (PA) with the SHPO. The PA specifies stipulations for the avoidance, minimization, and mitigation of adverse effects to NRHP-eligible properties resulting from the construction, operation, and maintenance of emissions control equipment and CCR disposal facilities and associated infrastructure. If, after avoidance measures for a historic cemetery have been considered in consultation with the SHPO and found not to be technically feasible or economically prudent, TVA would follow procedures outlined in Tennessee Code Title 46 Chapter 4 – Termination of Use of Land as Cemetery.

- Appropriate management of construction and land-clearing debris, including recycling and reuse when possible, would limit solid waste generation and disposal needs.

- TVA would develop a detailed blasting plan to protect workers and nearby neighbors. The plan would document the specifications or rules that clearly define the performance and safety requirements of the work. The plan would also delineate proper hearing protection for workers in the vicinity of the blast and would ensure that the use, transportation, and storage of explosives is being conducted in accordance with all applicable or relevant regulations, including 29 Code of Federal Regulations (*CFR)* 1926.900, *Blasting and the Use of Explosives*; 49 *CFR* Parts 171-179, *Highways and Railways*, and 49 *CFR* Parts 390-397, *Motor Carriers* (transportation); and 27 *CFR* Part 55, *Commerce in Explosives* (storage).

- The need to implement mitigation to alleviate traffic impacts would be identified through coordination with the Tennessee Department of Transportation (TDOT), the Sumner County Highway Department, and the City of Gallatin.

1.8.3 Proposed Operational BMPs

Clean Air Equipment

- TVA's recommended coal quality and specification testing would be performed, as required.
- Appropriate quality assurance activities related to continuous stack monitoring would be performed, as required, for the continuous emission monitoring (CEMs) equipment per CAA regulations.
- Stack paint and lighting patterns and requirements would be consistent with Federal Aviation Administration (FAA) regulation AC 70/7460 (FAA 2007).

Ammonia Facilities

- The spill retention basin would be sized to retain the contents of an entire tank, deluge water and storm water. The spill retention basin at a minimum would be lined with compacted in situ earth or low-permeability clay liner.
- TVA would monitor impacts on effluent pH; outfall parameters would be evaluated and adjusted as necessary to meet NPDES permit requirements.
- TVA would develop an RMP describing the overall management structure, all risks, and all physical and operational methods designed to minimize the likelihood of an accidental ammonia release.

1.8.4 Proposed Operational Design Measures

- TVA would characterize impacts from ammonia addition on dry CCR and associated runoff during rain events; CCR would be evaluated to determine optimum means of ensuring that adequate mixing and assimilation of ammonia compounds occur within the landfill. This will be performed by characterizing the anticipated ammonia-on-ash concentration based on actual coal blends and ammonia slip conditions during operations to ensure that it does not exceed the calculated threshold TVA would implement to meet the requirements of TDEC and the USFWS.
- TVA would ensure the maximum area of exposed ash at any particular time during the stacking period does not exceed 10 acres.

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