**Document Type:** EA-Administrative Record
**Index Field:** Environmental Assessment
**Project Name:** Gallatin Bottom Ash Process Dewatering EA
**Project Number:** 2016-21

# GALLATIN FOSSIL PLANT
# BOTTOM ASH PROCESS DEWATERING FACILITY
# **FINAL ENVIRONMENTAL ASSESSMENT**
## **Sumner County, Tennessee**

**Prepared by:**
TENNESSEE VALLEY AUTHORITY
Chattanooga, Tennessee

July 2017

To request further information, contact:
Ashley R. Farless, PE, AICP
NEPA Compliance
Tennessee Valley Authority
1101 Market Street
Chattanooga, TN 37402
E-mail: arfarless@tva.gov

This page intentionally left blank

# Table of Contents

# List of Appendices



# List of Tables



# List of Figures



# List of Photos

# Symbols, Acronyms, and Abbreviations

| | |
|---|---|
| $\mu g/m^3$ | micrograms per cubic meters |
| °F | degrees Fahrenheit |
| AADT | Average Annual Daily Traffic |
| APE | Area of Potential Effect |
| ATI | Agreed Temporary Injunction |
| BMP | Best Management Practice |
| Btu | British thermal unit |
| CAA | Clean Air Act |
| C&D | Construction and Demolition |
| CEQ | Council on Environmental Quality |
| CCR | Coal Combustion Residuals |
| CFR | Code of Federal Regulations |
| cfs | cubic feet per second |
| CO | Carbon Monoxide |
| $CO_2$ | Carbon Dioxide |
| CRAC | Cumberland River Aquatic Center |
| CRM | Cumberland River Mile |
| dB | decibels |
| dBA | A-weighted decibel |
| EA | Environmental Assessment |
| EIP | Environmental Investigation Plan |
| EO | Executive Order |
| EPA | Environmental Protection Agency |
| ESA | Endangered Species Act |
| FEMA | Federal Emergency Management Agency |
| FR | Federal Register |
| GAF | Gallatin Fossil Plant |
| gpm | gallons per minute |
| GWPS | Groundwater Protection Standards |
| ILB | Illinois Basin |
| IPaC | Information for Planning and Conservation |
| KIF | Kingston Fossil Plant |
| lb | pound |
| $L_{dn}$ | day-night sound level |
| $L_{eq}$ | equivalent sound level |
| LOD | limits of disturbance |
| mg/L | milligrams per liter |
| MGD | million gallons per day |
| MSL | mean sea level |
| mmBtu | million British thermal units |
| MW | megawatts |
| NAAQS | National Ambient Air Quality Standards |
| NAVDM | North American Vertical Datum of 1988 |
| NEPA | National Environmental Policy Act |
| NHPA | National Historic Preservation Act |
| NLEB | Northern long-eared bat |
| $NO_2$ | nitrogen dioxide |
| NOx | combined oxides of nitrogen |

| | |
|---|---|
| NPDES | National Pollutant Discharge Elimination System |
| NPS | National Park Service |
| NRHP | National Register of Historic Places |
| NRI | Nationwide Rivers Inventory |
| NRS | Non-Registered Site |
| NSR | New Source Review |
| NWI | National Wetlands Inventory |
| $O_3$ | Ozone |
| OSHA | Occupational Safety and Health Administration |
| Pb | Lead |
| PM | Particulate Matter |
| $PM_{10}$ | Particulate matter less than or equal to 10 micrometers |
| $PM_{2.5}$ | Particulate matter less than or equal to 2.5 micrometers |
| ppb | parts per billion |
| ppm | parts per million |
| PRB | Powder River Basin |
| PSD | Prevention of Significant Deterioration |
| RCRA | Resource Conservation and Recovery Act |
| RFAI | Reservoir Fish Assemblage Index |
| RV | recreation vehicle |
| SDCC | Submerged Drag Chain Conveyor |
| SHPO | State Historic Preservation Officer |
| $SO_2$ | sulfur dioxide |
| SR | State Route |
| SWPPP | Storm Water Pollution Prevention Plan |
| TDEC | Tennessee Department of Environment and Conservation |
| TDOT | Tennessee Department of Transportation |
| tph | tons per hour |
| TRO | total residual oxidants |
| TSS | total suspended solids |
| TVA | Tennessee Valley Authority |
| TVARAM | TVA Rapid Assessment Method |
| TWRA | Tennessee Wildlife Resources Agency |
| USACE | U.S. Army Corps of Engineers |
| U.S.C. | United States Code |
| USDA | U.S. Department of Agriculture |
| USFWS | U.S. Fish and Wildlife Service |
| WMA | Wildlife Management Area |
| WQC | water quality criteria |
| WWC | wet weather conveyance |

This page intentionally left blank

# EXECUTIVE SUMMARY

In 2009, TVA began to modernize its coal ash management including converting from wet to dry ash storage. This effort was later endorsed by the TVA Board in 2011 and resulted in a recommendation to convert the wet bottom ash storage system at Gallatin (GAF) to a dry storage system.

In 2015, new regulations reinforced TVA's conversion plans. The U.S. Environmental Protection Agency (EPA) published the final Disposal of Coal Combustion Residuals from Electric Utilities rule (CCR rule) in the Federal Register.

The purpose of the proposed action is to enable a wet-to-dry bottom ash conversion at GAF. Further, the dewatering facility would foster TVA's compliance with present and future regulatory requirements related to CCR production and management.

## Alternatives

TVA has developed alternatives for the construction and operation of a bottom ash process dewatering facility. These alternatives, described below, were analyzed with respect to potential environmental impacts to resources in the vicinity of GAF.

**Alternative A:** No Action Alternative

**Alternative B:** Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System

**Alternative C:** Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream

Under Alternatives B and C, TVA would construct a mechanical bottom ash dewatering facility at GAF to create dry CCR for storage in an approved onsite landfill. Under Alternative C, TVA would also construct a recirculation system, which would reroute the effluent water back into the powerhouse for future sluicing operations, instead of discharging it through the existing NPDES-permitted outfall. The recirculation system would be contained within the same project boundary described for Alternative B.

## Preferred Alternative

TVA's preferred alternative is Alternative C. However, Alternatives B and C provide long-term benefits and meet the purpose and need to convert from a wet bottom ash storage system to a dry system.

## Affected Environment and Environmental Consequences

TVA has prepared this EA to comply with the NEPA and its implementing regulations. The baseline conditions of 19 specific resource areas and the environmental consequences of the alternatives on these resource areas are evaluated.

Resources evaluated in this EA include: Air Quality; Climate Change; Vegetation; Wildlife; Aquatic Ecology; Threatened and Endangered Species; Surface Water and Wastewater; Groundwater and Geology; Wetlands; Floodplains; Natural Areas, Parks, and Recreation;

Cultural and Historic Resources; Solid and Hazardous Waste; Land Use and Prime Farmland; Rail and Roadway Transportation; Visual Resources; Noise; Socioeconomics and Environmental Justice; and Safety.

Although the No Action Alternative would result in fewer impacts than Alternatives B and C, it is not an adequate long-term solution for addressing the purpose and need of this project.

Alternatives B and C, the action alternatives, consist of construction of a bottom ash process dewatering facility in the same footprint, and therefore, are generally comparable in nature. However, the additional construction of a recirculation system under Alternative C would result in a slightly longer construction period. Differences in the potential impacts associated with Alternative B versus Alternative C would be negligible for the following resource areas: Air Quality; Climate Change; Vegetation; Wildlife; Aquatic Ecology; Threatened and Endangered Species; Wetlands; Floodplains; Natural Areas, Parks, and Recreation; Cultural and Historic Resources; Solid and Hazardous Waste; Land Use and Prime Farmland; Rail and Roadway Transportation; Visual Resources; Noise; Socioeconomics and Environmental Justice; and Safety.

Alternative C would potentially result in minor beneficial impacts to surface water and groundwater due to the addition of a recirculation system and reduction in discharge volumes. Because the construction of the recirculation system would require a slightly lengthier construction period, the potential construction-related, temporary impacts to noise and visual resources would be slightly less under Alternative B than Alternative C.

# CHAPTER 1 - PURPOSE OF AND NEED FOR ACTION

## 1.1 Introduction and Background

In 2009, TVA began to modernize its coal ash management including converting from wet to dry ash storage. This effort was later endorsed by the TVA Board in 2011 and resulted in a recommendation to convert the wet bottom ash storage system at Gallatin (GAF) to a dry storage system.

On April 17, 2015, the U.S. Environmental Protection Agency (EPA) published the final Disposal of Coal Combustion Residuals from Electric Utilities rule (CCR rule) in the Federal Register. Under the CCR rule, CCR impoundments are potentially subject to a closure deadline of five years, with the possibility of an extension of the closure time period under certain circumstances.

TVA's GAF is located on approximately 1,950 acres of land on the north bank of the Cumberland River in Sumner County, Tennessee. 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. TVA proposes to design and erect a new facility that would dewater the bottom ash and economizer ash (herein referred to as bottom ash) at GAF. The resulting dry ash would be transported to an approved onsite landfill that meets all state and federal requirements. This project is a critical component of the effort to improve the safe operation and stability of CCR facilities. This project supports TVA's plan to end wet storage of coal ash and gypsum, and convert to dry storage. .

The GAF regional project location is illustrated on the Project Vicinity Map (Figure 1.1-1). The GAF reservation property boundary (1,950 acres) and the Proposed Project boundary (280 acres) are shown on Figure 1.1-2. The specific Project Area considered for evaluation in this EA is the approximately 280-acre area shown in yellow on Figure 1.1-2. Following impact assessment and the identification of specific resource features (e.g., wetland W-1, forested areas, etc.) which would be avoided during construction and operation of the dewatering facility, a reduced acreage 'work boundary' was created. The approximately 58-acre TVA 'work boundary' area, which is a subset of the larger Project Area, was generated to avoid sensitive resources. The TVA 'work boundary' area is illustrated in orange on Figure 1.1-2. This project would include ground-disturbing activities and tree clearing with the TVA work boundary area. The scope of the dewatering project includes the unloading, storage, protection during storage, removal from storage, installation, erection, commissioning, and startup support necessary to place Bottom Ash Process Dewatering Facilities for TVA's GAF into successful and reliable operation. The design and conceptual layout of the proposed facility are shown on Figure 1.1-3.

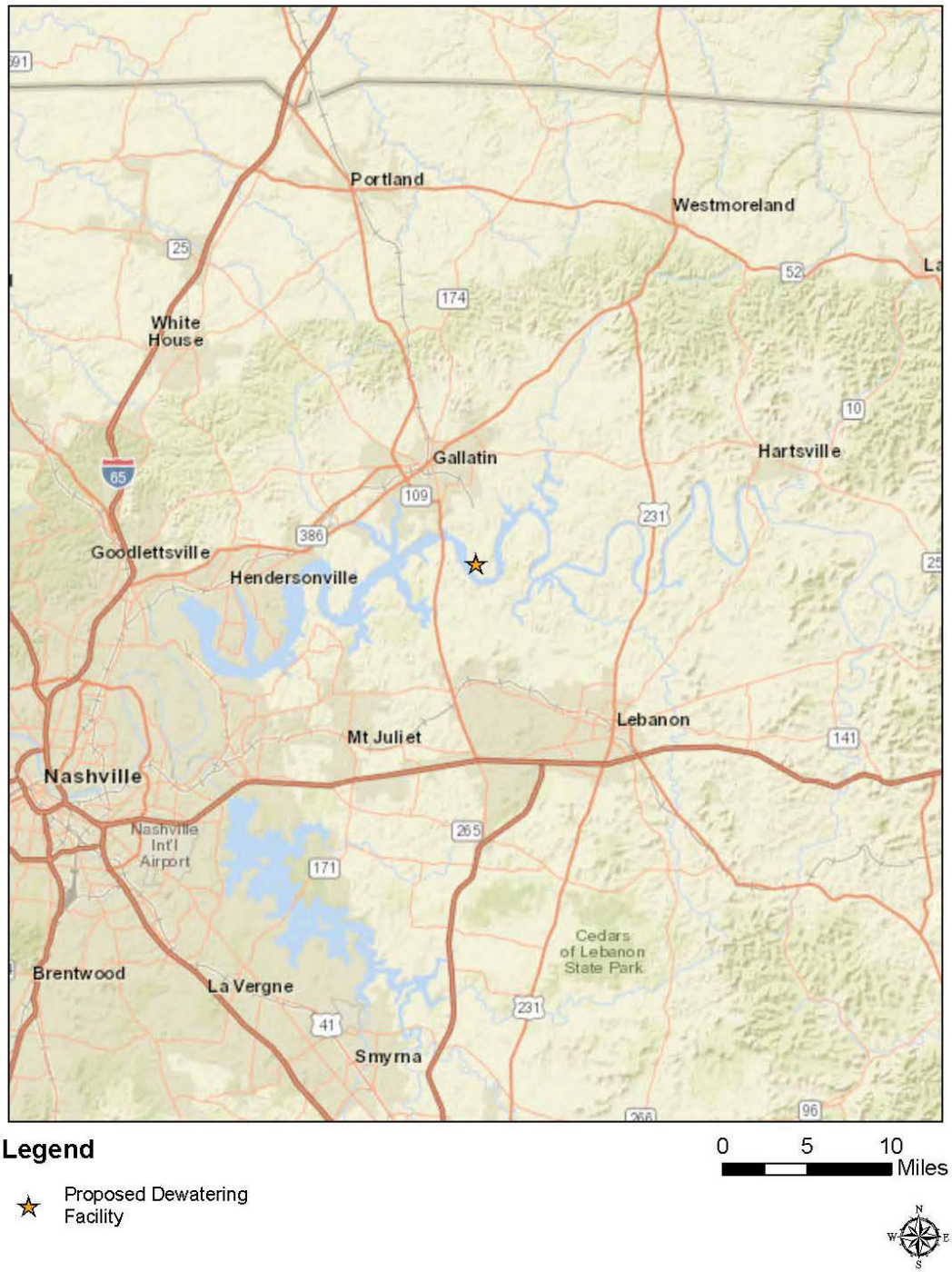



**Figure 1.1-1. Project Vicinity Map**

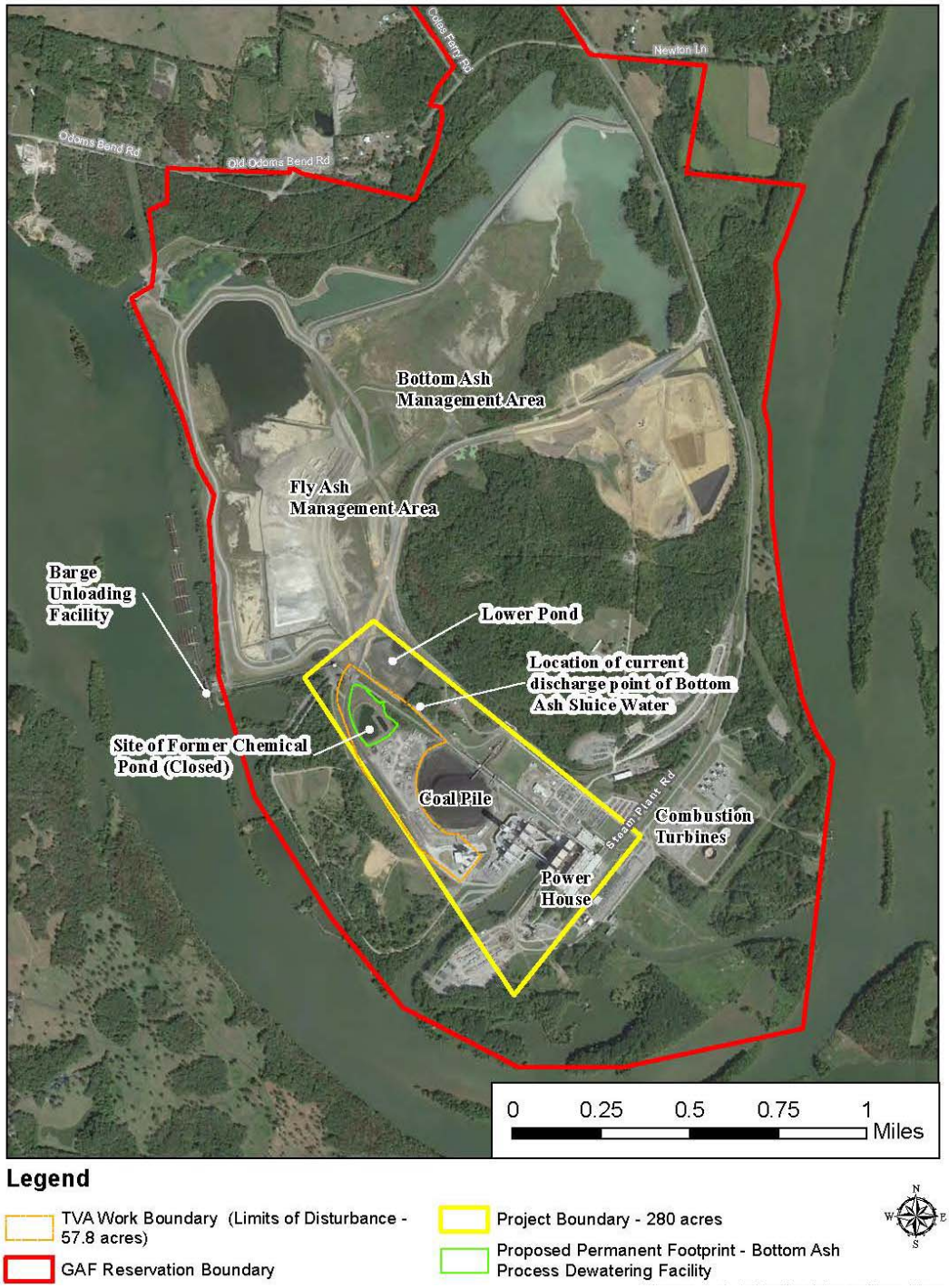



**Figure 1.1-2. Project Location Map**

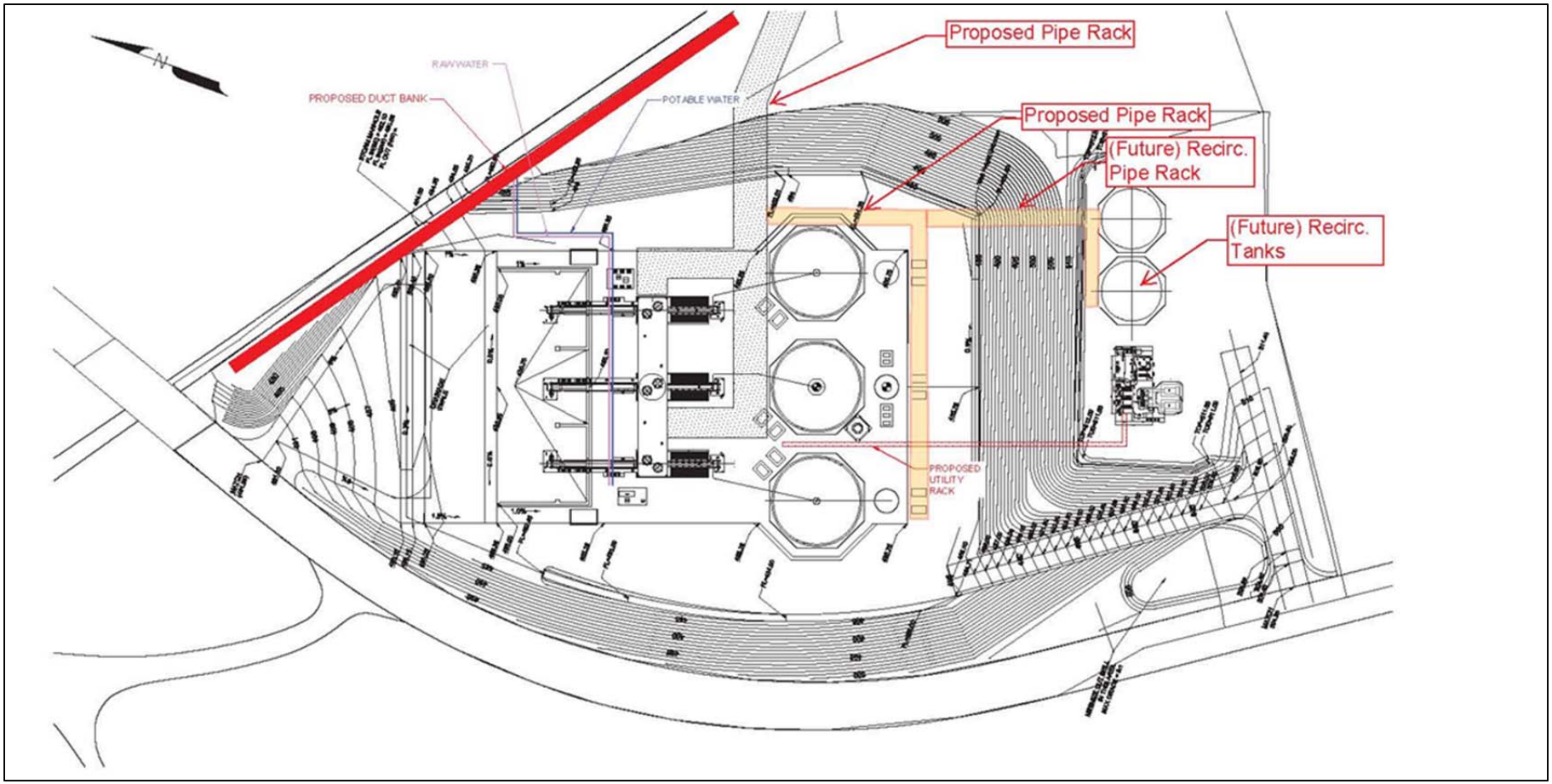



**Figure 1.1-3 – Site Layout Map**

The bottom ash to be dewatered is sluiced from the power plant in pipes to the new process dewatering facility. The facility would include three dewatering systems (two serving as the primary system and one as a backup). Dewatered bottom ash would be discharged to a concrete bunker, stacked in temporary staging piles, and finally trucked to the disposal area at the approved onsite landfill. Bottom ash effluent water would be discharged into the existing ash sluice trench adjacent to the facility and through the National Pollutant Discharge Elimination System (NPDES)-permitted outfall.

The proposed bottom ash process dewatering facility would be designed to process a total slurry flow rate of 7,900 gallons per minute (gpm). TVA currently burns low-sulfur PRB coal at GAF. TVA would conservatively design the dewatering system to accommodate a blend of approximately equal parts PRB and higher-sulfur Illinois Basin (ILB) coal. Table 1.1-1 provides design fuel specifications for the dewatering systems, though these are not a component of TVA's proposed action. The dewatering system will be designed to handle high sulfur coal CCR, which gives TVA the flexibility to switch coals in the future to take advantage of changing market conditions while maintaining compliance with applicable regulations. As stated above, a fully redundant dewatering system would be provided that would ensure that no single point failure leads to an outage of the entire dewatering facility. The facility would be designed for 24-hour/7-days a week availability.

**Table 1.1-1. Coal Blend Assumptions for Proposed Action**

| Coal Blend with ILB and PRB [1] | | Coal Analysis | | Final Blend | Design Coal Specifications |
|---|---|---|---|---|---|
| **Fuel** | | **ILB A-Rec'd** | **PRB As-Rec'd** | **50% PRB / 50% ILB As Rec'd** | |
| Sulfur | wt% | 2.94 | 0.284 | 1.61 | 1.61 |
| Moisture [2] | wt% | 9.89 | 27.5 | 18.7 | 30.0 |
| Ash [3] | wt% | 8.76 | 5.03 | 6.90 | 10.00 dry |
| Total | wt% | 100 | 100 | 100 | --- |
| HHV | Btu/lb | 11,500 | 8,720 | 10,324 | 10,324 |
| Fuel Sulfur | lb $SO_2$/mmBtu | 5.00 | 0.636 | 3.05 | 3.05 |

Btu = British thermal unit; ILB = Illinois Basin; lb =pound; mmBtu = million British thermal units; ppm = parts per million; PRB = Powder River Basin; $SO_2$ = sulfur dioxide; wt% = weight percent

(1) The scrubber design coal would not be limited to only PRB and ILB coals (other coal combinations could be acceptable provided permit conditions and compliance requirements are met.

(2) Although the table reads that the final blend moisture is 18.7%, the scrubbers would be designed for a maximum of 30% coal moisture to increase operational flexibility.

(3) Although the table reads that the final blend ash is 6.90%, the scrubbers would be designed for a maximum of 15% coal ash (% dry basis) to increase operational flexibility.

## 1.2 Purpose and Need

In July 2009, the TVA Board of Directors passed a resolution for TVA to review its practices for storing CCRs at its generating facilities, including GAF, which resulted in a recommendation to convert the wet bottom ash storage system at GAF to a dry storage system.

The purpose of the proposed action is to enable a wet-to-dry bottom ash conversion at GAF. Further, the dewatering facility would foster TVA's compliance with present and future regulatory requirements related to CCR production and management.

## 1.3 Decision to be Made

This EA is being prepared to inform TVA decision makers and the public about the environmental consequences of the proposed action. The decision TVA must make is whether or not to construct a mechanical bottom ash dewatering facility at GAF to create dry CCR for storage in the approved onsite landfill.

TVA will use this EA to support the decision-making process and to determine whether an Environmental Impact Statement (EIS) should be prepared or whether a Finding of No Significant Impact (FONSI) may be issued.

## 1.4 Related Environmental Reviews and Consultation Requirements

Environmental documents and reviews have been prepared by TVA for actions related to the operation of GAF, the similar dewatering projects at the Kingston Fossil Plant (KIF) and Shawnee Fossil Plant (SHF) facilities, and the 2013 GAF scrubber EA. The contents of these documents help describe the GAF Project Area and the process for dewatering of CCRs, and are incorporated by reference.

- *Installation of Emission Control Equipment and Associated Facilities at Gallatin Fossil Plant (TVA 2013)*.
- *Kingston Fossil Plant Bottom Ash Dewatering Facility Final Environmental Assessment (TVA 2016a).*
- *Shawnee Fossil Plant Bottom Ash Process Dewatering Facility Final Environmental Assessment (TVA 2016b).*

## 1.5 Scope of the Environmental Assessment

TVA has prepared this EA to comply with NEPA and its implementing regulations. TVA considered the possible environmental effects of the proposed action and determined that potential effects to the environmental resources listed below were relevant to the decision to be made, and assessed the impacts on those resources in detail in this EA:

- Air quality
- Climate change
- Vegetation
- Wildlife
- Aquatic ecology
- Threatened and endangered species
- Surface water and wastewater

- Groundwater and geology
- Wetlands
- Floodplains
- Natural areas, parks and recreation
- Cultural and historic resources
- Solid and hazardous waste
- Land use and prime farmland
- Rail and roadway transportation
- Visual resources
- Noise
- Socioeconomics and environmental justice
- Safety

## 1.6 Public and Agency Involvement

A draft of the EA was released for public review and comment on March 23, 2017. The Draft EA was transmitted to various agencies and federally recognized tribes. It was also posted on TVA's public NEPA review website. A notice of availability, including a request for comments on the Draft EA, was published in two newspapers serving the Gallatin area: The Gallatin News (ran on 3/29/17) and The News-Examiner (ran on 3/24/17). Comments were accepted through April 24, 2017, via TVA's website, mail, and e-mail.

TVA received comment letters on the Draft EA from one private citizen and from the Tennessee Department of Environment and Conservation (TDEC). All comments were carefully reviewed and the text of the EA was edited as appropriate. Appendix A contains the comments and TVA's responses to those comments.

## 1.7 Necessary Permits or Licenses

The environmental permits to be obtained for the activities related to TVA's action include:

- The project will require revisions to TVA's CAA Title V Permit for operations. Air permitting regulations under the Clean Air Act (CAA) will require TVA to secure an Air Pollution Control Permit to Construct prior to the commencement of the proposed construction.
- The project would include the disturbance of greater than one acre. By rule, any construction project that disturbs greater than one acre of land requires a NPDES General Storm Water Construction Permit. A Storm Water Permit issued by Tennessee Department of Environment and Conservation (TDEC), under the Clean Water Act, would be required prior to commencement of construction. This would require a storm water pollution prevention plan (SWPPP) and Best Management Practices Plan to ensure that storm water would be controlled onsite.

- TVA's current NPDES Permit and Storm Water Multi-Sector Permit would be evaluated to determine if a modification is necessary due to the potential alteration of the waste water or storm water stream(s).

Information regarding the above permits is provided in Appendix B. No permits or licenses are anticipated specifically for solid or hazardous waste transportation-related activities under any of the potential alternatives.

This page intentionally left blank

# CHAPTER 2 - ALTERNATIVES

Descriptions of the proposed action and its alternatives, a brief comparison of their environmental effects, and TVA's preferred alternative are presented in this chapter.

## 2.1 Description of Alternatives

TVA has determined that there are two action alternatives that meet the purpose and need defined in Chapter 1. These alternatives and a No Action Alternative were evaluated in this EA and are described below. In addition, four alternatives were considered but eliminated from further consideration. The following sections include summaries for each alternative proposed for this project.

### 2.1.1 Alternative A – No Action

Under the No Action Alternative, TVA would not construct the process dewatering facility. TVA would continue to store bottom ash in wet onsite impoundments. The existing impoundments would continue to be operated under current NPDES permits.

The active coal-fired generating units at GAF produce CCRs during power generation. The fly ash is treated in a dry process and is stored in an approved onsite landfill. The bottom ash is managed onsite with "wet" impoundments and a "dry" landfill. The bottom ash (including economizer ash) would continue to be wet-sluiced to the ash impoundments. The bottom ash that collects in the bottom of the boiler inside the powerhouse would be washed from the boiler bottoms and also sluiced to the bottom ash impoundments. The bottom ash would settle out of the sluice water in the impoundments. After settling, the bottom ash would be dug up out of the impoundments and allowed to dry in piles on the ground. After further dewatering and drying, the bottom ash would be transported and stored in an approved onsite landfill.

### 2.1.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System

Under Alternative B, TVA would construct a mechanical bottom ash dewatering facility at GAF to create dry CCR for storage in an approved onsite landfill. To meet requirements under EPA's CCR regulations that will apply to GAF, the existing ash impoundment(s) would eventually be closed. The dewatering facility would facilitate compliance with these requirements. The dewatering equipment would be constructed on the former site of the chemical pond. The former chemical pond has been closed under a separate TVA project and its location was selected as the footprint for this proposed project to make best use of the existing real estate at Gallatin. The facility would be constructed on an approximately 10-acre site (Figure 1.1-3 and Limits of Disturbance [LOD] on Figure 3.3-1); an additional 10 acres would be used for temporary equipment laydown and mobilization during construction. Construction of the dewatering facility is expected to take place over an 18- to 24-month period.

Bottom ash would be dewatered using equipment that would operate continuously while GAF is generating. The dewatering would involve two basic processes. In the first process, bottom ash sluice water would be pumped from the powerhouse to the entry point of a submerged drag chain conveyor (SDCC). Within the SDCC, the ash would settle out and would then be transported up an incline allowing for natural dewatering by gravity. At the top of the incline, the ash would be discharged to concrete pads ("bunkers") for temporary storage and would be stacked in piles. Any remaining water in the material would evaporate or would drain by gravity

and be collected in sumps which would drain back to the facility for treatment. The dry ash would then be transported directly to an approved onsite landfill by truck.

In the second process, water collected from the SDCC would be sent to a clarifier to facilitate settling of the remaining fine ash solids. Fine ash solids from the clarifier would be pumped back to the SDCC for further dewatering. Clarified water would be conveyed to the process water tanks (one tank per system; three tanks total) which would supply water for use in the dewatering system. Excess water from the process water tanks would be conveyed to either a wastewater treatment equalization (EQ) basin or directly to the NPDES outfall.

The bottom ash dewatering facility would be designed using three systems to provide redundancy and operational flexibility while providing suitable holding times for gravity settling of solids to match the maximum flows from the plant. Maximum peak flows are approximately 9400 gpm. The redundant nature of this arrangement would allow dewatering operations to continue in the event of mechanical problems with any of the dewatering systems. In the unlikely event that all sets of dewatering equipment become inoperative, necessary measures, including a forced outage of the plant could be implemented to meet the water quality limits under the NPDES permit.

The proposed process dewatering facility would be designed to remain operational during a 24-hour rainfall event with a recurrence interval of 25 years. During normal operations, process water and contact water (i.e., additional water from rainfall and surface runoff) would be processed through the bottom ash dewatering system. However, if or when the dewatering system storage or throughput capacity is exceeded, effluent would be initially discharged to the NPDES-permitted outfall.

### 2.1.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream

Under Alternative C, TVA would construct the same dewatering facility as described under Alternative B, and would also construct a recirculation system. Instead of discharging water from the dewatering process through the existing NPDES-permitted outfall, the effluent would be rerouted back into the powerhouse for future sluicing operations. The recirculation system would be contained within the same project boundary described for Alternative B. Construction of the dewatering facility would occur first, and would require 18 to 24 months; construction of the recirculation system would take place over a 12- to 18-month period following completion of the dewatering facility.

The recirculation system would include additional recirculating pumps, additional power from the electrical room, and a water containment facility. The containment facility would hold effluent from the bottom ash dewatering facility for recirculation back to the powerhouse and would make it readily available when needed for sluicing operations. Water would be pumped to the intake side of the bottom ash sluice pumps at the powerhouse or a new set of pumps will be installed to provide water back to the boiler bottom. No bottom ash sluice water would be discharged from the NPDES-permitted outfall, thus reducing this discharge. However, the recirculated water stream would also require a make-up water stream, a blowdown wastewater stream, and an outage wastewater stream.

- Make-up water is new water added to the effluent to make up for the water lost through evaporation during the bottom ash dewatering treatment process. This would result in slightly increasing the water withdrawal rate from the river, but would not significantly increase the total plant-wide withdrawals.

- Blowdown wastewater is recirculated water that is intentionally flushed out to avoid the concentration of impurities. When effluent from the bottom ash dewatering facility is recycled again and again, water evaporates, and the mineral content (calcium carbonate, magnesium, sodium, salts, etc.) of the remaining water increases in concentration of minerals. If left undiluted, these minerals will cause scaling on equipment surfaces; possibly damaging the system. It is assumed that 15 percent blowdown would be required in order to maintain a balance in the recirculating system. The blowdown water would be contained and reused to support current operations.

- Outage wastewater is water used to purge the system during plant outages. This outage waste stream could range between 0.2 and 0.5 million gallons per day (MGD).

### 2.1.4 Alternatives Considered but Eliminated From Further Consideration

#### *2.1.4.1 Alternative D – Under-Boiler Bottom Ash Removal System*

Under Alternative D, TVA would construct a SDCC directly beneath each active boiler unit within the powerhouse, which would eliminate the bottom ash sluice water making a recirculation system unnecessary. Instead of sluicing bottom ash to a dewatering facility, the quenched bottom ash would be transported up an incline allowing for natural dewatering by gravity. At the top of the incline, the ash would be discharged to concrete pads (“bunkers”) for temporary storage. The ash material would be stacked in piles having a maximum height of about 50 feet. Any remaining water in the material would evaporate or would drain by gravity and be collected in sumps which would drain to an approved plant wastewater EQ basin. The dry ash would then be transported directly to an approved onsite landfill. Excess water from the quenching process would be conveyed to the wastewater treatment EQ basin or directly to the NPDES outfall.

The boilers at GAF are in basements in close proximity to the powerhouse floor. There is not enough physical clearance to accommodate the required ash conveyance equipment underneath the boiler bottoms and there is not enough space to locate the supporting and auxiliary equipment close to the boiler bottoms. There is no access for installation of a drag chain conveyor under the boiler bottom or a path for material removal in a conventional system. In addition, an under-boiler system would not provide for dewatering of the economizer ash sluice stream. Therefore, Alternative D is not considered appropriate for GAF and was eliminated from further consideration.

#### *2.1.4.2 Alternative E – Mechanical Removal Using Excavators in Settling Tanks*

Under Alternative E, bottom ash would be sluiced from the powerhouse to a series of above-ground holding tanks, where the ash solids would settle out to the bottom of the tanks. As a tank becomes filled with solids and settling efficiency is reduced, the tank would be disconnected from the series, and the bottom ash would be excavated out of the tank using mechanical excavators and allowed to dry in piles on the ground. After further dewatering and drying, the bottom ash would be transported to an approved onsite landfill. Effluent water from the tanks would be discharged through the NPDES-permitted outfall.

Mechanical removal from tanks was eliminated from further consideration because it is a labor-intensive operation that would have higher uncertainty in meeting CCR ash management and NPDES permit requirements. Additional measures necessary to meet CCR ash management requirements could include concrete bunkers and runoff collection in sumps. Additional measures necessary to meet NPDES requirements could include clarifiers and process water

tanks. Once these measures are added, this alternative has essentially the same results as Alternative B. Therefore, Alternative E is considered not cost-effective for GAF and was eliminated from further consideration.

#### *2.1.4.3 Alternative F - Dry Boiler Bottom Conversion*

Conversion from wet boiler bottoms to dry bottoms and removing bottom ash in a dry state using methods that do not use water to cool the ash such as pneumatic conveying, DRYCON™, and vibrating ash conveying were considered. GAF is not a candidate for this process, due to the space limitations and the two hopper arrangements in the basement. The boilers at GAF are in the basement in close proximity to the powerhouse floor. There is not enough physical clearance to accommodate the ash management systems and supporting equipment close to the boiler bottoms. In addition, these systems would not provide for dewatering of the economizer ash sluice stream. The cost of Dry Boiler Bottom Conversion systems may be significantly greater than the wet-to-dry system. Therefore, Alternative F was eliminated from further consideration.

## 2.2 Comparison of Alternatives

The environmental impacts of the alternatives are summarized in Table 2.2-1. These summaries are derived from the information and analyses provided in Chapter 3.

**Table 2.2-1. Summary and Comparison of Alternatives by Resource Area**

| Resource Area | Impacts | | |
|---|---|---|---|
| | **Alternative A – No Action** | **Alternative B – Construction of Dewatering Facility** | **Alternative C – Dewatering plus Recirculation** |
| Air quality | No Impact | Minor short-term construction impact. Minor operations impact due to fugitive dust emissions. | Minor short-term construction impact. Minor operations impact due to fugitive dust emissions. |
| Climate change | No Impact | No significant impact | No significant impact |
| Vegetation | No Impact | No significant impact | No significant impact |
| Wildlife | No Impact | Minimal impact | Minimal impact |
| Aquatic ecology | No Impact | Minor beneficial direct and indirect impacts | Minor beneficial direct and indirect impacts |
| Threatened and endangered species | No Impact | No significant impact. Potential minor beneficial impact to listed aquatic species | No significant impact. Potential minor beneficial impact to listed aquatic species |
| Surface water and wastewater | No Impact | No significant impact | Potential minor beneficial impact |
| Groundwater and geology | No Impact | No significant impact | Potential minor beneficial impact to groundwater |
| Wetlands | No Impact | No impact | No impact |
| Floodplains | No Impact | No impact | No impact |
| Natural areas, parks and recreation | No Impact | No significant direct impacts and minor indirect short term construction impact | No significant direct impacts and minor indirect short term construction impact |

**Table 2.2-1. Summary and Comparison of Alternatives by Resource Area**

| Resource Area | Impacts | | |
|---|---|---|---|
| | **Alternative A – No Action** | **Alternative B – Construction of Dewatering Facility** | **Alternative C – Dewatering plus Recirculation** |
| Cultural and historic resources | No Impact | No impact | No impact |
| Solid and hazardous waste | No Impact | No significant impact | No significant impact |
| Land use and prime farmland | No Impact | No impact | No impact |
| Rail and Roadway transportation | No Impact | Minor short-term construction impact, minor internal impact during operations | Minor short-term construction impact, minor internal impact during operations |
| Visual resources | No Impact | No significant impact | No significant impact |
| Noise | No Impact | No significant impact | No significant impact |
| Socioeconomics and Environmental Justice | No Impact | Minor short term beneficial impacts during construction. No significant impacts during operation. No disproportionate impacts to Environmental Justice populations. | Minor short term beneficial impacts during construction. No significant impacts during operation. No disproportionate impacts to Environmental Justice populations. |
| Safety | No Impact | Minor short term negative impacts during construction. | Minor short term negative impacts during construction. |

## 2.3 Identification of Mitigation Measures

The following mitigation measures and best management practices (BMPs) have been identified to reduce potential environmental effects:

- Mitigation measures would be implemented as needed to reduce fugitive emissions as specified in the Title V Operating Permit 561209 and any air construction permits issued by the TDEC Division of Air Pollution Control.

- Erosion prevention and sedimentation controls would be implemented as required by the TN General Construction Storm Water Permit (TNR100000) or any specific construction storm water permit issued by the TDEC Division of Water Resources, and the Tennessee Erosion Prevention and Sediment Control Handbook.

- Mitigation measures as required by the facility's Class II solid waste permit (IDL #83-0219) for the handling and management of coal combustion byproduct materials.

### 2.3.1 Air Quality

Under Alternatives B and C, the construction contractor would be required to implement dust control measures during construction to prevent the spread of dust, dirt, and debris. These measures include wetting equipment and covering waste or debris piles, using covered containers to haul waste and debris, road sweepers on paved roads and wetting unpaved

vehicle access routes with water wash trucks, during hauling. Wet suppression can reduce fugitive dust emissions from roadways and unpaved areas by as much as 95 percent. Wet suppression is and will continue to be routinely utilized for dust control during operations. If necessary, bottom ash would be moistened to 15 to 20 percent moisture content for dust control while bottom ash is temporarily stored at the dewatering facility and during loading onto trucks. The open trucks would then be covered to further reduce the chance of fugitive emissions while ash is transported to an approved onsite landfill. In the event fugitive dust becomes an issue that is not corrected by the above measures, TVA could conduct onsite air monitoring.

TVA routinely requires onsite contractors to maintain engines and equipment in good working order. With these measures in place, potential effects to local air quality from the proposed construction are expected to be minor and temporary.

### 2.3.2 Surface Water and Groundwater

Alternatives B and C would involve land disturbance greater than 1 acre requiring a TDEC Construction Storm Water permit, which would include a SWPPP and BMP Plans. The current NPDES permit and Storm Water Multi-Sector Permit may require modification with these alternatives. Mitigation measures prescribed in a project specific SWPPP and BMP Plans would reduce the potential for erosion of soil minimizing the potential for pollutants to reach waters of the state, streams and wetlands, and groundwater.

Wastewater characterization of the discharge of this facility and the Outfall 001 discharge would be evaluated once the system is operational to ensure that these waste streams comply with all NPDES permit limits and Tennessee Water Quality Criteria. The use of wastewater treatment additives to help with pH control, the settling of solids, and the reduction of metals during dewatering operations would be implemented as needed to comply with NPDES permit limits.

## 2.4 Preferred Alternative

TVA's preferred alternative is Alternative C, construction of the process dewatering facility and the recirculation system to recycle sluice water back into the powerhouse for future sluicing operations. This alternative enables a wet-to-dry bottom ash conversion at Gallatin.

Both Alternatives B and C both provide long-term benefits and meet the purpose and need to convert from a wet bottom ash storage system to a dry system. Therefore, at the conclusion of the NEPA process, TVA would advance to an EIS or issue a Finding of No Significant Impact (FONSI) for both Alternatives B and Alternative C.

# CHAPTER 3 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment (existing conditions) of environmental resources in the Project Area and the anticipated environmental consequences that would occur from adoption of the alternatives described in Chapter 2. The affected environment descriptions below are based on published and unpublished reports, historical data, and online database retrievals, as necessary. A list of applicable source documents is provided in Chapter 6.

## 3.1 Air Quality

### 3.1.1 Affected Environment

Through its passage of the CAA, Congress has mandated the protection and enhancement of our nation's air quality resources through various programs including the promulgation and attainment of National Ambient Air Quality Standards (NAAQS) (40 Code of Federal Regulations [CFR] Part 50). EPA has established NAAQS to protect the public health and welfare for the following "criteria" pollutants:

- Sulfur dioxide ($SO_2$)
- Ozone ($O_3$)
- Nitrogen dioxide ($NO_2$)
- Particulate matter less than or equal to 10 micrometers ($PM_{10}$)
- Particulate matter less than or equal to 2.5 micrometers ($PM_{2.5}$)
- Carbon monoxide (CO)
- Lead (Pb)

There are two types of NAAQS: primary standards (set to protect public health) and secondary standards (set to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings).

Air quality in the Tennessee Valley and the Nation has steadily improved following the enactment of the CAA, subsequent amendments to that Act, and the promulgation of increasingly severe regulations by EPA and the states. This has resulted in significant emission reductions from industrial and other categories of sources, such as motor vehicles. Air quality levels of all criteria pollutants have significantly decreased by over 60 percent from 1990 to 2011 (EPA 2016a).

The EPA periodically reviews existing standards for each criteria pollutant, and sets or revises new NAAQS as it deems fit. States submit recommendations to the EPA as to whether or not an area is attaining the NAAQS for a criteria pollutant. States base these recommendations on air quality data collected from monitors at locations in urban and rural settings as well as other information characterizing air quality such as modeling. After working with the states, and considering the information from air quality monitors and/or models, EPA will "designate" an area as attainment or nonattainment for the standard. The air quality in Sumner County, Tennessee, where GAF is located, meets applicable federal and state air quality standards.

Sumner County and the surrounding counties (Wilson, Davidson, Robertson, and Trousdale) are all in attainment with applicable NAAQS (EPA 2016b).

The feasibility of operating a bottom ash dewatering system at the site may be affected by several air quality considerations. One such factor is the regulatory status or attainment of air quality standards. Air emission sources located in clean air areas are subject to the Prevention of Significant Deterioration (PSD) New Source Review (NSR) rules, whereas those located in or affecting areas failing to attain air quality standards must comply with nonattainment NSR. An overriding constraint in either NSR program is that no source may cause or significantly contribute to a violation of an ambient air quality standard. The only emissions from the proposed dewatering facility would be fugitive particulate matter (PM).

The project would not be subject to NSR review because it would not be a major modification under state air quality regulations (TDEC Air Pollution Control 1200-03-09-.01(5)(b)(2) [TDEC 2009]).

### 3.1.2 Environmental Consequences

#### *3.1.2.1 Alternative A – No Action*

Under the No Action Alternative, TVA would not construct the process dewatering facility. TVA would continue its current practice of disposing of wet bottom ash in onsite impoundments. For the foreseeable future, current air quality conditions are not likely to change due to plant operations. Implementing the No Action Alternative would not result in any additional direct impacts to air quality.

#### *3.1.2.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System*

Construction

Transient air pollutant emissions would occur during the construction phase. Construction-related air quality impacts would be primarily related to site preparation and the operation of internal combustion engines.

Site preparation and vehicular traffic over paved and unpaved roads at the construction site would result in the emission of fugitive dust PM during active construction periods. The largest fraction (greater than 95 percent by weight) of fugitive dust emissions would be deposited within the construction site boundaries (Buonicore and Davis 1992). The remaining fraction of the dust would be subject to transport beyond the property boundary. If necessary, emissions from open construction areas and paved/unpaved roads would be mitigated by spraying water on the roadways to reduce fugitive dust emissions.

Combustion of gasoline and diesel fuels by internal combustion engines (vehicles, generators, construction equipment, etc.) would generate local emissions of PM, nitrogen oxides, carbon monoxide, volatile organic compounds, and sulfur dioxide during the site preparation and construction period. The total amount of these emissions would be small and would result in minimal impacts to air quality.

Air quality impacts from construction activities would be temporary (18 to 24 months), and would depend on both man-made factors (intensity of activity, control measures, etc.) and natural factors such as wind speed and direction, soil moisture, etc. However, even under unusually adverse conditions, these emissions would have, at most, a minor transient impact on off-site air

quality and would be well below the applicable ambient air quality standard. Overall, the potential impacts to air quality from construction-related activities for the project would be minor.

Operations

The proposed dewatering facility would be operated in compliance with TDEC regulations. Operation of the bottom ash dewatering system is subject to specific TDEC process regulations and fugitive dust regulations. Operations are also subject to review for applicability of the PSD regulations for inhalable particulate matter ($PM_{10}$) and total particulates.

Because the emissions of $PM_{10}$ and total particulates would be below PSD significance levels of 15 tons per year and 25 tons per year, respectively, PSD does not apply to this project. Because the proposed project is located in an attainment area for $PM_{2.5}$, it is not subject to nonattainment NSR analysis. The $PM_{2.5}$ emissions increase associated with the proposed dewatering facility would not be significant since a very small percentage of the fugitive dust generated would be expected to be in the 2.5 micron size range.

Fugitive dust emission standards state that fugitive dust may not be emitted in quantities that produce visible emissions beyond the property for more than 5 minutes per hour or 20 minutes per day. During loading bottom ash would be moistened to 15 to 20 percent moisture content. This would be used for dust control while bottom ash is temporarily stored at the dewatering facility and loaded onto trucks. The open trucks would then be covered to further reduce the chance of fugitive emissions while ash is transported to an approved onsite landfill. Therefore, air quality impacts associated with project operations would be minor.

#### *3.1.2.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream*

Construction and Operation

Almost all activities described in Alternative B would occur under Alternative C in both the construction and operational phases. The primary difference under Alternative C is that a recirculation system would be constructed; therefore, the installation of this additional equipment would require additional machinery to be run that would create more air pollution (e.g., dust from truck traffic and construction equipment) compared to Alternative B. However, Alternative C would not create substantially more air pollutants than Alternative B given the same project footprint and the similarities of construction and operation processes. Thus, there would be short-term, minor impacts to air quality during construction of Alternative C. The additional electrical pumps would be served by the existing power infrastructure and contribute a negligible increase in air pollution at the power plant given their small power requirements.

## 3.2 Climate Change

### 3.2.1 Affected Environment

The 2014 National Climate Assessment concluded that global climate is projected to continue to change over this century and beyond. United States average temperature has increased by 1.3 degrees Fahrenheit (°F) to 1.9°F since 1895, and most of this increase has occurred since 1970. Temperatures are projected to rise another 2°F to 4°F in most areas of the United States over the next few decades. The amount of warming projected beyond the next few decades is directly linked to the cumulative global emissions of heat-trapping gases and particles. By the end of this century, a roughly 3°F to 5°F rise is projected under a lower emissions scenario, and

a 5°F to 10°F rise for a higher emissions scenario. In both projections, emissions are predominantly from fossil fuel combustion (Melillo et. al. 2014).

The southeastern United States is one of the few regions globally that does not exhibit an overall warming trend in surface temperature over the 20th century. The region warmed during the early part of last century, cooled for a few decades, and is now warming again. The lack of an overall upward trend over the entire period of 1900-2012 is unusual compared to the rest of the U.S. and the globe. This feature has been dubbed the "warming hole" and has been the subject of considerable research, although a conclusive cause has not been identified (Kunkel et al. 2013). From 1970 to the present, temperatures have increased by an average of 2°F, with higher average temperatures during summer months. There have been increasing numbers of days above 95°F and nights above 75°F, and decreasing numbers of extremely cold days since 1970.

Increasing temperatures and the associated increase in frequency, intensity, and duration of extreme heat events will affect public health, natural and built environments, energy, agriculture, and forestry. Higher temperatures also contribute to the formation of harmful air pollutants and allergens. Ground-level ozone, an air pollutant which generally increases with rising temperatures, is projected to increase in the 19 largest urban areas of the Southeast, leading to an increase in deaths. Heat stress also adversely affects dairy and livestock production, and is projected to reduce crop productivity, especially when coupled with increased drought (Melillo et. al. 2014).

The southeastern U.S. leads the nation in number of wildfires, averaging 45,000 fires per year, and this number continues to increase. Increasing temperatures contribute to increased fire frequency, intensity, and size (Melillo et. al. 2014). The Southeast region experiences a wide range of extreme weather and climate events that affect human society, ecosystems, and infrastructure. Since 1980, the Southeast has experienced more billion-dollar weather disasters than any other region in the U.S. Climatic phenomena that have major impacts on the Southeast include: heavy rainfall and floods, drought, extreme heat and cold, winter storms (in northern regions), severe thunderstorms and tornadoes, and tropical cyclones (Kunkel et al. 2013).

In 2013, worldwide man-made annual carbon dioxide ($CO_2$) emissions were estimated at 36 billion tons, with sources within the U.S. responsible for 14 percent of this total (Le Quéré et al. 2013). According to the official U.S. Greenhouse Gas Inventory, electric utilities in the U.S. were estimated to emit 2.039 billion tons, roughly 32 percent of the U.S. total in 2012 (EPA 2014). In 2014, fossil-fired generation accounted for 52 percent of TVA's total electric generation, and the non-emitting sources of nuclear, hydro, and other renewables accounted for 48 percent. Comparing the $CO_2$ emissions from the entire TVA system in 2005 to those in 2014, TVA has reduced its $CO_2$ emissions by approximately 30 percent and anticipates achieving a total $CO_2$ emission reduction of 40 percent by 2020.

### 3.2.2 Environmental Consequences

#### *3.2.2.1 Alternative A – No Action*

Under Alternative A, TVA would not construct the process dewatering facility. TVA would continue its current practice of disposing of wet bottom ash in onsite impoundments. Implementing the No Action Alternative would not result in any new emissions of greenhouse gases and, therefore, there would be no impacts to climate change.

#### *3.2.2.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System*

Construction

$CO_2$ emissions would occur during the construction phase. Construction-related $CO_2$ emissions would be primarily related to the combustion of gasoline and diesel fuels by internal combustion engines (vehicles, generators, construction equipment, etc.). The total amount of these emissions would be small and would not adversely affect regional greenhouse gas levels; therefore, this alternative would have no significant impact on climate change.

Operation

Operations at the dewatering facility would require the use of electricity provided by ongoing operations at GAF. The additional energy required to operate the dewatering facility would not require enough of an increase in the amount of fossil fuel burned at GAF to have a noticeable impact on climate change. Operation of equipment associated with the dewatering facility would result in emissions that would be small and would not adversely affect regional greenhouse gas levels; therefore, this alternative would have no significant impact on climate change.

#### *3.2.2.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream*

Construction

Implementing Alternative C would have the same impacts as Alternative B for the first construction phase (Phase 1) and additional construction-related $CO_2$ emissions for incorporating the recirculation system as part of Phase 2. Because emissions from Phases 1 and 2 would be minor and would not contribute to substantially greater regional greenhouse gas levels, the $CO_2$ emissions from energy required for the construction of dewatering facility and recirculation system would not result in significant impacts to climate change.

Operation

As with Alternative B, operation of equipment associated with the dewatering facility would result in emissions that would be small and would not adversely affect regional greenhouse gas levels. Implementation of Alternative C would not result in significant impacts to climate change.

## 3.3 Vegetation

### 3.3.1 Affected Environment

GAF lies completely within the Outer Nashville Basin of the Interior Plateau Ecoregion. According to Griffith et al. (2001), the Interior Plateau is a diverse ecoregion extending from southern Indiana and Ohio to northern Alabama. Rock types are distinctly different from the coastal plain sands of western Tennessee, and elevations are lower than the Appalachian region to the east. The Outer Nashville Basin is composed of a rolling and hilly topography with slightly higher elevations than the surrounding terrain. The region encompasses most of the outer areas of the generally non-cherty Ordovician limestone bedrock. The higher hills and knobs are capped by the more cherty Mississippian-age formations, and some Devonian-age Chattanooga shale, remnants of the Highland Rim. Deciduous forest with pasture and cropland are the dominant land covers. The natural vegetation of this ecoregion is primarily oak-hickory forest, with some areas of bluestem prairie and cedar glades (Griffith et al. 2001).

Field inspections conducted in October 2016 within the 280-acre project study area, which includes the approximately 10-acre proposed dewatering facility footprint (Figure 1.1-3), revealed that the vegetation is a mixture of common native and non-native herbaceous and woody species. Approximately 30 percent of the GAF reservation is covered by vegetation and can be classified based on plant community types; the remaining 70 percent is currently being used for facility operations (i.e., developed) and is not considered further in the vegetation discussion. In the Proposed Project Area, an even smaller percentage is covered by vegetation, including herbaceous vegetation and mixed evergreen-deciduous forest.

The southern end of the GAF reservation includes mixed evergreen-deciduous forest and evergreen forest, in the form of planted loblolly pine. The mixed evergreen-deciduous forest in the proposed landfill area is dominated by Osage orange, eastern red-cedar, hackberry, and black locust; both forest types are fragmented. The sub-canopy vegetation within the Project Area is sparse and includes scattered individuals of sumac, bush honeysuckle, flowering dogwood, hackberry, black locust, and black cherry. Vines, such as poison ivy and Virginia creeper, are abundant, and a few fern species were observed. Several species of deciduous trees are present in the Proposed Project Area and along the discharge channel, including American sycamore, cottonwood, box elder, sweetgum, and white ash. In addition, coral berry, flowering dogwood, hackberry, red maple, sugar maple, white ash, and winged elm are common understory species. The shrub layer contains the invasive species autumn olive, bush honeysuckle, Chinese privet, Japanese honeysuckle, and stiff dogwood. The herbaceous layer is dominated by the invasive Japanese stiltgrass. Areas not dominated by poison ivy and invasive shrubs contained a number of native herbaceous flowering plants and ferns. Examples of these include field horsetail, aborted buttercup, adder's tongue fern, baby blue-eyes, blunt-lobe woodsia, ebony spleenwort, green dragon, hound tongue, Jack-in-the-pulpit, and lyre-leaf sage.

The proposed dewatering facility would permanently occupy a footprint of approximately 10 acres (Figure 1.1-3); however, land disturbing activities could occur anywhere within the 280-acre Proposed Project Area (Figure 1.1-2). The proposed dewatering facility would be constructed on the former chemical pond. Only a few acres of this area include any vegetation, which is limited to forested patches on the southeast and northwest edges as well as the vegetated storm water ditch to the north. Because of the previously disturbed, industrial nature of the Project Area, a subset of the Project Area was identified specifically for Biological Resource survey work (Figure 3.3-1). This biological survey area totals approximately 12.5 acres and includes the 10-acre footprint of the proposed dewatering facility, as well as two small vegetated portions of the Project Area (Area 1 and Area 2 on Figure 3.3-1).

The storm water ditch includes black willow and black locust, along with primarily common reed (*Phragmites*) and various grass species. In the forested area in the northwest section of the Project Area, the dominant trees are cottonwood, hackberry, chinquapin oak, black locust, and eastern red cedar. Shrubs in the northwest area include bush honeysuckle, stiff dogwood, and sumac. To the southwest of the Project Area is another wooded area mostly outside of the grading/layout footprint (Figure 1.1-3). Vegetation in this area includes cottonwood, eastern red cedar, red maple, and American elm, while the herbaceous layer is dominated by field horsetail and some common reed. A portion of this area was designated as wetland (see Section 3.9).

There are no uncommon terrestrial plant communities, designated critical plant habitats, or otherwise noteworthy botanical areas occurring on or adjacent to the GAF facility.

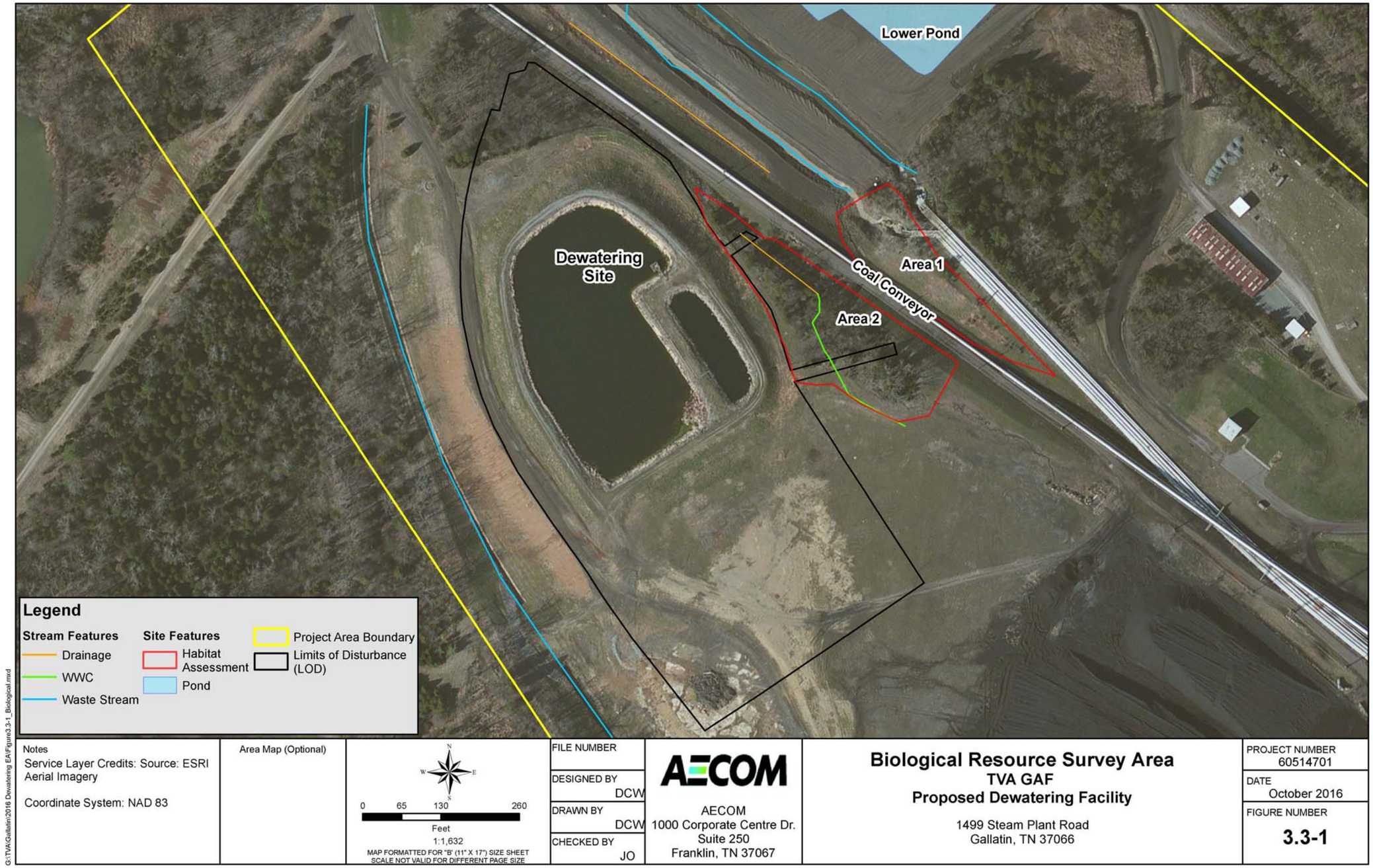



**Figure 3.3-1. Biological Resource Survey Area**

### 3.3.2 Environmental Consequences

#### *3.3.2.1 Alternative A – No Action*

Under the No Action Alternative, TVA would not construct the process dewatering facility. The property would remain in its current condition with minor maintenance over time as needed. Thus, vegetation on the GAF property would remain in its current state. The GAF property has no conservation value based on vegetation, and the adoption of Alternative A would not change that situation. Because the plant communities present on and around the GAF reservation are common and representative of the region, no direct and/or indirect impacts are expected to occur to these botanical resources as a result of the No Action Alternative. The few vegetated areas within the Project Area would continue to be dominated by non-native and early successional species indicative of disturbed habitats. Any changes occurring in the vegetation onsite would be the result of other natural or anthropogenic factors rather than Alternative A. No additional direct and/or indirect impacts on vegetation resources are expected to occur to as a result of the No Action Alternative.

#### *3.3.2.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System*

Construction and Operation

Adoption of Alternative B would result in the construction of a dewatering facility within the approximately 10-acre project footprint (see Limits of Disturbance boundary on Figure 3.3-1). Approximately 85 percent of this area is currently covered with non-vegetated soil used during the closure of the former chemical pond. This area does not contain intact native plant communities. The vegetation that does exist within the 10-acre project footprint consists of approximately 2 acres of low-quality, mixed evergreen-deciduous forest on the northwest corner of the project footprint and non-native weeds and early successional plants elsewhere that have no conservation value. The 2 acres of forest on the northwest corner would be cleared during construction. This community includes common species such as cottonwood, hackberry, eastern red cedar, black locust, chinquapin oak, bush honeysuckle, and persimmon. This wooded area does not include important plant species and is not connected to other vegetated areas. Given the small areas of common vegetation that would be lost, direct and indirect impacts on vegetation resources from Alternative B would not be significant.

#### *3.3.2.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream*

Construction and Operation

Because the Proposed Project boundary and footprint would be the same under Alternative C as Alternative B and the recirculation basin would be constructed in an area that currently is a gravel lot, impacts to vegetation under Alternative C would be the same as those described for Alternative B. Therefore, direct and indirect impacts on vegetation from Alternative C would not be significant.

## 3.4 Wildlife

### 3.4.1 Affected Environment

Habitats within the Project Area and the surrounding areas of the GAF reservation have been heavily impacted from years of construction, industrial activities, and traffic. The native wildlife

community has been permanently altered throughout the years. Much of the Project Area is either already devoid of natural vegetation (developed including office areas, laydown and steel yards, stockpile locations, flue gas desulfurization site) or consists of early successional habitats dominated by herbaceous vegetation (construction parking, transport routes, portions of landfill area, stockpile locations). However, a few small fragments of forest do exist within this heavily disturbed area, including approximately 2 acres within the project footprint that would be cleared. See Section 3.3 for a more detailed description of the various plant communities that provide habitat for wildlife on the GAF and within the 10-acre footprint of the proposed dewatering facility.

Early successional habitats within the Project Area (maintained lawns, fields, transmission rights-of-way, and roadway shoulders) are capable of supporting many common bird species, such as Canada goose, eastern meadowlark, European starling, killdeer, field sparrow, song sparrow, indigo bunting, wild turkey, red-winged blackbird, Carolina wren, and mourning dove. White-tailed deer, eastern cottontail, striped skunk, and rodents such as the white-footed mouse are also frequently associated with early successional habitats. Reptiles found in these habitats include northern black racer, black rat snake, and eastern gartersnake.

Mixed evergreen-deciduous forest fragments occur in the northwestern corner of the Project Area and around the Power House. Additional fragmented deciduous forest is present along the southern edge of the Project Area. These fragments provide poor quality habitat overall for terrestrial animals. Site surveys were conducted October 13 and 24, 2016, and focused on the biological resource survey area (Figure 3.3-1). Several common birds were observed in forested fragments, including the tufted titmouse, eastern towhee, northern cardinal, blue jay, American crow, American goldfinch, eastern phoebe, downy woodpecker, American robin, and Carolina chickadee. Mammals such as the eastern chipmunk and eastern gray squirrel were also observed in these forest types. Common amphibians and reptiles that may be found in this disturbed habitat include the eastern box turtle, copperhead, eastern fence lizard, and eastern gartersnake. Forested wetland habitat and a wet weather conveyance (WWC) (i.e., a depression that appears to be a stream during and after storm events, but does not have water in it at any other time) found within and adjacent to the Project Area provide minimal habitat for amphibians such as the northern cricket frog, upland chorus frog and dusky salamander.

Thirteen caves have been recorded within 3 miles of the proposed Project Area. The closest cave, Gallatin Fossil Plant Cave, occurs approximately 1,300 feet from the southern end of the GAF reservation, on the opposite side of the Cumberland River. The other caves are also located on the Cumberland River and are approximately 2 miles from the Project Area.

Two historical records of wading bird colonies occurred within 3 miles of the Project Area. Both were located along the Cumberland River on the west side of the reservation. The last survey of these heronries in 2000 confirmed there were no remaining nests at these locations. Osprey nests have been observed along the Cumberland River near the GAF in past years. No osprey nests were observed in or around the Project Area during the 2016 field surveys. No additional caves, heron colonies, or other unique habitats were observed during field investigations conducted in 2011 and 2012 (or more recently in 2016). The Project Area does not contain any designated critical habitat for federally protected species (U.S. Fish and Wildlife Service [USFWS] 2016).

Migratory Birds

The Fish and Wildlife Service database for endangered species and migratory birds in the Project Area indicated that 17 species of birds may use the ash impoundments, cooling

discharge channel, and upland habitat in the area. These include the bald eagle (*Haliaeetus leucocephalus),* black-billed cuckoo (*Coccyzus erythropthalmus)*, blue-winged warbler (*Vermivora pinus)*, Chuck-will's-widow (*Caprimulgus carolinensis),* dickcissel (*Spiza americana)*, fox sparrow (*Passerella iliaca)*, Kentucky warbler (*Oporornis formosus*) least bittern (*Ixobrychus exilis)*, loggerhead shrike (*Lanius ludovicianus),* prairie warbler (*Dendroica discolor)*, prothonotary warbler (*Protonotaria citrea)*, red-headed woodpecker (*Melanerpes erythrocephalus)*, rusty blackbird (*Euphagus carolinus),* sedge wren (*Cistothorus platensis)*, short-eared owl (*Asio flammeus)*, wood thrush (*Hylocichla mustelina)* and worm eating warbler (*Helmitheros vermivorum)* (USFWS 2016*)*. The majority of these birds would at most use the area on a temporary basis for migrating, wintering or breeding. Few are potential year-round residents. In addition, a variety of water fowl including the Canada goose (*Branta canadensis*), mallard duck (*Anas platyrhychos*), wood duck (*Aix sponsa*) and green-winged teal (*Anas crecca*) and shore birds utilize the open water areas of the discharge channel and near-by Cumberland River. A number of the birds listed as being of greatest or highest concern in Shorebirds of Conservation Concern in the US may utilize these ponds at times (U.S. Shorebird Conservation Plan Partnership 2016).

### 3.4.2 Environmental Consequences

#### *3.4.2.1 Alternative A – No Action*

Under the No Action Alternative, TVA would not construct the process dewatering facility. Soil and vegetation would remain in their current state, and tree clearing, earth moving, and construction would not occur in association with this project. The property would remain in its current condition with minor changes over time as needed. Thus, the GAF property would remain in its current state, which provides minimal habitat for wildlife. The wildlife communities present in and around the GAF reservation are common and representative of the region, and no additional direct and/or indirect impacts on terrestrial wildlife resources are expected to occur to as a result of the No Action Alternative.

#### *3.4.2.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System*

Construction and Operation

Wildlife habitat that could be altered by Alternative B is limited to very small areas. Alternative B would result in the displacement of wildlife species using the upland forested area in the northern portion of the project footprint which includes approximately 200 feet of WWC. The WWC would route storm water to the ditch adjacent to the coal conveyor line and into a storm water basin. Direct effects to some individuals may occur if those individuals are immobile during the time of habitat removal of this 2-acre woodland. This could be the case if activities took place during breeding/nesting seasons. Tree cutting during the period of August 15 to March 31 requires a mitigation multiplier of 1.0 for contributions to the Indiana Bat Conservation Fund (IBCF). During the period April 1 to August 15 tree cutting should be avoided; or a Site-specific evaluation should be conducted to determine presence/absence of bats; Habitat removal likely would disperse mobile wildlife into surrounding areas in an attempt to find new food and shelter sources and to re-establish territories, potentially resulting in added stress or energy use. In the event that the surrounding areas are already overpopulated, further stress could occur in those individuals presently utilizing these areas, as well as those attempting to relocate. Considering the small number of animals the forest fragments proposed for removal are likely to support and the large size of adjacent higher quality forest fragments, the addition of displaced individuals in adjacent areas is not likely to overpopulate these communities.

Under Alternative B, sluice water would no longer be added to the ash impoundments, which may result in the slow drying out of these ponds and loss of "habitat" for shore birds, wading birds and water fowl. However, with the large amount of shoreline and shallow water habitat in the adjacent Old Hickory Reservoir, these bird species would have ample habitat in the area for relocation. Wading birds or waterfowl that utilize the discharge channel would not be impacted as no modification of this area is proposed.

Given the limited extent and low quality of the wildlife habitats potentially lost under Alternative B and the few, common species that would be affected, this alternative is not expected to substantially impact wildlife populations in the Project Area; therefore, direct and indirect impacts on terrestrial wildlife from Alternative B would not be significant.

#### *3.4.2.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream*

Construction and Operation

Alternative C would be very similar to Alternative B; the location of the proposed basin constructed under Alternative C is currently a graded dirt area that was the former chemical pond and which provides no wildlife habitat. While the construction period would be somewhat longer for Alternative C (due to the construction of the recirculation system - Phase 2), there would be no substantial differences in impacts on wildlife between Alternatives B and C. Therefore, direct and indirect impacts on terrestrial wildlife from Alternative C would not be significant.

## 3.5 Aquatic Ecology

### 3.5.1 Affected Environment

The GAF facility is located within a large peninsula on Old Hickory Lake at Cumberland River mile (CRM) 241.5 to 246.0. The Cumberland River was altered from a free-flowing river to a reservoir due to impoundment by Old Hickory Dam, located 27 river miles downstream. Upstream of GAF, Old Hickory Lake extends 70 river miles to Cordell Hull Dam. The Project Area extends approximately 1 mile along the reservoir from the powerhouse and discharge channel north to the current location of the closed chemical-pond, where the proposed dewatering facility would be located. The discharge channel connects to the reservoir at approximately CRM 243.0.

The bottom ash and fly ash impoundments are located to the north of the Project Area, and the sluice trenches flow north through the Project Area. These ponds and the discharge channel support limited diversity of aquatic life (TVA 2013). An aquatic resource survey was conducted in September 2016. No streams have been identified within the Project Area (280 acres); thus, no potential aquatic life associated with these resources was identified. A wetland area borders the west side of the Project Area (Figure 3.9-1). This wetland covers approximately 4.6 acres and has developed as a result of construction of surrounding roads that encompass the area and affect drainage. A total of 0.67 acre of this wetland is included within the 280-acre Project Area (Figure 3.9-1). One storm water ditch is located to the north of the proposed dewatering facility location. A WWC is connected to the ditch from a small wooded area between the ditch and the former Chemical Pond (Figure 3.3-1). The WWC conveys storm water from the construction trailers to the storm water ditch. Storm water in this ditch flows north into the fly ash impoundment. The cooling water discharge channel is commonly visited by local fishermen on the reservoir, particularly in winter when the warm water of the discharge attracts fish.

Beginning in 2001, TVA began a fish community monitoring program in the Cumberland River downstream (CRM 239 to CRM 240.6) and upstream (CRM 248.4 to CRM249.9) of the GAF discharge in order to verify that a Balanced Indigenous Population of aquatic life was being maintained. Fish community monitoring was conducted during 2001, 2002, 2003, 2005, 2007, 2008, 2010, 2011, 2012, 2013, and 2014, and the data are shown in Table 3.5-1 (TVA 2016c). Over the 11 sampling years, the average Reservoir Fish Assemblage Index (RFAI) scores at the location just downstream of the GAF discharge and at the reference location upstream of GAF were identical, and differences between the scores for each location was six points or less each sample year, with the downstream location scoring higher than or within two points of the upstream location in eight of 11 years. The table footnotes identify the condition of the fish community based on five ratings associated with ranges of the RFAI numerical scores. The condition of the fish community downstream of GAF has been rated as fair to good in each of the years it was evaluated, with an average rating of fair based on an average score of 40. The condition of the fish community upstream of GAF also has been rated as fair to good in each of the years it was evaluated, with an average rating of good based on an average score of 41. Thus, the difference in fish community ratings upstream and downstream of GAF is minimal and does not indicate that the fish community has been adversely affected by the long-term operation of GAF.

Similar to the fish community monitoring program, the benthic macroinvertebrate community is monitored at two upstream and two downstream locations in the Cumberland River. Benthic macroinvertebrate monitoring was conducted during 2010, 2011, 2012, 2013, and 2014, and the data are shown in Table 3.5-2 (TVA 2016c). The table footnotes identify the condition of the benthic macroinvertebrate community based on five ratings associated with ranges of the

Reservoir Benthic Index scores. Recent benthic macroinvertebrate data indicated healthy benthic communities downstream and upstream of GAF, with the downstream locations consistently scoring higher than the upstream locations and rated as excellent the last two years. Thus, the benthic community ratings upstream and downstream of GAF do not indicate that the benthic macroinvertebrate community has been adversely affected by the operation of GAF. Neither fish nor benthic macroinvertebrate data indicate adverse impacts from GAF to the aquatic community downstream of the GAF discharge (TVA 2013 and 2016c).

**Table 3.5-1. GAF Reservoir Fisheries Index Scores**

| Station | 2001 | 2002 | 2003 | 2005 | 2007 | 2008 | 2010 | 2011 | 2012 | 2013 | 2014 | AVG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Downstream of GAF CRM 240 | 39 | 37 | 41 | 43 | 40 | 40 | 43 | 41 | 39 | 40 | 40 | 40 |
| Upstream of GAF CRM 249 | 37 | 33 | 44 | 38 | 46 | 41 | 47 | 42 | 41 | 37 | 41 | 41 |

RFAI Score Range: 12-21 (Very Poor), 22-31 (Poor), 32-40 (Fair), 41-50 (Good), or 51-60 (Excellent).
Source: TVA 2013 and TVA 2016c

**Table 3.5-2. GAF Reservoir Benthic Macroinvertebrate Community Scores**

| Station | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| Upstream CRM 250.2 | 23 | 27* | 23 (1) | 29 (1) | 27 (1) |
| Upstream CRM 248.7 | NS | 27* | 21 (1) | 23 (1) | 27 (1) |
| Downstream CRM 242.0 | NS | 31 | 29 | 31 | 31 |
| Downstream CRM 239.3 | 27 | 29 | 27 | 31 | 33 |

Reservoir Benthic Index Scores: 7-12 (“Very Poor”),13-18 (“Poor”), 19-23 (“Fair”), 24-29 (“Good”), 30-35 (“Excellent”).
NS = no sample
Source: TVA 2013 and TVA 2016c
(1) Scoring is based on 10 samples for each downstream site and 5 samples for each upstream site, with the exception of 10 samples for upstream site CRM 250.2 in 2010.

## 3.5.2 Environmental Consequences

### *3.5.2.1 Alternative A – No Action*

Under the No Action Alternative, TVA would not construct the process dewatering facility. GAF wastewater discharges would continue to meet NPDES permit requirements protective of water quality and aquatic life in the reservoir. Monitoring has not identified impacts to the fish or benthic macroinvertebrate communities as a result of these discharges. Project-related effects on aquatic resources in the Project Area would not change, and aquatic organisms and their habitats would continue to not be significantly impacted under Alternative A.

#### *3.5.2.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System*

Construction and Operation

Under Alternative B, direct impacts from construction on aquatic resources would be minimal. The 0.67-acre portion of wetland W-1 which falls within the Project Area (Figure 3.9-1) is located in an area that is not proposed to be impacted by the construction of the dewatering facility (Figure 1.1-3). One storm water ditch is located to the north of the proposed dewatering facility location. The grading plan indicates that this ditch will be crossed by a new access road. Storm water in this ditch flows to the north into the fly ash impoundment. A culvert under the road will allow storm water flow to continue through the ditch. Thus, this man-made feature, which provides minimal aquatic habitat, would not be affected except in the small area where the culvert would be installed for the new access road. The discharge channel and its fishery would not be affected by the proposed dewatering system.

Under Alternative B, dewatering would reduce metals in the water discharged to the reservoir. Metals concentrations in the discharge meet NPDES permit limits for protection of aquatic life under current conditions and would continue to do so under this alternative. The higher water quality discharged into the reservoir under this alternative could further reduce any potential for effects on aquatic organisms from the discharge. Therefore, beneficial effects on fish and mussels, as well as other invertebrate fauna, in the reservoir would be anticipated. Discharges would continue to take place through a permitted outfall. Given the improvements in the quality of the water discharged under Alternative B, this alternative is not expected to adversely impact the community of aquatic organisms in the river in the vicinity of the GAF. Therefore, direct and indirect impacts on aquatic ecology from Alternative B would be minor but beneficial.

#### *3.5.2.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream*

Construction and Operation

Under Alternative C, the discharge of water from the bottom ash impoundments would be discontinued as sluice water would be recycled in the dewatering facility. The only discharge from the dewatering area would be storm water through a permitted outfall. The addition of a recirculation system is not anticipated to result in impacts to aquatic ecology because the water would be plant process water or excess rainwater, and all clarified water would meet the NPDES permit limits. All other impacts would be the same as described in Alternative B, resulting in potential minor beneficial direct and indirect impacts to aquatic ecology by the reduction of discharge from the facility.

## 3.6 Threatened and Endangered Species

### 3.6.1 Affected Environment

The Endangered Species Act (ESA) provides protection for species of animals and plants that are listed as threatened or endangered in the United States or elsewhere, and specifically outlines procedures (Section 7[a]2) for federal agencies to follow when taking actions that may jeopardize federally listed species or destruction/adverse modification of their designated critical habitat. Additionally, Section 7(a)1 of the ESA states that federal agencies must seek to conserve endangered and threatened species and use their authorities to further the purposes of the Act. The Project Area includes primarily disturbed land, and industrial operating facilities.

Small wooded areas and an initial stilling pond (Lower Pond) are located on the north end of the Project Area, and the discharge channel for the cooling towers is located on the south end of the Project Area. A team of biologists reviewed the Project Area on October 13 and 24, 2016 (AECOM 2016).

Data from the TVA Regional Natural Heritage Database (TVA 2016d) for aquatic species indicated that one federally listed endangered species (the pink mucket mussel) and nine state-listed fish species are known to occur within a 10-mile radius of GAF in Sumner County and/or Wilson County (Table 3.6-1). No federally designated critical habitat segments are present within the Project Area. Of the species listed in Table 3.6-1, only the pink mucket mussel and lake sturgeon are likely to occur in the Cumberland River adjacent to GAF. None of the aquatic species are known to occur or are likely to occur in intermittent streams or ponds within the Project Area or within the 10-acre LOD area (Figure 3.3-1).

The TVA Natural Heritage database also indicated five federally listed mammal species (gray bat, Indiana bat, northern long-eared bat, southeastern shrew, and the Allegheny woodrat) have recorded occurrences within 5-miles of the Project Area (Table 3.6-1). Thus, potential for impacts to these species or their habitat are evaluated in this document.

The bald eagle, which has a state status of Deemed in Need of Management (D), is identified in the TVA database as having two nests documented within 35 miles of the Project Area. The nearest recorded bald eagle nest is located at GAF along a discharge channel on the eastern side of the reservation, greater than 660 feet from the proposed dewatering facility. Vegetation visibly separates this nest from the proposed dewatering facility site. The second nest is located approximately 2 miles from the Project Area.

Three threatened or endangered plant species are known to occur within 5 miles of the GAF, two of which were documented south of the Cumberland River in Wilson County.

Only seven threatened or endangered species are listed in Sumner County on the TDEC Natural Heritage Database. Three of these species correspond to the TVA database within a 5-mile radius (gray bat, lake sturgeon and leafy prairie-clover) while the other four (northern pine snake, least trillium, butternut, and giant blue cohosh) are not documented within a 5-mile radius of GAF.

The USFWS Environmental Conservation Online System (Information for Planning and Conservation [IPaC]) was reviewed in October 2016 (USFWS 2016). The IPaC resource report for the area of GAF indicated that several federally listed species potentially may occur in the area. These include three threatened or endangered mammals: the gray bat, Indiana bat, and northern long-eared bat, and two endangered plants, leafy prairie-clover and Spring Creek bladderpod. The IPaC report also identified 17 birds of conservation concern which may occur in the area or could potentially be affected by activities in this location, including the bald eagle (*Haliaeetus leucocephalus*) which is also identified in the TVA Heritage Database as having been observed in Sumner County (see Section 3.4 for discussion of impacts to other migratory bird species).

One of the federally listed plants, Spring Creek bladderpod, is known to occur within 5 miles of GAF; however, it has only been found in Wilson County south of the Cumberland River from GAF. Records of the federally listed endangered species leafy prairie clover are reported from Sumner County, but not within 5 miles of GAF. Water stitchwort has been recorded south of the Cumberland River in Wilson County and not in Sumner County. No endangered, threatened, or

rare plants or habitats to support them were observed during the site visit. No critical habitat was reported in the IPaC report (Appendix C) for the Project Area.

**Table 3.6-1. Terrestrial Species of Conservation Concern within 5 Miles of GAF, Aquatic Species within 10 Miles, and Federally Listed Species from Sumner County, Tennessee**

| Common Name | Scientific Name | Status [1] | |
|---|---|---|---|
| | | Federal | State (Rank) [2] |
| **Birds** | | | |
| Bald eagle | *Haliaeetus leucocephalus* | -- | D(S3) |
| **Mammals** | | | |
| Gray bat | *Myotis grisescens* | LE | E(S2) |
| Indiana bat [3] | *Myotis sodalis* | LE | E(S1) |
| Northern long-eared bat [4] | *Myotis septentrionalis* | LT | (S1S2) |
| Allegheny wood rat | *Neotoma magister* | -- | D(S3) |
| Southeastern shrew | *Sorex longirostris* | -- | D(S4) |
| **Fishes** | | | |
| Bedrock Shiner | *Notropis rupestris* | -- | D(S2) |
| Blackfin Sucker | *Thoburnia atripinnis* | -- | D(S2) |
| Flame Chub | *Hermitremia flammea* | -- | D(S3) |
| Frecklebelly Darter | *Percinia stictogaster* | -- | D(S1) |
| Lake Sturgeon [5] | *Acipenser fulvescens* | -- | E(S1) |
| Orangefin Darter | *Etheostoma bellum* | -- | D(S3) |
| Slenderhead Darter | *Percina phoxocephala* | -- | D(S3) |
| Splendid Darter | *Etheostoma barrenese* | -- | D(S3) |
| Teardrop Darter | *Etheostoma barbouri* | -- | D(S2) |
| **Mussels** | | | |
| Pink Mucket | *Lampsilis abrupta* | LE | E(S2) |
| **Plants** | | | |
| Leafy Prairie-clover | *Dalea foliosa* | LE | E(S2S3) |
| Spring Creek Bladderpod | *Lesquerella perforata* | LE | E(S1) |
| Water Stitchwort | *Stellaria fontinalis* | - | SC(S3) |

*Source*: TVA 2016d and TDEC 2016a

(1) Status Codes: E = Endangered; LE = Listed Endangered; LT = Listed Threatened; SC = Special Concern; D = Deemed In Need of Management; T = Threatened

(2) Status Ranks: S1 = Extremely rare and critically imperiled; S2 = Very rare and imperiled; S3 = Vulnerable; S4 = Apparently secure, but with cause for long-term concern; S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2)

(3) Federally endangered species that is not yet known from Sumner County, Tennessee, but is thought to occur statewide.

(4) Federally threatened species that is not yet known from Sumner County, Tennessee, but is thought to occur statewide.

(5) Lake Sturgeon were stocked in the Cumberland River in 2009 by Tennessee Wildlife Resources Agency.

#### *3.6.1.1 Species Descriptions*

The following are descriptions of plant Species of Conservation Concern within 5 miles of GAF and federally listed species from Sumner County. However, because it was determined that the

Project would have no impact (Section 3.5) on aquatic ecology, fishes, and mussels are not described in further detail.

#### 3.6.1.1.1 Birds

The bald eagle is no longer listed under the Endangered Species Act but is protected under the Bald and Golden Eagle Protection Act. It has a state status of Deemed in Need of Management (D). This species is associated with larger mature trees capable of supporting its massive nests. These nests are usually found near larger waterways over which bald eagles forage. The Cumberland River provides suitable foraging habitat. Two bald eagle nests have been documented within 3 miles of the Project Area. The nearest recorded bald eagle nest is located at GAF along a discharge channel on the eastern side of the reservation. Upon last survey in 2012, only remnants of this nest remained. No new bald eagle nesting location has been reported on GAF.

#### 3.6.1.1.2 Mammals

The primary range for the gray bat is concentrated in the cave regions of Alabama, Arkansas, Kentucky, Missouri, and Tennessee (USFWS 2009). Gray bats roost in caves year-round and migrate between summer and winter roosts during spring and fall and foraging over waterways (Brady et al. 1982, Tuttle 1976). The gray bat has been documented in Sumner County. However, the nearest gray bat recorded is from a cave, located in Wilson County approximately 1,300 feet across the Cumberland River from the southern portion of the GAF reservation. This cave has been monitored since 1976, with estimated bat numbers ranging from 0 to 17,000 per survey. The most recent survey was conducted in the summer of 2013 and found an estimate of around 17,000 bats (the most since monitoring began). No caves have been documented on the Project Area, and none were encountered during field investigations. Foraging habitat is available in the stilling ponds, drainage canals, and cooling channel in and adjacent to the Project Area, as well as along the Cumberland River, which surrounds the TVA GAF Reservation.

Indiana bats hibernate in caves in winter and use areas around them for swarming (mating) in the fall and staging in the spring, prior to migration back to summer habitat. During the summer, Indiana bats roost under the exfoliating bark of dead snags and living trees in mature forests with an open understory and a nearby source of water (Pruitt and TeWinkel 2007; Kurta et. al. 2002). Indiana bats are known to change roost trees frequently throughout the season while still maintaining site fidelity, returning to the same summer roosting areas in subsequent years (Pruitt and TeWinkel 2007). Although less common, Indiana bats have also been documented roosting in buildings. No caves or other winter roosting habitat are known to occur within the Project Area.

Indiana bat habitat surveys were performed by AECOM on October 24, 2016 in the forested areas proposed for tree clearing within the Project Area (see Areas 1 and 2 on Figure 3.3-1). Surveys followed protocols outlined in the 2016 Range-wide Indiana Bat Summer Survey Guidelines. No suitable summer roosting habitat for Indiana bats was observed in the Project Area. Forest fragments were typically comprised of black cherry, chinquapin oak, common persimmon, eastern cottonwood, eastern red cedar, hackberry, loblolly pine, locust, northern red oak, sweetgum, white ash, and winged elm (AECOM 2016).

Acoustic surveys performed for the Indiana bat on the GAF in June and August of 2012 recorded a total of two calls identified as Indiana bat using MORENET. The location of these detections was over the ash impoundment, suggesting any bats detected were traveling over

the pond, potentially using the pond as foraging habitat. Additional foraging habitat occurs over drainage channels, cooling channels, the Cumberland River, and forested habitat within the Project Area. Overall forested habitat across the GAF provides little to no quality summer roosting habitat for the Indiana bat.

The northern long-eared bat (NLEB) roosts in caves or cave-like structures (such as buildings and mines) in winter, while summer roosts are typically in cave-like structures as well as live and dead trees with exfoliating bark and crevices. NLEB tend to forage within the midstory and canopy of upland forests on hillsides and ridges (USFWS 2013). White-nose syndrome is by far the biggest threat to this species along with habitat loss and changing climate. No caves or other winter roosting habitat are known to occur within the Project Area.

NLEB habitat surveys were performed by AECOM on October 24, 2016 in the forested areas proposed for tree clearing within the Project Area (see Areas 1 and 2 on Figure 3.3-1). Surveys followed protocols outlined in the 2016 Range-wide Indiana Bat Summer Survey Guidelines. No suitable summer roosting habitat for NLEB was observed in the Project Area. Overall forested habitat across the GAF provides little to no quality summer roosting habitat for NLEB.

The Allegheny woodrat, though solitary and territorial, most often occur in clusters due to the patchiness of the rock outcrop, talus, and cave habitats it prefers. Its home range is are small, 0.26 to 0.6 hectare; usually less than about 90 meters across. Foraging movements, while often focused within rock habitat, may extend beyond the protection of rocks up to 160 meters from the den site. Den shifts tend be less than 100 meters with a median of 40 meters, and woodrats, particularly females, often live their entire lives in the same outcrop (NatureServe 2016a). Rock outcrops, cave habitat or similar habitat were not observed in the Project Area during biological surveys in October 2016.

The southeastern shrew utilizes various habitats ranging from bogs and damp woods to upland shrubby or wooded areas. It prefers moist to wet areas, usually bordering swamps, marshes, or rivers, and most often associated with heavy ground cover. It generally resides underground or beneath ground covers. The southeastern shrew might respond favorably to disturbances that allow dense ground cover to thrive (NatureServe 2016b). Bogs and damp woods were not observed during the site visit in October 2016. Shrubby and wooded areas were noted in two small areas on the north and east side of the LOD footprint; however, this land was very rocky and dry with shallow soils and not well suited for a burrowing animal that must feed constantly on invertebrates.

#### 3.6.1.1.3 Plants

There are numerous known occurrences of the leafy prairie-clover recorded, most of which are in Tennessee and most are of which are of poor or very poor quality (TVA 2016d). Continuing land use change due to commercial and industrial development, overgrazing, and lack of fire are a few of the reasons the species as a whole is highly threatened. Loss of habitat, propagated by land use change and exotic species, is particularly rapid in the Central Basin of Tennessee, especially so in Davidson, Rutherford, and Wilson counties (NatureServe 2016c).

The range of the Spring Creek bladderpod consists of only four populations. TVA Natural Heritage Database has 24 extant occurrences of this species in Wilson County (TVA 2016d). There are no current records of the species in Sumner County, Tennessee. The Spring Creek bladderpod is disturbance-adapted; however, herbicides, and other industrial development adversely affect the habitat (NatureServe 2016d).

### 3.6.2 Environmental Consequences

#### *3.6.2.1 Alternative A – No Action*

Under the No Action Alternative, TVA would not construct the process dewatering facility. Soil and vegetation would remain in their current state and tree clearing, earth moving, and building demolition and construction would not occur in association with this project. No impacts to threatened or endangered plant or animal species would occur as a result of the No Action Alternative.

#### *3.6.2.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System*

Construction and Operation

Under Alternative B, TVA would design and construct a new facility that would dewater the GAF bottom ash to create dry products for disposal in an approved onsite landfill. The current stilling pond would no longer receive ash slurry inputs from the plant because the stream feeding the ponds would be pumped into the new dewatering facility to be dewatered, and the dry product would be extracted. The proposed project would result in the removal of two small vegetated areas on the northeast side of the Project Area. These small areas would be cleared to connect the sluice pipes to the dewatering facility. The areas were reviewed October 24, 2016 by biologists and comprise a total area of approximately 2 acres. The vegetation within these areas consisted primarily of eastern red cedar, eastern cottonwood, hackberry, honey locust and chinquapin oak. None of the trees were dead or dying or exhibiting exfoliated/flaking bark suitable for bat habitat.

One federally listed animal species (gray bat) has recorded occurrences within 5 miles of the Project Area. No caves or other hibernacula for gray bat, Indiana bat, or NLEB exist in the Project Area or would be impacted by the project. No suitable summer roosting habitat was observed during bat habitat assessments of the forested fragments to be removed. Low-quality foraging habitat exists for all three species of bats in open water areas around the Project Area, including the discharge channel and ash impoundments. Proposed activities would not impact these open water areas, but would eventually contribute to the drying of the ash impoundments at GAF. The forest fragment found within the Project Area also may offer a small amount of low quality foraging habitat for the Indiana bat and NLEB; however, an abundance of higher quality foraging habitat exists in the surrounding landscape over the larger forested and open areas and the reservoir. Therefore, implementation of Alternative B is not expected to impact gray bat, Indiana bat, or NLEB.

Suitable foraging habitat exists adjacent to the project site for the bald eagle; however, this habitat will not be impacted by Alternative B. Habitat for the Allegheny woodrat and southeastern shrew is not present on the proposed Project Site. Bald eagle, Allegheny woodrat and southeastern shrew would not be impacted by the Proposed Action.

One federally listed plant species (Spring Creek bladderpod) has recorded occurrences within 5 miles of the Project Area. Previous construction, operation, and maintenance activities on GAF have resulted in significant disturbance that makes habitats on this parcel unsuitable for threatened or endangered plant species. Adoption of this alternative would result in some additional disturbance on the GAF site, but the project would not affect federal or state-listed plants because those species are not present within proposed Project Area (TVA 2013).

Suitable habitat for federally listed aquatic species is not provided within the water bodies documented within the Project Area but may be provided by Old Hickory Lake on the Cumberland River. As discussed in Subsection 3.5.2.2, dewatering under Alternative B would improve the quality of the water discharged to the reservoir. Although biological monitoring data (TVA 2016c) do not indicate that aquatic organisms, including listed species, are being impacted by the existing facility discharge, the higher water quality discharged into the reservoir under this alternative could further reduce any potential for effects on aquatic organisms from the discharge. Therefore, beneficial effects on listed aquatic species, such as the pink mucket and lake sturgeon, would be expected if these species occur in the reservoir.

No significant direct and indirect impacts on federally or state-listed terrestrial species would occur under Alternative B. With the potential for water quality improvements in Old Hickory Lake under this alternative, there could be minor beneficial effects on listed aquatic species if present in the reservoir.

#### *3.6.2.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream*

Construction and Operation

Impacts to threatened and endangered species under Alternative C would be similar to those described for Alternative B. No significant direct and indirect impacts on federally or state-listed terrestrial species would occur under Alternative C. In addition, as discussed under Alternative B, there would be the potential for water quality improvements in Old Hickory Lake under Alternative C that could be beneficial for listed aquatic species, if present in the reservoir.

## 3.7 Surface Water and Wastewater

### 3.7.1 Affected Environment

GAF is located on the northern side of a bend in the Cumberland River between Cumberland River mile (CRM) 240 and 246. The main plant area is drained by permitted storm water outfalls, WWCs, intermittent streams, the condenser cooling water discharge (Outfall 002), and the intake screen backwash (Outfall 004) along with process and storm water discharges from the ash impoundment system (Outfall 001).

This portion of the Cumberland River is impounded by Old Hickory Dam (owned and operated by the U.S. Army Corps of Engineers [USACE]) at approximately CRM 216.2. Stream flow varies with rainfall and averages about 21 inches of runoff per year. This equates to approximately 1.5 cubic feet per second (cfs) per square mile of drainage area. Pool elevations (feet above sea level) for CRM 242.5 are:

- Normal Minimum: 442.00
- Normal High: 445.00
- 10 Year Storm: 451.50
- 25 Year Storm: 451.80
- 50 Year Storm: 452.20
- 100 Year Storm: 452.60

Old Hickory Lake is a mainstream storage impoundment on the Cumberland River operated by the USACE. The reservoir contains 22,500 surface acres at an elevation of 445 feet (above sea level) and extends 97.3 river miles. Water level fluctuations are minimal with minimum pool elevation at 442 feet (USACE 2012a).

The surface area and volume of the reservoir at normal minimum and high pool elevations are 19,550 and 22,500 acres, respectively; and 357,000 and 420,000 acre-feet, respectively.

For the period 1957 through 2005, the annual mean flow at Old Hickory Dam was 19,110 cfs, the lowest daily mean was 200 cfs (Nov. 3, 1957); the annual 7-day minimum was 1,070 cfs (Oct. 28, 1969), and 90% of the time flow exceeded 5,390 cfs. During 2005, the mean flow was 20,440 cfs and the lowest daily mean flow was 4,270 cfs (USGS 2005).

The USACE maintains water quality monitoring locations above and below GAF at CRMs 245.0 and 241.0, respectively. Parameters monitored are mostly related to eutrophic conditions (dissolved oxygen, temperature, pH, and nutrients), but some data is available for a comprehensive list of parameters, including major and minor ions and trace metals. The Cumberland River and its tributaries generally exhibit moderate to high concentrations of calcium and magnesium and a slightly alkaline pH because much of the basin is comprised of limestone and dolomitic bedrock. Total dissolved solids concentrations, a measure of all salts in solution, range from 94 to 173 milligrams per liter (mg/L) in the data retrieved from the USACE monitoring stations between June of 2012 and September of 2015. The metals concentrations at both station locations above and below the GAF facility were evaluated and were found to display concentrations below the TDEC water quality criteria (WQC), except for thallium, cadmium and one lead reading (upstream of the facility). The thallium and cadmium exception (found at both upstream and downstream locations) are an artifact produced by the method of treating censored data (i.e., values below detection limits set equal to one-half detection limit), and the fact that the thallium and cadmium detection laboratory limits of 0.0005 milligrams per liter (mg/L) exceed the TDEC criterion. These results, however, are due to limitations in testing methods and do not represent true impacts to water quality due to thallium and cadmium concentrations. The one iron concentration that was higher than the WQC was upstream in 2012 and was not assumed to be site related. Note that when WQC were based on dissolved metals concentrations, only the dissolved concentration data set was evaluated (USACE 2012-2015).

Generally, the mainstream Cumberland River exhibits lower suspended solids concentrations than its tributaries. The lower Cumberland watershed tributaries, west of Nashville, are characterized by higher suspended solids concentrations ranging from 300 to 2,000 mg/L. The higher values in the lower Cumberland watershed tributaries are caused in part by differences in soils and rock formation. The Mississippian materials of the lower watershed are generally more erosion-prone than the Ordovician materials of the upper watershed. Topography and land usage also influence the erodibility of the lower Cumberland tributary valleys (TVA 1995).

The Cumberland River from CRM 216.2 to 309.2 (Caney Fork River) is classified by TDEC (TDEC 2013) for the following uses:

- Domestic Water Supply
- Industrial Water Supply
- Fish and Aquatic Life

- Recreation
- Livestock Watering and Wildlife
- Irrigation Livestock Watering and Wildlife
- Navigation
- Trout Stream

Specific standards are established for each of these uses with the most stringent associated with domestic water supply and fish and aquatic life. TDEC assesses the status of the streams, rivers, and lakes annually. The project area drains to the Cumberland River (at Old Hickory Reservoir) and its tributaries. To provide a baseline for the proposed project's impacts, both upstream and downstream existing conditions are noted below.

Upstream tributaries of the project site include Bledsoe Creek and its tributaries. All of the off-site streams upstream of the project are classified for fish and aquatic life, recreation, livestock watering, and irrigation. However, portions of Bledsoe Creek in Bledsoe Creek State Park, Old Hickory Wildlife Management Area (WMA), and Cragfront State Historic Area are also designated by the state as exceptional Tennessee Waters (TDEC 2016b). One unnamed tributary to Old Hickory Reservoir in Sumner County is on the TDEC Draft 2016 303(d) list as impaired (i.e., not fully supporting its designated uses) due to loss of biological integrity because of siltation and nutrients from discharges from a municipal separate storm sewer system ("MS4") area (TDEC 2016c). Brunley Branch is also listed as impaired for loss of biological integrity because of siltation and alteration of stream-side or littoral vegetation due to pasture grazing. However, the upstream main stem of the Old Hickory Lake/Cumberland River is considered to be fully supporting its designated uses.

Downstream of the project area there are several streams that are listed as impaired including: Rankin Branch of Station Camp Creek, which is listed for impairments including alteration of stream-side or littoral vegetation, total phosphorus, and E coli due to pasture grazing, channelization, and discharges from a MS4 area; Town Creek is listed for impairments due to loss of biological integrity due to siltation and other anthropogenic habitat alternations caused by discharges from MS4 area and hydromodification; and Dry Fork Branch of Spencer Creek which is listed for loss of biological integrity due to siltation and alteration of stream-side or littoral vegetation due to pasture grazing. Additionally, a biological advisory has been listed for the Cumberland River/Cheatham Lake from Mile 185.7 to 190.6 in the Metro Nashville area, far downstream from the current proposed project site. This advisory is primarily due to discharges from municipal separate storm water sewer system (TDEC 2016d).

*Existing Wastewaters*

There are several existing wastewater streams at GAF permitted under NPDES Number TN0005428 (TDEC 2012a). The streams that could be potentially impacted by the proposed actions are the bottom ash sluice, coal yard drainage ditch, and the ash impoundment discharge.

Because the ash impoundment discharge (Outfall 001) and the condenser cooling water discharge channel (Outfall 002) are the primary off-site discharge streams potentially affected by the proposed actions, they will be the focus of discussion. About 19.626 MGD is discharged from the ash impoundment through NPDES Outfall 001. Outfall 001 discharges to CRM 240.5. The pH of the ash impoundment discharge generally ranges from 6.9 to 9.0. The current

NPDES Permit contains limitations on the ash impoundment discharge for pH, oil and grease, total suspended solids (TSS) and toxicity. This permit also requires reporting of sixteen metals including aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, selenium, iron, mercury, manganese, nickel, silver, cyanide and thallium.

Approximately 895 MGD is discharged from the condenser cooling water discharge channel through NPDES Outfall 002. Outfall 002 discharges to CRM 242.5. The plant's permitted discharges into this stream are once-through cooling water, auxiliary cooling water, and storm water runoff. The current NPDES Permit contains limitations on the condenser cooling water discharge for temperature, total residual oxidants (TRO), and toxicity. TRO and toxicity are only monitored when oxidants are added to the waste stream. This permit also requires reporting of flow, intake temperature and time of chlorination.

Existing Coal Combustion Residue (CCR) Solid and Wastewater Streams

As described below, an onsite wastewater treatment complex receives and treats wastewater effluents, and consists of a series of treatment impoundments which provides treatment to settle out fine particles, provide pH control, provide ammonia uptake and other treatment prior to waters being discharged from Outfall 001. An approved onsite landfill receives dry-handled byproducts.

*Fly Ash and Dry Flue Gas Desulfurization*

GAF currently burns 100 percent PRB coal. GAF burns between 3.5 and 4.4 million tons of coal annually. This coal averages 5.5 percent ash; therefore, total ash production ranges from approximately 192,500 to 242,000 tons of ash per year. The ash is collected as either fly ash, which is fine enough and light enough to be carried with the flue gas stream exiting the boiler, or as bottom ash, which is coarser and heavier and falls to the bottom of the boiler.

The fly ash/bottom ash split is approximately 80 percent fly ash and 20 percent bottom ash by weight. Fly ash production is expected to range from approximately 154,000 to 193,600 tons per year. Currently all fly ash is mixed together with dry flue gas desulfurization (DFGD) byproduct process and the dry commingled DFGD/ash waste is collected in a baghouse and transported to an approved onsite landfill. The DFGD byproduct/ash waste is permitted to range between 364,000 and 987,000 tons per a year. Currently bottom ash is wet-sluiced to the ash impoundment complex.

There is a potential that GAF could change fuels to burn a higher sulfur blend. The fuel blend expected to produce the most CCRs would be a 50/50 blend of PRB and ILB coal. With this blend the coal could average 7 percent ash; therefore, total ash production would average approximately 245,000 to 308,000 tons of ash per year. Fly ash production would be expected to average approximately 196,000 to 246,400 tons per year. Such a change in fuels blends would not impact GAF's ability to meet its permit limits.

*Dry Flue Gas Desulfurization*

The DFGD systems are primarily dry systems, except for the use of conditioning water via injection nozzles that require cleaning out several times daily. This system mixes together the fly ash and DFGD solid CCR waste stream together in a baghouse. The nozzle wash out could contain ash, hydrated lime, calcium sulfite, and calcium sulfate. Additionally, other miscellaneous wastewater streams would include sumps, drains, and DFGD wash. The volume of water from this process is a relatively low flow stream with approximately 0.0981 MGD which is routed to the coal yard drainage ditch and then to the ash impoundment complex for

discharge through Outfall 001. Storm water flows from the area are estimated to be 0.0391 MGD.

*Bottom Ash*

Bottom ash collects in the bottom of the boiler and is washed from the boiler bottoms with jets of water and is sluiced to a bottom ash impoundment, which is part of the ash impoundment complex. Bottom ash is currently managed in the ash impoundment complex until closure. Bottom ash production currently can range from 38,500 to 48,400 tons per year. Bottom Ash production could change to 49,000 to 61,600 tons per year with the 50/50 PRB/ILB blend.

### 3.7.2 Environmental Consequences

#### *3.7.2.1 Alternative A – No Action*

Under the No Action Alternative, TVA would not construct the proposed dewatering facility and the bottom ash sluice would continue to be handled in accordance with the NPDES permit. Thus, continued operations at GAF under the No Action Alternative would not be expected to cause any additional direct or indirect effects to local surface water resources and therefore, would not change existing conditions.

#### *3.7.2.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System*

*Surface Water Withdrawal and Discharge Rates*

Withdrawal and discharge rates would not change with the implementation of Alternative B. The discharge characteristics (including thermal loading) at Outfall 002 would not be changed by the current project. Thermal discharges from Outfall 001 would also not change. Raw and potable waters utilized in the bottom ash dewatering process and storm water flows associated with this project would remain at ambient temperatures; therefore, no additional thermal impacts would be anticipated. Additionally, the discharge rate from this outfall would remain unchanged.

TVA would maintain wet surface impoundments onsite as required to support GAF's operations and continued management of wastewater streams. However, this treatment system would potentially be altered in the future in preparation for compliance with the CCR rule. This change would potentially include the closure of the majority of the pond complex and the creation of an approved lined EQ basin, but would treat the same flows. This system change would be detailed and impacts assessed in a subsequent NEPA evaluation. When surface impoundments are closed, the closure would be regulated either by the NPDES permit and/or a closure plan.

*Bottom Ash Dewatering Streams*

The wastewater streams that could change under this alternative would be:

- Bottom ash sluice waste stream
- Surface runoff from the proposed bottom ash dewatering facility area
- Discharges from Outfall 001
- Outage washes associated with plant activities and the bottom ash dewatering facility

*Construction Impacts*

Wastewaters generated during construction of the proposed project may include construction storm water runoff, dewatering of work areas, domestic sewage, non-detergent equipment washings, dust control water, and hydrostatic test discharges.

**Surface Runoff:** Demolition and construction activities have the potential to temporarily affect surface water via storm water runoff. TVA would comply with appropriate state and federal regulatory permit requirements. Demolition and construction activities of the associated project would be located on the plant property. Appropriate best management practices (BMPs) would be followed, and proposed project activities would be conducted in a manner to ensure that waste materials are contained, and the introduction of pollutants to the receiving waters would be minimized. A General Permit for Storm Water Discharges Associated with Construction Activities (TDEC 2016e) would be required for this project. This permit requires development of a project-specific SWPPP. This plan would identify specific BMPs to address construction-related activities that would be adopted to minimize storm water impacts. Additionally, BMPs, as described in *the Tennessee Erosion and Sediment Control Handbook* (TDEC 2012b), would be used to avoid contamination of surface water in the Project Area. Where soil disturbance could occur, the area would be stabilized and vegetated with noninvasive grasses and mulched, as described in the above-mentioned handbook (TDEC 2012b). BMPs or equivalent measures would be used to avoid contamination of surface water in the Project Area. Therefore, no significant impacts to surface water would be expected due to surface water runoff from the construction site. Additionally, because this project would not take place in "Waters of the United States" or "Waters of the State of Tennessee" or in regulated adjacent waters, no water quality certification or USACE permit would be required.

Impervious buildings and infrastructure prevent rain from percolating through the soil and result in additional runoff of water and pollutants into storm drains, ditches, and streams. Existing structures and infrastructure would be removed from the project site; however, they would be replaced with the covered dewatering facility and would alter the current storm water flows. Because the site is currently industrialized and partially covered with impervious structures, this construction would increase the impervious surface area, but not significantly. Under the preferred alternative, the concentrated storm water flow from the Project Area would come primarily from the proposed facility's roof drains. This flow would need to be treated with either implementation of the proper BMPs or by diverting the storm water discharges to the ash impoundment system for co-treatment.

**Domestic Sewage:** Portable toilets would be provided for the construction workforce as needed. These toilets would be pumped out regularly, and the sewage would be transported by tanker truck to a publicly-owned wastewater treatment works that accepts pump out.

**Equipment Washing and Dust Control**: Equipment washing and dust control discharges would be handled in accordance with BMPs described in the SWPPP for water-only cleaning and/or NPDES Permit TN0005428.

**Hydrostatic Testing**: These discharges would be handled in accordance with NPDES Permit TN0005428 or the TDEC General NPDES Permit for Discharges of Hydrostatic Test Water (TN670000).

With the implementation of appropriate BMPs, no significant impacts to surrounding surface waters are expected from construction activities.

*Operational Impacts*

Bottom Ash Dewatering Operations

The bottom ash that would be dewatered is presently sluiced from the boiler bottoms to a series of impoundments and then to the stilling impoundment. Currently the bottom ash sluice stream also sluices economizer ash. Both of these waste streams would be sluiced to the dewatering facility and would be dewatered and sent to an approved onsite landfill. The sluice water would then be released to the bottom ash impoundment and ultimately discharged through Outfall 001. Clarified water from the dewatering facility would meet current NPDES permit limits; the clarifier and chemical injection systems would be designed such that the facility would meet the permitted 28 mg/L monthly average and 93 mg/L daily average, if required at the clarifier discharge. If needed, additional treatment for TSS and other constituents could be provided by either the current impoundment complex or by the future EQ basin prior to discharge to the Cumberland River.

To support the dewatering effort, TVA performed a study in 2011 to determine the potential wastewater management issues of the bottom ash and pyrite reject waste streams during the dewatering process. This study specifically focused on the solubility of the pyrite/coal mixture, both separately and combined, in the sluice water prior to and after the dewatering process (TVA 2011).

The results of this study determined that the dewatering was of such a short duration that the metals and pyritic bacteria had little time to react and cause significant water chemistry changes, reducing the likelihood of pH and metal accumulation problems in the dewatered stream. All metals concentrations were below TDEC's WQC limits. Furthermore the pH throughout the study period was found to be within pH range of 6 to 9 standard units. This study's results indicate that the waste stream that would be generated by this process would likely meet the current TDEC pH and metals in-stream WQC. In addition, the study illustrated that because the fines associated with this waste stream were much finer than were previously theorized, meeting NPDES TSS requirements could be more challenging should the discharge be routed directly to the Outfall 001 discharge (TVA 2011). Therefore, the effluent flows from the proposed dewatering facility would have additional treatment prior to discharge from Outfall 001. Mitigation measures would be implemented to ensure that discharges would meet NPDES limits, including but not limited to, altered settling times and chemical treatment.

Results for operational dewatering systems could vary greatly based on many factors including the nature and composition of the coal burned, the make-up water used in the system, and the moisture level of the bottom ash. This study focused upon a dewatering process with pyritic reject streams, results of this study may become more applicable to GAF with possible future changes in coal sources.

Any discharges would initially be sent to the ash impoundment complex for co-treatment and ultimately released through permitted Outfall 001, which would meet all applicable NPDES requirements. Additionally, associated process storm water associated with this facility would be routed to sumps and the ash impoundment for co-treatment prior to discharge. No direct negative impacts to the surface waters would be anticipated from the operation of this facility because any discharges would be required to meet NPDES limits and Tennessee WQC that are developed to be protective of designated uses.

Discharge Characterization

In both the existing operation and the proposed mechanical dewatering operation, discharges would be routed to the bottom ash impoundment, would flow through the ash impoundment complex, and then leave the facility through Outfall 001 to the Cumberland River at CRM 240.5. The dewatering project would change the dynamics of the outfall discharge by removing the bottom ash in the transport water prior to discharge into and treatment by the impoundment system. The removal of the bottom ash from the water stream along with implementation of wastewater treatment additives should not only control pH and TSS concentrations, but reduce metals in this waste stream as well.

To characterize the current conditions and changes in the Outfall 001 discharge, TVA evaluated in-stream mixing calculations of chemical characteristics. These measures are useful in predicting potential impacts to water quality that may arise resulting from the changes to the bottom ash handling systems.

Results of the surface water mixing analysis under current operations are presented in Table 3.7-1. For the current operations analysis, metals data were collected from the Outfall 001 impoundment discharge and the plant intake, over the last year's monitoring period. Outfall 001 data was taken from monitoring period 11/10/2015 through 10/13/2016, and intake data was taken from monitoring period 1/1/2015 through 12/31/2015, unless the constituent was not sampled during this period; in which case the intake data was taken from the 1/1/2013 to 12/31/2013 data set. This information was used to show current operations with the resultant discharge concentrations after mixing with the receiving stream. The projected in-stream mixing concentrations were based on analyses of the GAF intake and the minimum one-day low flow that occurs once in 10 years (i.e., the "1Q10") of 552 MGD from the Water Quality Based Effluent Calculations in the GAF NPDES Permit TN0005428 Rationale. The 1Q10 stream flow is the regulated low flow condition according to U.S. Geological Survey data for the protection of fish and aquatic life.

**Table 3.7-1. In-Stream Mixing Concentrations of Current Operations**

| Element | Current Baseline | Current Operations | | Water Quality Criteria [3] Conc. (mg/L) @ 100 mg/L hardness |
|---|---|---|---|---|
| | Intake Conc. [1] (mg/L) | Ash Impoundment Discharge [2] Conc. (mg/L) | Mixing Conc. At Cumberland River 1Q10 (mg/L) | |
| Aluminum | 0.208 | 1.230 | 0.24309 | |
| Antimony | <0.002 | <0.002 | <0.00100 | 0.0056 |
| Arsenic | <0.002 | 0.004 | <0.00110 | 0.01 |
| Barium | 0.023 | 0.220 | 0.02976 | 2.0 |
| Beryllium | <0.004 | <0.002 | <0.00197 | 0.004 |
| Cadmium | <0.001 | <0.001 | <0.00050 | 0.002 |
| Chromium | <0.002 | 0.0069 | <0.00120 | 0.1 |
| Copper | <0.002 | <0.01 | <0.00098 | 0.013 |
| Cyanide | <0.005 | <0.01 | <0.00259 | |
| Iron | 0.217 | 0.316 | 0.22040 | |
| Lead | <0.005 | <0.002 | <0.00245 | 0.005 |
| Manganese | 0.0446 | 0.018 | 0.04369 | |
| Mercury | 0.000000585 | 0.00000416 | 0.0000007 | 0.00005 |

**Table 3.7-1. In-Stream Mixing Concentrations of Current Operations**

| Element | Current Baseline | Current Operations | | Water Quality Criteria [3] Conc. (mg/L) @ 100 mg/L hardness |
|---|---|---|---|---|
| | Intake Conc. [1] (mg/L) | Ash Impoundment Discharge [2] Conc. (mg/L) | Mixing Conc. At Cumberland River 1Q10 (mg/L) | |
| Nickel | <0.002 | 0.00513 | <0.00114 | 0.1 |
| Selenium | <0.002 | <0.006 | <0.00117 | 0.02 |
| Silver | <0.005 | <0.002 | <0.00245 | 0.0032 |
| Thallium | <0.002 | <0.002 | <0.00100 | 0.00024 |

lbs/day = conc. In mg/L X flow in MGD x 8.34 lbs/gal
Ash Impoundment Flow 19.6
Intake Flow 915.84
1QQ10 River flow 552
Flows taken from NPDES flow schematic 2016 for Permit No. TN0005428 permit renewal

(1) Intake data was taken from monitoring period 1/1/15 through 12/31/15 unless the constituent was not sampled during this period, in which case it was taken from 1/1/13 to 12/31/13. Used ½ of the RDL for thallium concentrations in the future ash impoundment discharge concentration because of continuous BDL results.
(2) Ash Impoundment Data was taken from DMR data from 11/10/15 until 10/13/16. The maximum concentration was used as worse case although this number may not be representative of all other samples or the average concentration.
(3) TDEC Criteria, Rule 1200-4-3-.03

Results of the in-stream mixing concentrations show that all the constituents except thallium would meet the TDEC lowest criteria (i.e., the limit equal to minimum of the drinking water and aquatic toxicity limits). The thallium exception results from testing methods that can only detect thallium in concentrations over 0.002 mg/L while the TDEC criterion is 0.00024 mg/L. Since no thallium was detected, the mass balance calculation conservatively assumes one-half the detection limit; thus weighting the calculation with assumed thallium detections of 0.001 mg/L. The conservative use of these assumed values at more than four-times the health-protective TDEC criterion for thallium salts, predisposes the thallium results to exceed TDEC criteria. These results, however, are due to limitations in testing methods and do not represent true impacts to water quality due to thallium concentrations. The mass balance analysis indicates that the overall impact of current and future dewatering operations would still meet TDEC lowest criteria and therefore would not cause impacts to surface water quality.

Future metal discharge rates for the proposed operation are conservatively represented by current conditions depicted in Table 3.7-1. This shows concentrations of in-stream metals below Tennessee WQC, with the exception of thallium as described previously. Additionally, in-stream metals concentrations could be further reduced in the proposed dewatering process through settling or treatment with waste water treatment chemicals in the dewatering clarifiers. Consequently, future operations of the bottom ash dewatering facility would be expected to have minor temporary, even potentially beneficial, impacts on the receiving stream. The dewatering of the bottom ash would be a necessary initial phase of any action to reduce and/or eliminate this flow, however upgrading or enhancement of this initial dewatering design may be required to meet future regulations.

TVA would conduct an operational characterization of the altered and new waste streams to confirm that no significant impacts to the Cumberland River would occur from this action.

Additionally, no direct negative (toxic) impacts on the Cumberland River are anticipated because Outfall 001 would be required to meet NPDES chronic toxicity limits. If the operational characterization showed impacts, then mitigation measures, including but not limited to altered settling times and chemical treatments, would be undertaken to ensure discharges meet required NPDES and chronic toxicity limits and do not cause an exceedance of in-stream TDEC WQC.

Thus, continued operations at GAF under Alternative B conditions would not be expected to cause any additional direct or indirect effects to local surface water resources.

Runoff Streams Solid I Waste Landfill

Currently the bottom ash is wet sluiced to the bottom ash impoundment where it is removed from the sluice ditch with the use of heavy machinery and managed in the bottom ash area of the ash impoundment complex. When the bottom ash dewatering system is operational, the ash would no longer be managed and stored in the impoundment, it would be taken from the storage facility after being dewatered, and transported to and deposited into the permitted Class II Solid Waste Landfill (TVA 2013). The landfill is currently permitted to receive all CCR waste streams, including dewatered bottom ash. Therefore, project-related environmental conditions in the Project Area with respect to surface waters (including storm water and leachate discharges) are not expected to change.

In summary, no significant direct or indirect operational impacts to surface water and wastewater would be anticipated under Alternative B.

#### *3.7.2.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream*

This alternative would have similar impacts to the construction, dewatering and leachate impacts noted above in Alternative B. However, the construction of the recirculation system along with the dewatering facility would decrease the volume of water discharged; thus providing a potential benefit to groundwater quality. The operational, withdrawals, and discharges details and impacts would be altered with Alternative C, as discussed below.

The primary withdrawal usage plant-wide is for the condenser cooling water, which carries the majority (99.9 percent) of the thermal loading from GAF discharges at Outfall 002. The discharge characteristics (including thermal loading) at Outfall 002 would be changed very little by the current project. In this alternative, no bottom ash sluice transport water would be discharged from Outfall 001, and this would be a reduction of 13.20 MGD of discharges from Outfall 001. Thermal discharges from Outfall 001 would not change. Raw and potable waters utilized in the bottom ash dewatering process and storm water flows associated with this project would remain at ambient temperatures; therefore, no additional thermal impacts would be anticipated.

The dewatering process for Alternative C, as described in Subsection 2.1.3, would be similar to the process for Alternative B, with the addition of recirculating the majority of the bottom ash sluice transport water. This recirculation would include a make-up water stream, a low volume continuous blowdown stream, and an outage waste stream. The make-up water stream would be additional raw water that would replace or supplement the water lost from evaporation or leakage in the system. This raw make-up water withdrawal rate would range from 300 to 600 gpm, which equates to a maximum 0.864 MGD of additional make-up water. Not only would make-up water replace water lost in the system, but it would help to balance the pH and other

chemical constituents in the recirculating system in order to maintain the integrity of the system's infrastructure and materials. Note that under the conditions of Alternative C, the withdrawal rate used by the sluice system with the dewatering system and the recirculation system would actually reduce the total withdrawal rate from 13.2 MGD to approximately 1 to 2 MGD. This is a reduction of approximately 11 MGD.

Wastewater would flow from the dewatering conveyor to the clarifier and process flow tanks and lastly into a wastewater containment facility (or recirculation tank) prior to being recirculated. The blowdown stream from the containment facility would help to regulate the hydraulic flow levels from all four generation units and would reduce the existing bottom ash discharge from 13.20 MGD to a maximum of 2 MGD of process water. During outages the waste stream flow from the system could range between 0.2 to 0.5 MGD to purge the system. All process waste streams would be managed to comply with the NPDES permit.

Discharge Reduction Characterization

Discharges from the bottom ash system would be managed to ensure regulatory compliance. Current design of the bottom ash sluice waste water would have treatment and would not be directly discharged without treatment and the recirculation blowdown stream would be managed to comply through the site specific NPDES permit.

In order to show the changes in this waste stream with the implementation of this alternative, the range of metals that could potential be reduced from this waste stream was evaluated. To properly evaluate these changes the concentrations of parameters could not be simply subtracted, but must be converted to loadings, pounds per day to accurately show this range of reductions. Results of the reduction in loading ranges for Alternative C (i.e., following the bottom ash dewatering with recirculation) are displayed in Table 3.7-2. There is limited bottom ash sluice metals data for the contributing streams that was collected prior to mixing and treatment in the ash impoundment and this data is therefore, not reflective of the actual discharge from Outfall 001. The minimum and maximum concentrations of the Table 3.7-2 parameters were used to display the potential range of reduction of loading that would be sent to the ash impoundment in the future should this alternative be chosen. Currently, the ash impoundment effectively treats and decreases these concentrations. This treatment system works by assimilating the process waste stream and allowing time for particles that bond with metals and other parameters to settle. Following settlement within the bottom ash impoundment, much of this material is then excavated and allowed to dry in piles on the ground next to the impoundment. Smaller particles of ash are conveyed within the impoundment system and settle out prior to or in the stilling impoundment where they are retained, prior to discharge to the receiving stream. Together these processes are effective in reducing concentrations in the discharge waste stream to below NPDES permitted values. It is assumed that the discharges from Outfall 001 would be reduced through this action and would continue to meet NPDES permit limits and TDEC WQC.

**Table 3.7-2. Reduction of Bottom Ash Loadings Into the GAF Impoundment System with Implementation of Alternative C**

| Element | Current Operations | | Range of Loading Reductions | |
|---|---|---|---|---|
| | Low End | High End | Low End | High End |
| | Current Bottom Ash Sluice Conc. mg/L | Current Bottom Ash Sluice Conc. mg/L | Current Bottom Ash Sluice Loading (1) lbs/day | Current Bottom Ash Sluice Loading (1) lbs/day |
| Aluminum | 8 | 43.0000 | 881.7600 | 4739.4600 |
| Antimony | <0.001 | <0.001 | <0.0551 | <0.0551 |
| Arsenic | 0.0027 | 0.0035 | 0.2976 | 0.3858 |
| Barium | 0.58 | 1.6000 | 63.9276 | 176.3520 |
| Beryllium | <0.001 | <0.001 | <0.0551 | <0.0551 |
| Cadmium | <0.0005 | <0.0005 | <0.0276 | <0.0276 |
| Chromium | 0.0005 | 0.0160 | 0.0551 | 1.7635 |
| Copper | 0.018 | 0.0260 | 1.9840 | 2.8657 |
| Iron | 3.2 | 5.6000 | 352.7040 | 617.2320 |
| Lead | 0.0015 | 0.0031 | 0.1653 | 0.3417 |
| Manganese | 0.054 | 0.12 | 5.9519 | 13.2264 |
| Mercury | <.0002 | <.0002 | <0.0110 | <0.0110 |
| Nickel | 0.0052 | 0.0091 | 0.5731 | 1.0030 |
| Selenium | 0.0014 | 0.0017 | 0.1543 | 0.1874 |
| Silver | <0.0005 | <0.0005 | <0.0276 | <0.0276 |
| Thallium | <0.001 | <0.001 | <0.0551 | <0.0551 |

Note: Mass Discharge and Loadings below detection were calculated using 0.5 of the Minimum Detection Limit
(1) TDEC Criteria, Rule 1200-4-3-.03
lbs/day = conc. in mg/L X flow in MGD X 8.34 lbs/gal.
Bottom Ash Sluice data from TVA special study
Bottom Ash 13.2 MGD Bottom Ash Flow from GAF 2016 NPDES Permit renewal application

The majority of concentrations would be expected to decrease with the removal of the bottom ash waste stream. The analysis indicates that the overall impact of future dewatering operations with recirculation would have minor beneficial impacts and the overall proposed project would not have significant impacts to surface water quality. Thus, continued operations at GAF under the Alternative C would not be expected to cause any additional direct and/or indirect impacts to local surface water resources.

TVA would conduct an operational characterization of the altered and new waste streams to confirm this study's results that no significant impacts to the Cumberland River would occur from this action. Additionally, no direct negative (toxic) impacts on the Cumberland River are anticipated because Outfall 001 would be required to meet NPDES chronic toxicity limits. If the operational characterization shows impacts, then mitigation measures, including altered settling times and chemical treatments, would be undertaken to meet requirements for ensuring that discharges meet NPDES and chronic toxicity limits.

## 3.8 Groundwater and Geology

### 3.8.1 Affected Environment

The Project Area is underlain by Ordovician-, Silurian-, and Devonian-aged rocks of the Interior Low Plateaus Physiographic Province. These carbonate rocks, which are primarily limestone with some dolostone, are also the principal aquifers in large areas of Middle Tennessee and are part of the Central Basin aquifer system. The carbonate rock aquifers consist of limestone and minor dolostone, interlayered with confining units of shale and shaley limestone. The middle Ordovician Stones River Group (Carters and Lebanon Limestones) contains the most important carbonate-rock aquifers in the Project Area.

Groundwater is present in fractures within the limestone bedrock. Locally, these fractures may be enlarged due to dissolution of the limestone. Features characteristic of karst development, such as sinkholes, have been observed in specific areas at GAF, but there does not appear to be significant groundwater flow conduit. Beneath portions of the Project Area, the limestone bedrock is overlain by variable thicknesses of overburden consisting primarily of residuum derived from weathering of the underlying bedrock. Closer to the river, significant thicknesses of a clay alluvium are present.

Precipitation is the primary source of recharge for the Central Basin aquifer system. Most of the precipitation becomes overland runoff to streams, but some percolates downward through soil to the underlying bedrock. Where karst topography is present, runoff may also enter the groundwater system via direct infiltration into swallow holes or sinkholes. The Carters Limestone has been defined as a local aquifer due to permeability enhanced by solution openings, especially at weathered portions of the T-3 bentonite layer (Hanchar 1988). Bentonite zones in the Carters Limestone play a significant role in the hydrology of the Central Basin aquifer system. In areas where the bentonite layers are unbreached, the downward movement of groundwater is restricted. Where the bentonite zones are breached by open joints or intersecting stream valleys, solution openings can form in the underlying limestone (Brahana and Bradley 1986). At GAF, both of these conditions exist. In contrast, shale units within the formations typically act as local confining units for groundwater (Brahana and Bradley 1986).

Groundwater at the project site is encountered within the residuum and rocks of the Carters and Lebanon Limestones. Groundwater is expected to flow vertically downward from the clay-rich residuum to the underlying bedrock, and then through bedrock fractures towards the Cumberland River.

#### *3.8.1.1 Groundwater Quality*

The groundwater in the carbonate formations in the Central Basin aquifer system is typically of the calcium or calcium-magnesium bicarbonate water type. Groundwater chemistry is controlled primary by dissolution of limestones, dolomites, and gypsum (Hileman and Lee 1993). Water quality conditions can be highly variable, with total dissolved solids varying from under 500 mg/l to over 10,000 mg/l, due to the presence of localized flow systems. Groundwater in the Central Basin is commonly hard and contains hydrogen sulfide gas (Brahana and Bradley 1986).

TVA has been working with TDEC on the closed ash impoundment since it became a Non-Registered Site (NRS; # 83-1324) and initiated groundwater monitoring in 1997. TVA has been performing groundwater monitoring at GAF since 2000 and reports this data to TDEC quarterly. Monitoring locations are primarily for characterizing GAF's NRS, the closed ash impoundment, which is located west and downgradient from the Project Area. Groundwater samples are

collected from a background well, GAF-22, and from four downgradient compliance wells, GAF-19R, GAF-20, GAF-26, and GAF-27, to characterize the groundwater downgradient of the NRS. The latest report submitted in December 2016 is representative of past trends for GAF; Groundwater Protection Standards (GWPSs) historically are exceeded for beryllium, cadmium and nickel at one of the four compliance wells (GAF-19R). Elevated levels of beryllium, cadmium and nickel at GAF-19R are associated with unusually low pH (i.e., median pH is 3.8 at this location). By comparison, median pH values for compliance well GAF-20 and background well GAF-22 are 5.7 and 7.1, respectively. The unusually low pH is currently under investigation by TVA. Groundwater sampling results for GAF-19R may be localized to this portion of the NRS because the other three compliance wells, along with the background well, did not exhibit sampling results exceeding GWPS; therefore, the results from those compliance wells may be more representative of a greater portion of the site (TVA 2016e). TVA continues to work with TDEC at the site under a Groundwater Assessment Program. A Groundwater Assessment Monitoring Project Summary and Risk Assessment Report was submitted to TDEC in November 2014. TVA will continue to follow the regulatory requirements for groundwater assessment at the NRS.

New federal regulations require groundwater monitoring at the active ash impoundment complex, including the Bottom Ash Impoundment, located just east of the Project Area. By October 2017, a groundwater monitoring network must be installed and eight independent samples collected from the network.

In State of Tennessee et al. v. Tennessee Valley Authority, Davidson County Chancery Court, Docket No. 15-23-IV, the Davidson County Chancery Court entered an Agreed Temporary Injunction (ATI) on January 21, 2016, outlining the additional studies needed to fully characterize the hydrology and geology of GAF, identify the extent of CCR contamination in soil, surface water, and groundwater, and assess the quantities and characteristics of CCR materials currently on-site. The ATI required TVA to develop an Environmental Investigation Plan (EIP) to meet the ATI requirements. The EIP was submitted to TDEC on June 20, 2016. TVA is currently in the process of conducting the Environmental Investigations as approved by TDEC.

#### *3.8.1.2 Groundwater Use*

The Central Basin aquifer system is an important source of drinking water for Middle Tennessee, as it supplies most of the rural domestic wells and many public drinking wells in the Central Basin and surrounding region. Private residential wells are present north of GAF, but none occur near or downgradient from the Project Area. Public water for Sumner County is supplied by surface water sources (EPA 2012). The Project Area is not within a state-designated Source Water Protection Area.

### 3.8.2 Environmental Consequences

#### *3.8.2.1 Alternative A – No Action*

Under the No Action Alternative, TVA would not construct the process dewatering facility. TVA would continue its current practice of disposing of wet bottom ash in onsite impoundments. Project-related environmental conditions in the Project Area with respect to groundwater are not expected to change. Thus, continued operations at GAF under the No Action Alternative would not be expected to cause any direct and/or indirect impacts to local groundwater or geological resources.

#### *3.8.2.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System*

Construction

The majority of excavations associated with the proposed dewatering facility would be shallow (less than about 8 feet deep), and would not be expected to encounter significant groundwater. Pilings installed to support the dewatering facility may be deeper. Pilings would be driven into the ground and would not expose surface activity to groundwater. The pilings are constructed of re-enforced concrete and would not impact groundwater. Groundwater control, if needed, would be limited to short-term dewatering from excavations. BMPs, as described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority* (Bowen et al. 2012), would be used to avoid contamination of groundwater in the Project Area. BMPs would be used to control sediment infiltration from storm water runoff during construction phases of the project. With the use of BMPs, there would be no significant impacts to groundwater or groundwater resources.

Operations

Potential sources of groundwater contamination resulting from operation of the three proposed dewatering treatment systems include releases from the pumping system, the SDCC system, the bunkers, and/or the clarifiers. To minimize these potential sources, the bottom ash dewatering facility would have a concrete footprint that is sloped back to trench drains within the facility that would capture any normal water discharges from the equipment. The trenches would carry the water to the sumps and then it would be pumped back into the system. In addition, this drainage system would be designed to hold a 25-year 24-hour rain event. The clarified water from the dewatering process will be discharged through the existing ash impoundment complex and NPDES-permitted outfall.

The dewatered bottom ash would be transported by truck directly to an approved onsite landfill. Cell 1 of the approved onsite landfill, completed in 2016, is an 18.8-acre landfill with a 2-foot thick compacted clay layer along with a bentonite geosynthetic clay liner and a high-density polyethylene plastic liner. This liner complies with requirements of the CCR rule. Permitted construction of Cell 2 and Cell 3 within the next 15 years would bring the approved onsite landfill storage to a total of 52 acres (TVA 2013). Groundwater at the landfill is monitored in accordance with a permit issued by TDEC (TVA 2016f) and the CCR rule.

Because dewatered bottom ash compacts similarly to sand, it may be used as an alternative beneficial construction material. Construction use of this relatively inert material includes structural fill applications including backfill, road bases, and road sub-bases. Dewatered bottom ash may also be used as aggregate for concrete, asphalt, and masonry along with use as an abrasive to improve traction in snowy and icy conditions (Larson 2016). Groundwater would not be significantly impacted by use of bottom ash as fill because of its relatively inert nature. Trace elements in bottom ash are similar to concentrations in soils and are only slightly above protective EPA screening levels for arsenic, cobalt, chromium, and vanadium (EPRI 2010, USGS 2011, and EPA 2016c). Thus, possible use of bottom ash as fill would not significantly impact groundwater.

Groundwater resource impacts from Alternative B would be insignificant; the liner and leachate collection system are designed to eliminate downward migration of gypsum and ash leachate from the approved onsite landfill into the underlying groundwater. Consequently, no significant impacts to groundwater and/or geology under Alternative B would be expected.

#### *3.8.2.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream*

Construction and Operation

The impacts from Alternative C (Alternative B plus a recirculated bottom ash effluent) are essentially identical to those of Alternative B; however, the construction of the recirculation system along with the dewatering facility would decrease the volume of water discharged; thus providing a potential benefit to groundwater quality.

## 3.9 Wetlands

### 3.9.1 Affected Environment

Wetlands are those areas inundated by surface or groundwater such that vegetation adapted to saturated soil conditions is prevalent. Examples include swamps, marshes, bogs, and wet meadows. Wetland fringe areas also are found along the edges of most watercourses and impounded waters (both natural and man-made). The hilly and rolling topography of the region affects the type, location, and extent of wetlands. In general, low-lying, poorly drained areas are confined to floodplains and large (greater than 10 acres) wetlands are uncommon. Land use/land cover data generated by EPA in 1999 indicated wetlands make up less than one percent of overall land use types in the Cumberland River watershed (TDEC 2007).

Human excavation and land movement actions have also created wetlands over time as drainage patterns were altered, creating low-lying areas where water remains over time and wetland vegetation develops. The GAF reservation is on a large peninsula surrounded on the east, south, and west by Old Hickory Lake, a reservoir of the Cumberland River. Wetlands on the GAF reservation are associated with ash disposal ponds, intermittent/ephemeral streams, reservoir/riverine shoreline, and topographical depressions (vernal pools).

Wetlands within the GAF Project Area were identified using National Wetlands Inventory (NWI) maps, aerial photography, and field surveys (Figure 3.9-1). Wetland determinations were performed in October 2016 according to USACE standards (USACE 2012b), which require documentation of hydrophytic vegetation, hydric soil, and wetland hydrology. Broader definitions of wetlands were also considered in this review. They include the definition provided in Executive Order (EO) 11990 (Protection of Wetlands), the USFWS definition (Cowardin et al. 1979), and the TVA Environmental Review Procedures definition.

The TVA Rapid Assessment Method (TVARAM) was used to assess wetland condition and identify wetlands with potential ecological significance (Mack 2001). Using TVARAM, wetlands may be classified into three categories. Category 1 wetlands are considered “limited quality waters” and represent degraded aquatic resources that have limited potential for restoration and such low functionality that lower standards for avoidance, minimization, and mitigation can be applied. Category 2 includes wetlands of moderate quality and wetlands that are degraded but could be restored. Avoidance and minimization are the first lines of mitigation for Category 2 wetlands. Category 3 generally includes wetlands of very high quality or of regional/statewide concern, such as wetlands that provide habitat for threatened or endangered species. Avoidance and minimization are the first lines of mitigation for Category 2 and 3 wetlands. TVARAM scores and categories are summarized in Table 3.9-1 for the single wetland (W-1) identified in the Project Area. TVARAM and USACE Field Data Forms are provided in Appendix C.

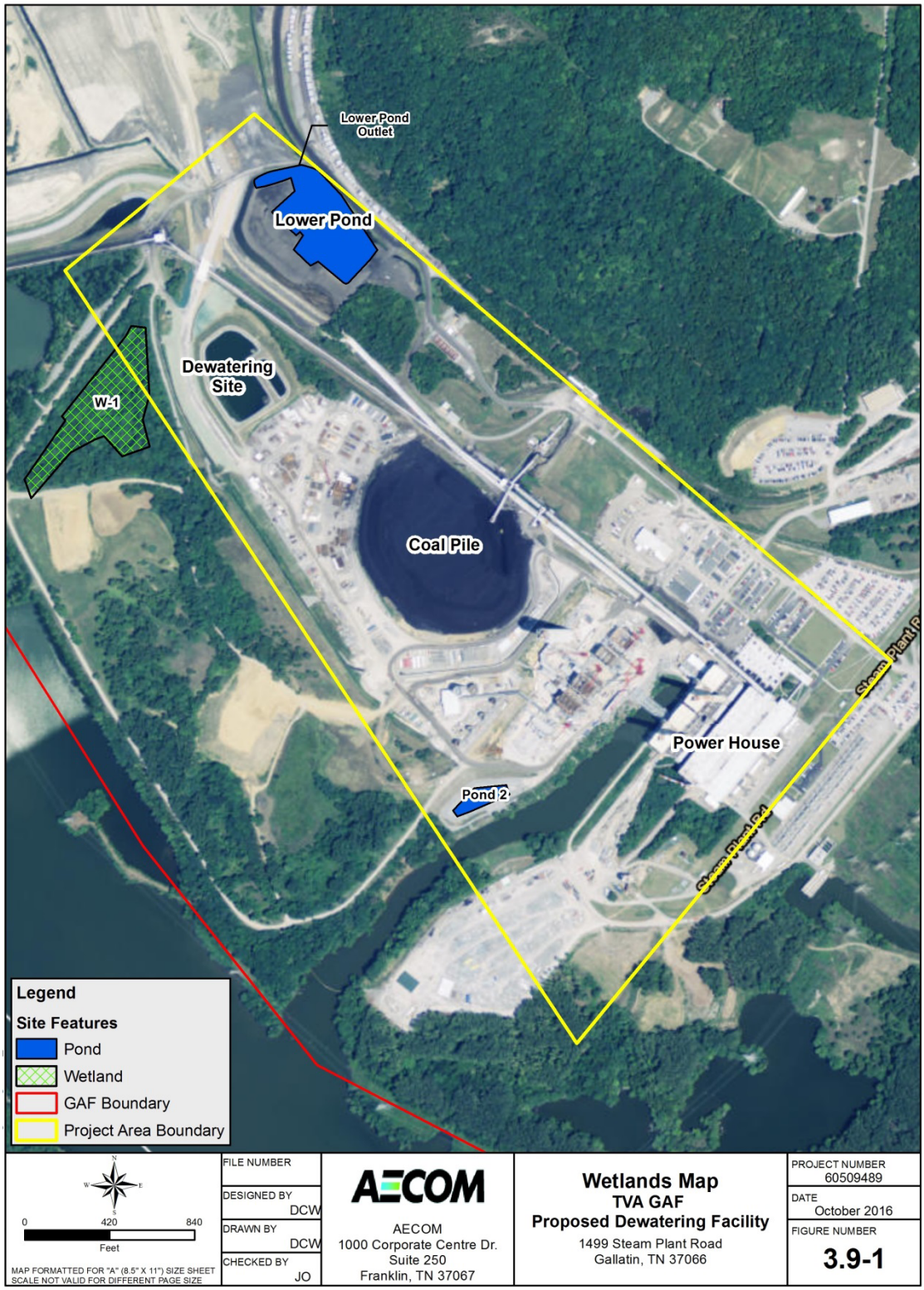



**Figure 3.9-1. Wetlands Map**

**Table 3.9-1. Summary of Wetlands Identified at GAF**

| Wetland ID | Wetland Type (1) | TVARAM Category (Score) | Total Wetland Acreage |
|---|---|---|---|
| W-1 | PEM1J/PFO1J | 2 | 4.61 |

(1) Cowardin Classification:
PEM1J = palustrine, persistent emergent, broad-leaved deciduous, intermittently flooded;
PFO1J = palustrine, forested, broad leaved deciduous, intermittently flooded;
ID = identification.

According to the NWI, the 280-acre Project Area included two ponds. The Lower Pond is an approximately 4-acre, man-made, ash settling pond located in the northeast corner of the Project Area (Figure 3.9-1). The Lower Pond is an active part of the GAF ash handling system. Pond 2 is an approximately 0.5-acre, concrete-lined, storm water pond located south of the coal pile area (Figure 3.9-1). This pond is bordered by a gravel access road. Neither of these ponds is considered a water of the United States because they are active, industrial, storm water ponds. Field inspections confirmed that neither of these ponds is a water of the United States.

In addition to the two ponds, one wetland was identified in the project area. W-1 is a forested wetland located in the northwestern portion of the Project Area approximately 250 feet west of the proposed dewatering site. The forested wetland continues beyond the Project Area and covers a total of 4.6 acres (Figure 3.9-1). The wetland is located in a depression bounded by raised gravel roadbeds. The vegetation exhibits hydrologic indicators such as water-stained leaves, sparsely vegetated concave surface, drainage patterns, moss lines, and stunted or stressed plants (USACE 2012b). The dominant trees in this wetland are cottonwood, red cedar, red maple, and sycamore, and the dominant herbaceous species are horse tail, Japanese stiltgrass, and bush honeysuckle. Approximately 0.67 acre of this wetland (15 percent of the total area of this wetland) falls within the Project Area boundary.

### 3.9.2 Environmental Consequences

Wetlands are protected under Sections 404 and 401 of the Clean Water Act and by EO 11990, *Protection of Wetlands*. In order to conduct specific activities in wetlands, authorization under a Section 404 permit from the USACE may be required depending on the wetland's size and hydrologic connectivity to a navigable waterway. Section 401 gives states the authority to certify whether activities permitted under Section 404 are in accordance with state water quality standards. In Tennessee, the Department of Environment and Conservation is responsible for issuing Section 401 water quality certifications. EO 11990 requires all federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities.

#### *3.9.2.1 Alternative A – No Action*

Under the No Action Alternative, no alterations or construction activities would occur in or near wetlands. Wetlands on or near the Project Area would continue to be influenced by the operation and maintenance of the site, and these existing wetlands would likely be maintained in their current state.

#### *3.9.2.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System*

Construction and Operation

Under Alternative B, construction and operation of the proposed dewatering facility would not result in impacts to wetlands as the Limits of Disturbance (LOD) for the Project Area would not include this identified wetland area (W-1). Wetland W-1 lies on the west and southwest sides of the coal yard runoff ditch, and all construction activities would take place east of the coal yard runoff ditch. Proper BMPs would be implemented within and around the LOD to ensure that the wetland would not be disturbed or impacted by runoff and sedimentation. In the event that the Project Area was extended to the southwest, impacts to Wetland W-1 might occur; in that event, proper permitting and mitigation would be undertaken.

Any temporary wetland impacts resulting from the construction of the dewatering facility would be minimized to the extent possible through the implementation of BMPs. If permanent wetland dredge or fill is proposed, TVA will comply with the Clean Water Act and adhere to permit requirements imposed by USACE. Therefore, with these measures in place, and no plan to modify the wetland on and adjacent to the project boundary, the proposed project would have no direct and/or indirect impacts to wetland areas and associated wetland functions and values.

#### *3.9.2.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream*

Construction and Operation

Because the project boundary and footprint of the proposed facility would be the same under Alternative C as Alternative B and the recirculation system would be constructed in an area that is currently a gravel lot, there would be no difference in the disturbance to wetlands as described under Alternative B. Therefore, Alternative C would have no direct and/or indirect impacts to the wetlands on or adjacent to the Project Area and associated wetland functions and values.

## 3.10 Floodplains

### 3.10.1 Affected Environment

A floodplain is the relatively level land area along a stream or river that is subject to periodic flooding. The area subject to a one percent chance of flooding in any given year is normally called the 100-year floodplain. The area subject to a 0.2 percent chance of flooding in any given year is normally called the 500-year floodplain.

The proposed project would be located between CRM 241.7-242.8; within the area bounded in yellow in Figure 3.10-1 (Federal Emergency Management Agency [FEMA] 2016). Interpolating elevations from the 2012 flood insurance study as represented on this figure, flood elevations are provided in Table 3.10-1 (FEMA 2012).

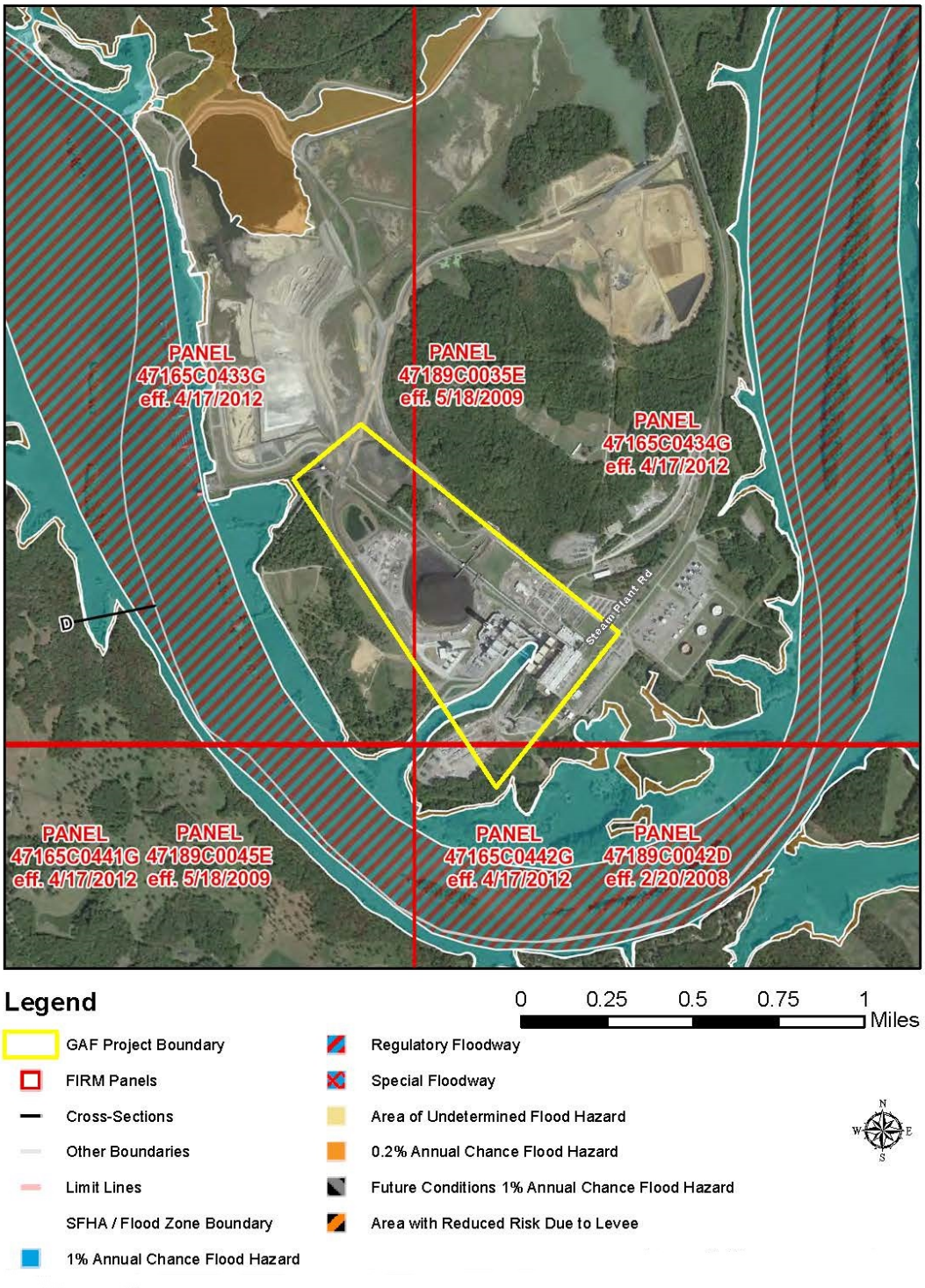



**Figure 3.10-1. FEMA Flood Map**

**Table 3.10-1. Project Flood Elevations**

| Project Activities | CRM | 100-year Flood Elevation (feet NAVD) (1) | 500-year Flood Elevation (feet NAVD) (1) |
|---|---|---|---|
| downstream extent of project boundary (embayment at northeast end of Coal Pile) | 241.7 | 451.9 | 455.1 |
| discharge channel | 242.5 | 452.1 | 455.4 |
| upstream extent of project boundary | 242.8 | 452.2 | 455.5 |

(1) Elevations interpolated from 2012 Sumner County, Tennessee, Flood Insurance Study
NAVD = North American Vertical Datum of 1988

### 3.10.2 Environmental Consequences

As a federal agency, TVA is subject to the requirements of EO 11988, Floodplain Management. The objective of EO 11988 is "…to avoid to the extent possible the long- and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative" (EO 11988, Floodplain Management). The EO is not intended to prohibit floodplain development in all cases, but rather to create a consistent government policy against such development under most circumstances. The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative. For certain "critical actions," the minimum floodplain of concern is the 500-year floodplain, which is the area subject to inundation from a 500-year (0.2 percent annual chance) flood.

The U.S. Water Resources Council defines "critical actions" as "any activity for which even a slight chance of flooding would be too great" (U.S. Water Resources Council 1978). Critical actions can include facilities producing hazardous materials (such as liquefied natural gas terminals), facilities whose occupants may be unable to evacuate quickly (such as schools and nursing homes), and facilities containing or providing essential and irreplaceable records, utilities, and/or emergency services (such as large power-generating facilities, data centers, hospitals, or emergency operations centers). CCR material could enter floodplains and streams and alter the flood-carrying capacity of those streams, and thus create an added dimension to a disaster. Therefore, the proposed dewatering facility would be considered a "critical action."

#### *3.10.2.1 Alternative A – No Action*

Under the No Action Alternative, construction and operation of the dewatering facility would not occur. Therefore, there would be no direct and/or indirect impacts to floodplains because there would be no physical changes to the current conditions found within the local floodplains.

#### *3.10.2.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System*

Construction and Operation

Under Alternative B, TVA would design and construct a bottom ash dewatering facility to create dry CCR for disposal in an approved onsite landfill. The proposed project could potentially

impact floodplains in two portions of the Project Area: the area near the discharge channel, at CRM 242.5, and the area at the northwest end of the coal pile at CRM 241.7. However, the mitigation measure of avoiding construction and laydown activities below the 100- and 500-year flood elevations shown in Table 3.10-1 would be employed, consistent with EO 11988 requirements for critical actions. Therefore, there would be no direct and/or indirect impacts to floodplains or floodplain resources.

#### *3.10.2.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream*

Construction and Operation

Under Alternative C, TVA would design and construct a recirculation system along with the bottom ash dewatering facility described in Alternative B. The dewatering facility and recirculation system of Alternative C would be contained within the same project footprint as Alternative B and therefore be subject to the same consequences and mitigation measures as Alternative B. Like Alternative B, construction and laydown activities would avoid the 100- and 500-year floodplains in the proposed Project Area; consistent with EO 11988 requirements for critical actions. Therefore, as described under Alternative B, there would be no direct and/or indirect impacts to floodplains or floodplain resources from Alternative C.

## 3.11 Natural Areas, Parks and Recreation

### 3.11.1 Affected Environment

Natural areas include ecologically significant sites; federal, state, or local park lands; national or state forests; wilderness areas; scenic areas; WMAs; recreational areas; greenways; trails; Nationwide Rivers Inventory (NRI) streams; and wild and scenic rivers. Managed areas include lands held in public ownership that are managed by an entity (e.g., TVA, U.S. Department of Agriculture, United States Forest Service, State of Tennessee, and Sumner County) to protect and maintain certain ecological and/or recreational features. Ecologically significant sites are either tracts of privately owned land that are recognized by resource biologists as having significant environmental resources or identified tracts on TVA lands that are ecologically significant but not specifically managed by TVA's Natural Areas program. NRI streams are free-flowing segments of rivers recognized by the National Park Service (NPS) as possessing remarkable natural or cultural values. Seven natural areas occur in the vicinity of GAF (TVA 2013).

The GAF reservation is located on a reservoir of the Cumberland River, Old Hickory Lake. Portions of the GAF reservation are included in a Tennessee Wildlife Resources Agency (TWRA) WMA. The Cumberland River Aquatic Center (CRAC) is also located on the GAF reservation. The CRAC is a hatchery facility that TVA originally constructed and which is now operated by the TWRA (TVA 2013).

The seven natural areas in the vicinity of the GAF reservation include:

- The Gallatin Steam Plant WMA. Most of the GAF reservation is designated as the Gallatin Steam Plant WMA. This WMA is managed by TWRA for hunting within specified hunting zones. Only deer and turkey can be hunted, and only with archery equipment. A special permit issued by TWRA is required to hunt on the WMA. About 229 acres of the GAF reservation and WMA are open to

hunting. The ash impoundments, and to a lesser extent the stilling ponds, are used by shorebirds during migration and by waterfowl throughout much of the year, but especially during the winter.

- The Gallatin Steam Plant Heronry is an ecologically significant site located on a small island in the reservoir. This site has historically been utilized by great blue herons for a nesting colony, but is not currently used.
- The Old Hickory State WMA is managed by TWRA for small and large game, including waterfowl. It is located along the shoreline of the reservoir. The Old Hickory State WMA is to the east, adjacent to an approved onsite landfill. Portions of the Old Hickory WMA are located within the GAF property boundary primarily along the shoreline. A boat ramp for lake access is located on the eastern side of the GAF property off Steam Plant Road. In addition to hunting and fishing, these areas also provide limited public opportunities for watching wildlife, especially shorebirds, waterfowl, and wading birds.
- The Old Hickory Lake Reservation is managed by the USACE and extends from the dam at CRM 100 upstream to Cordell Hull Lock and Dam. This reservoir is adjacent to the GAF property.
- Bledsoe Creek State Park is located approximately 3 miles east of the GAF property. It is a 164-acre site managed by the State of Tennessee Division of State Parks. It is located on the Bledsoe Creek embayment of Old Hickory Lake and offers several public recreation opportunities such as boating, camping, fishing and hiking.
- The Bledsoe Creek NRI stream is located approximately 2 miles northeast of GAF in Sumner County. It is designated by the NPS as an NRI stream from RM zero (0) at Old Hickory Lake to river mile 14 at Bethpage and is noted for its scenic, recreational, geological, fisheries, wildlife, historical, and cultural values. This stream empties into Old Hickory Lake approximately 2.0 miles northeast of the GAF property.
- Sumner County Park is located approximately 3 miles west of the GAF reservation along the shoreline of the reservoir. This park, managed by Sumner County, is open to the public for recreation (TVA 2013).

In addition to the natural areas, there are many recreational opportunities along the reservoir. The TWRA maintains multiple blind sites for waterfowl hunting along the reservoir; the locations are not the same every year (TWRA 2016a). There are also multiple public boat launches which have additional amenities such as picnic areas, camping, hiking and biking trails, as well as two private marinas in the vicinity of the GAF reservation. Public parks and water access areas include the following:

- TVA Gallatin Steam Plant public access boat ramp
- Cages Bend Recreation area is approximately 6 miles west. It has 42 recreation vehicle (RV) spots, a boat ramp, restrooms, shower and laundry facilities (Good Sam Club 2016).
- Cedar Creek Access Area is approximately 6 miles southwest. It has 58 RV or camping spaces, a boat ramp, restrooms, shower and laundry facilities (Good Sam Club 2016).

- Lone Branch Access Area is adjacent to Cedar Creek to the north. It has a boat launch and two shelters with electricity for a maximum of 50 people (Recreation.gov 2016).
- Sumner County/Lock 4 Park is located approximately 3 miles to the west. It has a mountain bike trail, boat ramps, picnic areas, and a picnic pavilion, all located on 161 acres (City of Gallatin 2016).
- Odom's Bend Access area has a boat launch approximately 1 mile northwest of the GAF reservation (Google Earth 2016).
- Bulls Creek Access Area has a large boat launch, parking area, and Tackle Shop approximately 1 mile northwest of the GAF reservation.
- Martha Gallatin Access Area has a boat launch and parking located approximately 1 mile west of the GAF reservation on the other side of the reservoir.
- Cherokee steakhouse and marina is immediately across the reservoir near the GAF reservation. There are temporary docks for restaurant boat parking, a large car parking lot, and marine gas. Slips can be rented for a nightly fee, but live-aboards are not allowed (Active Captain 2016).
- Gallatin Marina is north of Sumner County/Lock 4 Park. It has dry and wet slips with covers, water, and electricity (Gallatin Marina 2016).

### 3.11.2 Environmental Consequences

#### *3.11.2.1 Alternative A – No Action*

Under this No Action Alternative, the project would not be undertaken and the natural areas, parks recreation facilities, and public use patterns on this section of Old Hickory Lake would not be affected.

#### *3.11.2.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System*

Construction and Operation

Under Alternative B, the construction of the facility would not change any land use on the GAF reservation. Natural areas, hunting areas, and recreational access would not be disturbed. The same areas currently available as WMAs, parks, hunting, fishing, or bird watching areas would continue to be available in their current state. Therefore, no direct impacts to natural areas, parks and recreation are anticipated.

Minor indirect negative impacts could occur during construction and operation due to noise disturbance. Hunting and fishing could be disrupted temporarily during construction due to noise. It is unlikely that noise levels during operation of the new facility would disturb wildlife or park visitors. Minor indirect negative impacts to recreation could occur during construction due to temporary visual changes. The appearance of large equipment during construction may disturb hunters, bird watchers or fishers on the reservoir. During operations, however, indirect impacts to visual resources are not anticipated as the structures would be less than 45 feet high and not likely to be visible from the water areas due to screening by trees along the banks. Therefore, minor impacts to recreation are possible during construction, but these would be of short duration and are not anticipated to occur during operation of the new facility. Thus, no

significant direct impacts and only minor, temporary indirect impacts to natural areas, parks and recreation are anticipated under Alternative B.

#### *3.11.2.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream*

Construction and Operation

Under Alternative C, impacts to natural areas, parks and recreation would be the same as those discussed under Alternative B. Thus, no significant direct impacts and only minor, temporary indirect impacts to natural areas, parks and recreation are anticipated under Alternative C.

## 3.12 Cultural and Historic Resources

### 3.12.1 Affected Environment

Cultural resources include prehistoric and historic archaeological sites, districts, buildings, structures, and objects, and locations of important historic events that lack material evidence of those events. Cultural resources that are included or considered eligible for inclusion in the National Register of Historic Places (NRHP) maintained by the NPS are called historic properties. Federal agencies are required by the National Historic Preservation Act (NHPA) (16 United States Code [U.S.C.] 470) and by NEPA to consider the possible effects of their undertakings on historic properties. 'Undertaking' means any project, activity, or program, and any of its elements, which has the potential to have an effect on a historic property and is under the direct or indirect jurisdiction of a federal agency or is licensed or assisted by a federal agency.

An agency may fulfill its statutory obligations under NEPA by following the process outlined in the regulations implementing Section 106 of NHPA at 36 CFR Part 800. Throughout the process the agency must consult with the appropriate State Historic Preservation Officer (SHPO) and other interested consulting parties, including federally recognized Indian tribes.

To be included or considered eligible for inclusion in the NRHP, a cultural resource must possess integrity of location, design, setting, materials, workmanship, feeling, and association. In addition, it must also meet one of four criteria: (a) association with important historical events; (b) association with the lives of significant historic persons; (c) having distinctive characteristics of a type, period, or method of construction, or representing the work of a master, or having high artistic value; or (d) having yielded or having the potential to yield information important in history or prehistory.

The area of potential effect (APE) is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist. TVA has defined the APE for archaeological resources for the proposed actions as the approximately 280-acre Proposed Project boundary.

Much of the area surrounding the APE has been previously included in archaeological surveys (Barret and Holland 2012; Deter-Wolf and Wampler 2005; McKee 2010, McKee 2011, McKee 2012, Hockersmith and Holland 2013, Hockersmith et al. 2012, and Hockersmith et al. 2013). As a result of these previous surveys, 27 archaeological sites have been identified on the GAF property and are reflective of the various historic and prehistoric site types found on the peninsula-like point bar housing the fossil plant.

TVA conducted a desktop review of the APE. The desktop review included a careful examination of historic and current maps, as well as historic records (such as *The Gallatin Steam Plant: A Report on the Planning, Design, Construction, Costs, and First Power Operations of the Initial Four-Unit Plant* Technical Report No. 36 [TVA 1967]). This information documents that all land within the APE has been affected by the construction and operation of GAF over the past five decades. These past actions have resulted in the removal or mixing of the original soils and sediments. As a result, there does not appear to be any potential for the presence of intact archaeological sites that could be eligible for inclusion in the NRHP within the APE. Based on this desktop review, TVA determined that there are no historic properties within the undertaking's APE. TVA consulted with the Tennessee State Historic Preservation Officer (SHPO) and federally recognized Indian tribes regarding this finding. In a letter dated February 8, 2017, the SHPO concurred with TVA's finding that there are no NRHP listed or eligible properties affected by this undertaking. As of March 10, 2017, responses had been received by the Shawnee Tribe, the Muscogee (Creek) Nation, and the Eastern Shawnee Tribe, each of whom responded that no resources of cultural importance to their tribes would be impacted by the proposed project (Appendix D).

### 3.12.2 Environmental Consequences

#### *3.12.2.1 Alternative A – No Action*

Under the No Action Alternative, there would be no ground disturbing activities. Therefore, no direct or indirect impacts to cultural resources would occur under Alternative A.

#### *3.12.2.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System*

Construction and Operation

For NRHP-listed or eligible archaeological resources located in the APE, project effects could result from vegetation clearing, construction, maintenance, and operation of the proposed activities. These effects could include compaction from heavy equipment, the mixing of stratigraphic layers, displacement and removal of artifacts and features due to ground disturbance, and looting or vandalism stemming from the increased exposure of archaeological deposits due to vegetation clearing. In a letter dated February 8, 2017 (included in Appendix D), the SHPO concurred with TVA's finding of no historic properties affected; therefore, TVA finds that Alternative B will not affect historic properties.

#### *3.12.2.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream*

Construction and Operation

Alternative C would add a recirculation system to the dewatering facility. The recirculation system would be contained within the same project boundary described for Alternative B, which is the former site of the chemical pond. Therefore, the potential adverse effects of Alternative C to archaeological sites would be similar to those that would occur under Alternative B. In a letter dated February 8, 2017, the SHPO concurred with TVA's finding of no historic properties affected; therefore, TVA finds that Alternative C will not affect historic properties.

## 3.13 Solid Waste and Hazardous Waste

### 3.13.1 Affected Environment

Solid waste consists of a broad range of materials that include refuse, sanitary wastes, contaminated environmental media, scrap metals, nonhazardous wastewater treatment plant sludge, nonhazardous air pollution control wastes, various nonhazardous industrial waste (e.g., coal combustion residual) and other materials (solid, liquid, or contained gaseous substances). Subtitle D Resource Conservation and Recovery Act (RCRA) and its implementing regulations establish minimum federal technical standards and guidelines for nonhazardous solid waste management. States are primarily responsible for planning, regulating, implementing, and enforcing solid waste management.

In general, hazardous materials include substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health or the environment when released into the environment. Hazardous materials are regulated under a variety of federal laws including the Occupational Safety and Health Administration (OSHA) standards, Emergency Planning and Community Right to Know Act, RCRA, the Comprehensive Environmental Response, Compensation and Liability Act of 1980 and Toxic Substances Control Act.

Existing GAF Waste Production

GAF operates four coal-fired, steam-generating units; combusting approximately 12,350 tons of coal per day. GAF burns low-sulfur blend coal, primarily PRB coal, to reduce sulfur dioxide emissions. Because PRB coal averages 5.5 percent ash, GAF produces between 192,500 and 242,000 tons of ash per year. Approximately 185,000 dry tons of fly ash and approximately 46,500 dry tons of bottom ash are currently wet-sluiced to GAF's surface impoundments each year. The fly ash/bottom ash split, by weight, is about 80 percent fly ash and 20 percent bottom ash. Therefore, approximately 38,500 to 48,400 tons of bottom ash is generated annually (TVA 2013).

Nonhazardous materials not disposed onsite are taken to the Sumner County solid waste transfer station and then shipped for disposal by Republic Waste Services to the Middlepoint Sanitary Landfill in Murfreesboro, Tennessee. This landfill, a Subtitle D landfill with two clay liners and two synthetic liners, opened in September 1997. There are no construction and demolition (C&D) [Class IV] landfills within Sumner County; however, four such landfills are located in nearby counties, including the Southern Services and Central Pike landfills in Davidson County, the Wilson County Landfill, and the Rutherford County Demolition Landfill (TVA 2013).

GAF generates a limited quantity of hazardous waste and is considered a small quantity generator of hazardous waste; generating between 100 to 1,000 kg hazardous waste per month. Currently generated wastes streams are related to maintenance and testing activities and include small quantities of waste paint, paint chips, solvents, mercury waste, absorbents, solvent-contaminated rags, silver containing wastes from x-ray operations, welding, abrasive wastes, and liquid-filled fuses. Used oils including pump lube oils, gear box oils, vacuum pump oils, used engine and transmission oils from vehicles and heavy equipment, hydraulic oils and cutting oils are also generated from maintenance activities. These used oils are generally recycled.

Limited amounts of universal wastes (batteries, and lamps) are routinely generated from the plant infrastructure and operations. GAF is considered a small quantity handler of universal wastes.

### 3.13.2 Environmental Consequences

#### *3.13.2.1 Alternative A – No Action*

Under the No Action Alternative the dewatering facility would not be built and no hazardous or solid substances would be generated from construction or operation activities.

#### *3.13.2.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System*

Under Alternative B, construction of a once-through bottom ash process dewatering facility, a limited amount of wastes would be generated from construction and operation activities.

Construction

Construction of the dewatering facility includes site preparation and construction activities generating typical construction debris along with small volumes of hazardous wastes. The dewatering facility will be located northwest of the existing coal pile adjacent to the coal conveyors in a 10-acre area that includes the former chemical pond. Construction of the proposed facility includes grading, road modifications, and paving along with foundations and piping to support the clarifiers, submerged flight conveyors, storage bins, transformers, slop oil tanks, process water tanks, pipe racks, pipe tie-ins, and sump pits as well as the chemical building and the power distribution center (TVA 2016g). Another 10 acres would be used during construction for temporary equipment laydown and mobilization.

TVA would manage all solid wastes generated from construction of the proposed facility in accordance with established procedures. Solid wastes would be managed as required by applicable state regulations in conformity with TVA's environmental procedures and BMPs. Any soils generated due to grading or excavation would be managed on site. Facility solid waste construction impacts are expected to be minor.

Nonhazardous waste generated during site preparation and construction activities would be placed in roll-offs and disposed off-site in a Subtitle C and D landfill in nearby counties, including the Southern Services and Central Pike landfills in Davidson County, the Wilson County Landfill, and the Rutherford County Demolition Landfill (TVA 2013). This nonhazardous construction waste would include a limited amount of construction debris including paper, wood, plastic, metal, and other debris.

Hazardous materials used during site preparation and construction may include limited quantities of fuels, lubricating oils, solvents, paints, adhesives, welding material, and other hazardous materials. Appropriate spill prevention, containment, and disposal requirements for hazardous materials would be implemented to protect construction and plant workers, the public, and the environment. All wastes would be characterized for appropriate disposal and a permitted third-party waste disposal facility would be used for ultimate disposal of the wastes. Therefore, no significant impacts associated with the use of fuels, oil, lubricants, and the limited quantities of other hazardous materials during construction would be expected.

Operation

Operation of the proposed dewatering facility would generate a similar amount of CCR as existing operations. Under Alternative B, the dewatering facility would handle 16.2 tons per hour (tph) of bottom ash, producing dry product for transport and disposal in the approved onsite landfill (TVA 2016g). TVA received permit approval from TDEC for disposal of the CCR in the approved onsite landfill on 30 June 2014. This permit allows the disposal of CCR including mill and coal breaker rejects, boiler slag, cinders, and clinker. This permit describes the liner for the permitted disposal facility, from top to bottom, as flexible material, CCR-resistant polymer-treated geosynthetic clay liner, compacted clay, and geological buffer (TDEC 2014).

Limited quantities of used oils would be generated during operation of the proposed dewatering facility from vacuum pumps, liquid and slurry transfer pumps, gear boxes, compressors and other machinery. Hydraulic oils may also be generated from components of the dewatering facility and associated equipment. These types of used oil are currently generated by GAF, and the increase in generation rate of these wastes is not expected to be significant. Used oil is recycled in accordance with applicable regulations and TVA's procedures.

Hazardous materials would be handled and disposed in accordance with federal, state, and TVA requirements. Limited quantities of hazardous wastes likely generated during the operation of the dewatering facility include adhesives, paints, paint chips, degreasing solvents, absorbents, solvent-contaminated rags, sandblasting wastes, and abrasive wastes. GAF is expected to remain a small quantity generator of hazardous waste.

Operation of the dewatering facility would also generate limited quantities of universal wastes including batteries and lamps. These universal wastes would continue to be managed through TVA BMPs and in accordance with RCRA requirements. GAF is expected to remain a small quantity universal waste handler. Therefore, no significant impacts associated with solid and hazardous waste during operation of Alternative B would be expected.

#### *3.13.2.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream*

Construction and Operation

Under Alternative C, a limited amount of wastes would be generated from construction and operation activities similar to impacts from Alternative B. In addition, solid waste, hazardous waste, and universal waste impacts from operation are anticipated to be similar to Alternative B. Therefore, no significant impacts associated with solid and hazardous waste from Alternative C would be expected.

## 3.14 Land Use and Prime Farmland

### 3.14.1 Affected Environment

Current land use at GAF is heavy industrial: coal- and gas-fired power production. Major facilities and features associated with coal-fired generation include the powerhouse, coal handling system, switchyard, transmission corridors, coal pile, ash disposal areas, access roads, railroad tracks, barge unloading facility, and parking areas (Figure 1.1-2). TVA also operates a combustion turbine facility adjacent to the powerhouse site. Surrounding these areas is a mix of forested tracts and open fields.

The majority of the GAF property is surrounded by Old Hickory Lake. Land use adjacent to the northern property boundary is primarily agricultural land with some residential. The closest residences to the northern property boundary are located along Odom's Bend Road and Newton Lane. Additional residential areas are located across the reservoir to the west, south, and east.

Prime farmland soils, as defined by the U.S. Department of Agriculture (USDA 1997), are those soils that are the most suitable for economically producing sustained high yields of food, feed, fiber, forage, and oilseed crops. Prime farmlands have the best combination of soil type, growing season, and moisture supply and are available for agricultural use (i.e., not water or urban built-up land). The concern that continued conversion of prime farmland to nonagricultural use would deplete the nation's resource of productive farmland prompted creation of the 1981 federal Farmland Protection Policy Act (7 U.S.C. 4201 et seq.). The act set guidelines that require federal agencies to evaluate land prior to permanently converting it to nonagricultural land use. Form AD 1006, "Farmland Conversion Impact Rating," is required to be completed with assistance from the Natural Resources Conservation Service before an action is taken when prime farmland is involved.

Two soil types are identified within the proposed dewatering facility Project Area: Slickens and Udorthents (Natural Resources Conservation Service 2015). The Slickens soil unit consists of specially constructed basins that contain fine-textured ash material, which is a by-product of burning coal to produce electricity. The Udorthents soil unit consists of excavated sites with soil material that ranges in texture from silt loam to clay. Neither of these soil types is classified as prime farmland (USDA 1997) and Form AD 1006 is not required.

### 3.14.2 Environmental Consequences

#### *3.14.2.1 Alternative A – No Action*

Under the No Action Alternative, land use at the project site would not change. No direct or indirect impacts to land use or prime farmland would occur.

#### *3.14.2.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System*

Construction and Operation

Under Alternative B, land use would not change. Land use for the Project Area would remain industrial. The dewatering facility would be constructed within the GAF facility on the former site of the chemical pond, in an area not classified as prime farmland. Therefore, no direct or indirect impacts to land use or prime farmland would occur under this alternative.

#### *3.14.2.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream*

Construction and Operation

Under Alternative C, impacts to land use and prime farmland would be the same as those described for Alternative B. The recirculation system would be contained within the same project boundary as Alternative B. Accordingly, no direct or indirect impacts to land use or prime farmland would occur under this alternative.

## 3.15 Rail and Roadway Transportation

### 3.15.1 Affected Environment

The site is generally accessible via Steam Plant Road, off of I-40 and Highway 109. Population in the immediate area is sparse, with only a few dwellings in the vicinity. Historically, GAF was served by rail for construction and daily operational services; however, GAF is currently served by highway and barge modes of transportation. U.S. Highway 109 provides truck and automobile access via Odom's Bend Rd to Steam Plant Road to GAF. Table 3.15-1 compares existing roadway capacities with current average annual daily traffic (AADT; Tennessee Department of Transportation [TDOT] 2013). Traffic volumes on the existing roadway system are currently below capacity.

**Table 3.15-1. Current Average Annual Daily Traffic**

| Roadway | Typical Section | 2015 AADT |
|---|---|---|
| I-40 | Freeway | 72,357 |
| U.S. Highway 109 | Major thoroughfare, two-lane | 19,355 |
| Odom's Bend Rd | Rural, two-lane | 2,536 |
| Steam Plant Road at GAF | Rural, two-lane | 1,964 |

### 3.15.2 Environmental Consequences

#### *3.15.2.1 Alternative A – No Action*

If Alternative A is selected, TVA would continue to follow the current operating plan, which includes the ongoing maintenance of the coal-fired powerhouse and its related structures and parking. No changes or impacts to current transportation activities associated with GAF are anticipated under this alternative.

#### *3.15.2.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System*

Construction and Operation

Alternative B would involve construction and operation of the proposed dewatering facility. Transportation-related concerns for the surrounding roadway infrastructure under this alternative would be minor and would consist primarily of temporary increases of construction traffic to and from the facility. Truck traffic volumes in the vicinity could increase temporarily for a short period, having a short-term minor impact on the capacity of the roadway system in the area.

The dewatering facility is projected to generate approximately 16.5 tph of bottom ash, which would result in approximately 200,000 tons per year of CCR. The assumption was made that CCR hauling would begin as soon as the proposed dewatering facility is operational. A truck has a 30-ton capacity, and CCR was assumed to have 20 percent moisture content once it was loaded onto the truck.

Based on 260 work days per year, approximately 26 truck trips per day would be generated on days the CCR would be hauled. Since CCR would be hauled to an approved onsite landfill, consideration must be given to the impacts of additional truck traffic to the internal roadway infrastructure at GAF. For an assumed 8-hour work day, approximately three to four truck trips

per hour would result. This level of truck traffic is expected to have a minor impact on the GAF roadways. During operations, the project would not affect traffic on public roads.

#### *3.15.2.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream*

Construction and Operation

If Alternative C is selected, the effects of construction activities would be similar to those resulting from Alternative B. However, the construction would take longer because there would be subsequent work after the once-through system is constructed. As with Alternative B, construction activities are expected to have a minor impact on the GAF roadways. There would be no difference in operational transportation impacts than described in Alternative B.

## 3.16 Visual Resources

Visual resources were 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).

### 3.16.1 Affected Environment

The immediate area surrounding the GAF reservation is rural and suburban in nature. The scenery is dominated by forested areas and small clearings with single family homes. To the west, across the Cumberland River from GAF, is a low density residential area with widely-spaced homes and businesses. Further north and to the west are the Cities of Gallatin (5 miles northwest) and Hendersonville (12 miles west; Figure 1.1-1), which are more densely populated areas.

Near the GAF reservation, in the foreground, the viewshed is mostly natural, with trees and the Cumberland River generating a peaceful setting. The plant itself dominates views from the river and shorelines as it is highly industrial and the facility stacks are 500 feet high. The newest stack associated with the scrubber facility is slightly shorter and wider than the steam plant stacks. All three stacks are visible from the surrounding area and can overpower areas where viewsheds are not screened by trees. Recreational boaters would be the observers most affected by the disjointed view of a large industrial facility in the midst of a mostly natural setting. Motorists travelling on Steam Plant Road would also be affected by the plant visually, but the only features located at the end of that road are the GAF plant and a single boat ramp, so the majority of travelers on this road would likely be plant employees.

The area has a gently rolling terrain, with elevations ranging from 450 to 600 feet around the plant. The plant itself is situated in a relatively low spot, at approximately 500 feet, which helps to screen the plant as well (Figure 3.16-1).

The proposed dewatering facility would be located at the former chemical pond site (Figure 1.1-2). Photo 3.16-1 shows the proposed site. This area is also industrial in nature; however, it is slightly less visually imposing compared to the overall GAF reservation. The site appears similar to an earthen parking lot and a construction staging area. The pond has been filled and currently appears as a construction site in the early stages, with heavy equipment, large metal pipes and other construction materials stored adjacent to the earthen area. Although no major

man-made structures are present in the view, it is still industrial in nature due to the presence of construction-related machinery and a lack of vegetation.

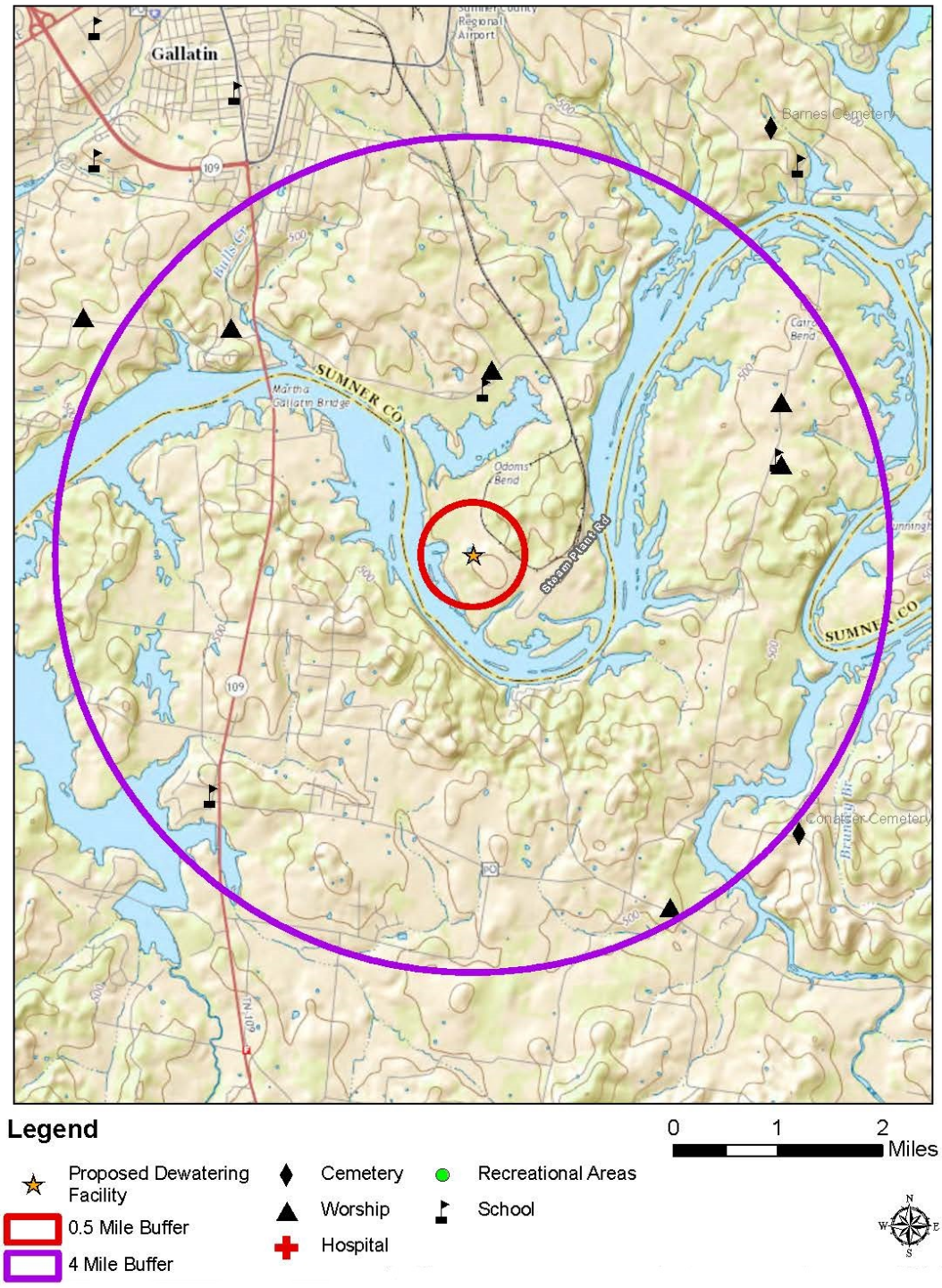



**Figure 3.16-1. Visual Resources Foreground and Middleground**

**Photo 3.16-1. View of the proposed site for the dewatering facility (former chemical pond)**

The proposed dewatering facility would be constructed on what is essentially the bottom of the former chemical pond at an elevation of 485 feet above mean sea level (MSL). The tallest constituent of the dewatering facility would rise approximately 50 feet above this. The shoreline of the Cumberland River in this area is approximately 450 to 500 feet above MSL.

Figure 3.16-1 shows the foreground (0.5-mile buffer) and the middle ground (4-mile buffer) surrounding the former chemical pond site. The sensitive receptors such as schools and places of worship have been designated on the map. There are no receptors located within 0.5 miles of the site, and there are three schools and five places of worship within the middle ground viewing area. Figure 3.16-2 shows a close up of the foreground viewing area. No residences, schools, places of worship or other common observation points are located this close to the proposed construction site. Figure 3.16-2 illustrates that only plant employees and recreational boaters on the Cumberland River would find themselves in the foreground viewshed.

Figure 3.16-3 represents a simulated visibility map where potential viewers could possibly see the proposed dewatering facility. This image was constructed using topographical data and vegetation heights to simulate lines of site. There is limited visibility of the proposed dewatering facility within 2 miles of the site. One school and place of worship are co-located within 2 miles of the site (to the north on Odom's Road). However, this viewpoint does not appear to have line of sight due to topography and vegetative screening. Some residents (to the south) on Lago Vista Drive, (to the west) on Drifting Circle, and near the Cherokee Marina may be able to see the construction site and the proposed dewatering facility.


**Figure 3.16-2. Visual Resources Foreground**

This page intentionally left blank

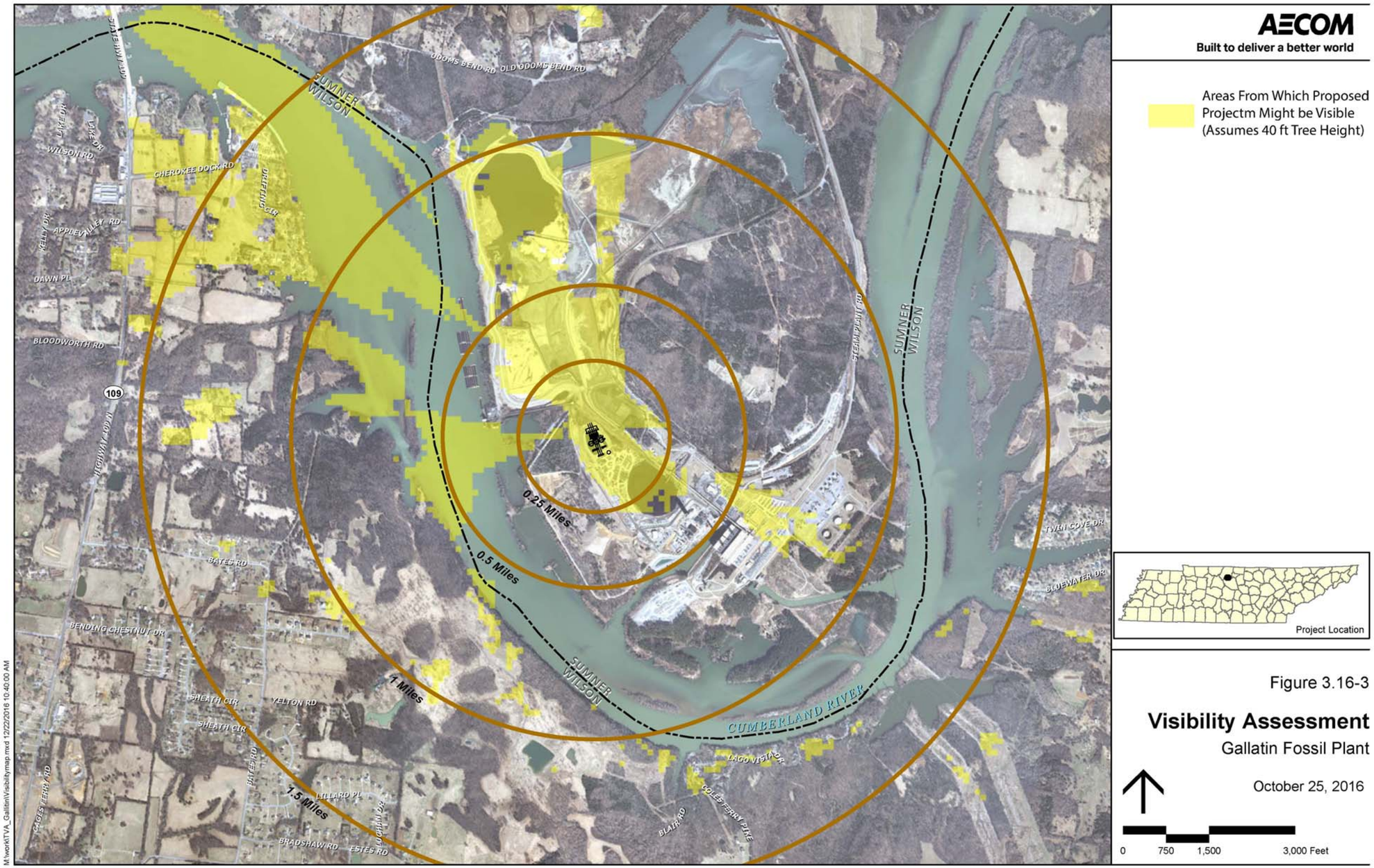



**Figure 3.16-3. Visibility Assessment**

### 3.16.2 Environmental Consequences

#### *3.16.2.1 Alternative A – No Action*

Adoption of the No Action Alternative would mean that GAF would remain as is and there would be no changes to the viewshed. Alternative A would cause no impacts to existing visual resources.

#### *3.16.2.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System*

Construction and Operation

Alternative B would not significantly alter the current visual environment. Views to and from the Cumberland River would remain the same, including the GAF stacks, associated GAF buildings and juxtaposed natural scenery. These visual items constitute the major visual features. Photo 3.16-2 shows the dewatering facility at the TVA Bull Run Plant. The proposed facility at the GAF reservation would appear similar. As can be seen in Photo 3.16-2, although the facility is large, it would not be large in comparison to the existing GAF plant and coal pile. The proposed facility would be approximately 50 feet above grade (485 feet above MSL). Additionally, the facility would essentially be recessed at the bottom of the former chemical pond and would be screened by trees on the shoreline of the Cumberland River. The addition of another industrial aspect to an existing industrial area would not create a major change to the existing viewshed.

The proposed facility would not be visible to any sensitive receptors such as schools or places of worship in the vicinity. The dewatering facility may be visible to some of the residents nearby. Figure 3.16-3 shows the potential viewshed for the new structures. Some residents near the Cherokee Marina and across the river to the south have potential line of sight to the facility. These lines of sight, however, are already dominated by the existing stacks at the plant itself. Both residential areas are already impacted by the much larger and more imposing stacks. The Marina area would see the larger stacks behind the less obtrusive proposed dewatering facility; therefore, visitors to the marina would experience views of the dewatering facility that would be less impactful than the existing coal pile and stacks. Therefore, the dewatering facility would not represent a significant visual impact in the context of the existing conditions at the Project Site. Residents to the south would similarly have their view dominated by the existing plant structures, and would similarly not experience significant impacts.

**Photo 3.16-2. The Dewatering facility at the Bull Run Plant**

Boaters may be able to see the proposed facility from some portions of the Cumberland River. However, these areas (Figure 3.16-2) are in the immediate vicinity of the existing plant. Like the residential areas that could experience minor visual changes, these boaters would already have a viewshed dominated by the existing plant features. Additionally, the difference in height from the water and the base elevation of the proposed dewatering facility would make line of sight less likely. With the addition of trees on both shorelines as natural visual buffers and the far more visually dominant existing plant components, any changes to the visual environment for recreational boaters would be negligible.

During construction, some cranes and other large heavy-duty equipment may also be visible from the river and nearby homes. This visual disturbance would be temporary and localized and would not be considered significant.

Photo 3.16-3 shows the dewatering facility at the Bull Run Plant at night; the proposed GAF project would be similar in design and scale. Minor negative impacts to visual resources at night may occur due to lighting. The general area around the GAF reservation is rural and suburban with few light sources. If night lighting were to be used, it could create light in an otherwise dark area. The facility could possibly be seen from further away than during the day due to the lack of other light sources. Mitigation could be used, such as shielding and directional lighting, which would lessen these potential impacts. The existing night lighting at the plant already has a visual impact which would not be significantly increased by lighting at the proposed dewatering facility. Additionally, due to the surrounding trees, most residents would not have a direct line of sight.

Most observers would experience a light shimmer in the night sky in the general direction of the facility. The nighttime visual resources in the area would therefore not be significantly negatively impacted.

**Photo 3.16-3. The dewatering facility at TVA's Bull Run Plant at night**

Overall, due to the size of the existing plant, the size of the proposed addition, the location of the facility behind a treed riverbank, its recessed elevation, and the lack of sensitive receptors within 0.5 miles of the site, no significant impacts to visual resources are anticipated.

#### *3.16.2.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream*

Construction and Operation

Under Alternative C, impacts to visual resources would be similar to those under Alternative B. The dewatering facility with a recirculating system would not be significantly visually different than a dewatering facility without one. The addition of recirculating tanks would not alter the view as they would not be any taller than the system proposed under Alternative B. The tanks are not likely to be visible from the surrounding area at all. Therefore under Alternative C, visual resources would not be significantly impacted.

## 3.17 Noise

### 3.17.1 Affected Environment

The area surrounding GAF consists, for the most part, of semi-rural, sparsely populated areas along the outer limits of the town of Gallatin, Tennessee. There are some small waterfront subdivisions along the bank of the Cumberland River south of GAF. The closest homes are located approximately 3,500 to 4,000 feet south of GAF. Population density within one mile of GAF is low.

Noise is measured in logarithmic units called decibels (dB). Given that the human ear cannot perceive all pitches or frequencies in the sound range, noise measurements are typically weighted to correspond to the limits of human hearing. This adjusted unit of measure is known as the A-weighted decibel, or the dBA. A-scale weighting reflects the fact that a human ear hears poorly in the lower octave-bands. It emphasizes the noise levels in the higher frequency bands heard more efficiently by the ear and discounts the lower frequency bands.

The equivalent sound level, or $L_{eq}$, 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, or $L_{dn}$, 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.

The City of Gallatin limits noise emissions to 45 dBA during nighttime hours. The City of Lebanon references OSHA guidelines as suggested noise limits; however, OSHA does not stipulate residential noise limits. Since GAF is not in the city limits of Gallatin or Lebanon, EPA suggested limits are most applicable to the facility. The EPA suggests that noise be limited at noise-sensitive areas during nighttime hours to a Day-Night Average ($L_{dn}$) of 55 dBA. Research by the U.S. Air Force has established suggested levels of annoyance experienced by nearby receptors to various background $L_{dn}$ levels (Table 3.17-1).

**Table 3.17-1. Estimated Annoyance from Background Noise**

| $L_{dn}$ (dBA) | Percent Highly Annoyed | Average Community Reaction |
|---|---|---|
| 75 and above | 37% | Very severe |
| 70 | 25% | Severe |
| 65 | 15% | Significant |
| 60 | 9% | Moderate |
| 55 and below | 4% | Slight |

Source: Federal Interagency Committee on Noise. 1992.

Noise levels near GAF typically are well below 55 dBA, with only occasional excursions beyond that level.

Typical noise measurements at residences in a semi-rural setting can average 46 dBA during periods without coal unloading activity. Usually the loudest noises are from cars or farm equipment driving on gravel roads; traffic in this type of area is typically very light. Based on 2009 background noise level measurements made under similar conditions at the Kingston

Fossil Plant, noise from ash handling at a power plant along with coal unloading can create average noise levels of 51 dBA near the residences located 1,000 to 2,000 feet away (TVA 2009). Periodically, during construction activities, noise levels can approach approximately 73 dBA near the residences. Overall, the homes experience relatively low noise levels much of the time.

As a part of the construction of the gas desulfurization plant at GAF, AECOM (formerly URS) conducted noise level surveys in response to noise complaints by local residents in March 2016 (URS 2016). During the acoustical surveys, detailed notes were kept on the noise sources observed during the measurement period. The significant noise sources identified coming from the Gallatin power plant site were the induced draft (I.D.) fans (through the top of the exhaust stack), and to a much lesser degree, coal handling equipment (bulldozer on the coal pile), vehicle noise, impact noises, and construction activity on the south end of the property (near the Fish Hatchery). The I.D. Fans were a consistent noise source when observed, while the other sources tended to be intermittent in nature. Data collected at a residence in Gallatin showed the noise levels ranged from 35 to 37 dBA, which is under the nighttime noise limit for Gallatin; while the noise level at a residence in Lebanon was 50 dBA, which is under the EPA suggested limit. In addition, TVA previously installed noise-reducing baffles to address local residential concerns with the new stack associated with the new gas desulfurization plant.

### 3.17.2 Environmental Consequences

#### *3.17.2.1 Alternative A – No Action*

Under the No Action Alternative, TVA would not construct the process dewatering facility. TVA would continue to follow the current operating plan, which includes the ongoing maintenance of the coal-fired powerhouse and its related structures and parking. No changes to current noise levels surrounding GAF are anticipated, and therefore there would be no noise related impacts, under this alternative.

#### *3.17.2.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System*

Construction and Operation

Under Alternative B, construction activities would last approximately 18 to 24 months. Most of the work would occur during the day on weekdays. Construction activities would result in a minor increase to traffic on roads near the plant, which would result in minor increases in intermittent noise at some nearby residences. During construction, noise would be generated by a variety of construction equipment, including compactors, front loaders, backhoes, graders, and trucks. Due to the temporary nature of construction, and the site's semi-rural location and distance to the nearest receptors (approximately 0.75 mile), noise from construction is expected to cause minor, short-term impacts. Operation of the dewatering facility would result in low noise levels as the conveyer would be contained in a building and would be inaudible to local residences. The results of the 2016 URS noise study, which involved much noisier operating equipment and a larger construction project, indicate that no significant noise related impacts are anticipated related to construction or operation of the dewatering facility.

#### *3.17.2.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream*

Construction and Operation

Under Alternative C, the effects of construction activities would be similar to those resulting from Alternative B. Construction of the recirculation system (Phase 2) under Alternative C would add approximately 12 to 18 months to the construction duration, making overall construction activities more pronounced because of the greater complexity of the project, creating a higher level of additional construction-related noise. As with Alternative B, noise from construction activities is expected to cause minor, short-term impacts. The operation of the additional equipment under this alternative, such as electric pumps, inside the building should not perceptively change the ambient noise environment. The other activities are the same as Alternative B, so the operational noise would not be expected to result in significant impacts to noise.

## 3.18 Socioeconomics and Environmental Justice

### 3.18.1 Affected Environment

GAF is located in Sumner County on the north bank of the Cumberland River approximately 7 miles south of the City of Gallatin.

#### *3.18.1.1 Socioeconomics*

The 2014 estimated population of Sumner County is 166,636, including 31,800 who live in Gallatin (U.S. Census Bureau 2016a). Wilson County, across the Cumberland River from GAF, had a population of 119,584. Both counties are part of the Nashville Metropolitan Statistical Area, which includes all counties linked to the Nashville economy. In 2014, total employment in Sumner County was 63,732, and in Wilson County it was 57,859 (U.S. Bureau of Economic Analysis 2016a). No single industry dominates employment in either county. In 2014, the two largest employment sectors in Sumner County were government and government enterprises, which accounted for 13 percent of employment, followed by 11.1 percent in retail trade. In Wilson County, government and government enterprises accounted for 9.5 percent of total employment, and retail trade accounted for 13.9 percent. In comparison, statewide, 11.8 percent of jobs were in government and 10.6 percent were in retail trade, while nationally, 12.9 percent of jobs were in government and 10.1 were in retail trade. Per capita income in 2014 was $38,813 in Sumner County, or 84 percent of the national average of $46,049 (U.S. Bureau of Economic Analysis 2016b). In Wilson County, average income was slightly higher at $41,214, or 90 percent of the national average. Statewide, per capita income was 88 percent of the national average, at $40,457.

#### *3.18.1.2 Environmental Justice*

Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Under EO 12898, Environmental Justice, federal agencies identified in that EO are to address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. While EO 12898 does not apply to its actions, TVA assesses environmental justice impacts in its environmental reviews.

GAF is located in Sumner County in Census Tract 209.01. Census Tract 301.01 and Census Tract 302.04 in Wilson County are to the east, south, and west across the Cumberland River. Census Tract 209.01, Block Group 1 in Sumner County and Census Tract 301.01, Block Group 1 and Census Tract 302.04, Block Group 2 in Wilson County are identified as the potentially affected area for environmental justice.

Minorities include individuals who identify themselves as members of the following population groups: American Indian or Alaskan Native, Asian, Native Hawaiian or Other Pacific Islander, Black, Hispanic, or two or more races (Council on Environmental Quality [CEQ] 1997). Minorities constitute 13.6 percent of the total population in Sumner County as of 2014 and 13.2 percent in Wilson County (Table 3.18-1). Census Tract 209.01, Block Group 1 has a minority population of 8.3 percent, Census Tract 301.01, Block Group 1 has a minority population of 2.6 percent, and Census Tract 302.04, Block Group 2 has a minority population of 5.5 percent. Census Tract 209.01, Block Group 1 has a lesser proportion of minorities than does Sumner County as a whole. Census Tract 301.01, Block Group 1 and Census Tract 302.04, Block Group 2 have a lesser proportion of minorities than does Wilson County as a whole. The block group minority levels are below the state average of 25 percent and less than the national average of 37.2 percent. Therefore, residents of the block groups in the potentially affected area for the GAF site are not considered minority populations.

**Table 3.18-1. 2014 Minority Population Data**

| Area | Total Population | Minority Population | Percent Minority Population |
|---|---|---|---|
| Block Group 1 Census Tract 209.01 (Sumner County) | 1,477 | 123 | 8.3 |
| Block Group 1 Census Tract 301.01 (Wilson County) | 2,107 | 55 | 2.6 |
| Block Group 2 Census Tract 302.04 (Wilson County) | 4,229 | 233 | 5.5 |
| Sumner County | 166,636 | 22,730 | 13.6 |
| Wilson County | 119,584 | 15,835 | 13.2 |
| Tennessee | 6,451,365 | 1,612,415 | 25 |
| United States | 314,107,084 | 116,947,592 | 37.2 |

Note: 2010-2014 American Community Survey 5-Year Estimates.
Source: U.S. Census Bureau 2016b.

Low-income populations in an affected area are identified based on the annual statistical poverty thresholds from the U.S. Census Bureau (CEQ 1997). The portion of the population in Sumner County that has income below the poverty level as of 2014 is 10.2 percent and in Wilson County is 10.4 percent (Table 3.18-2). Census Tract 209.01, Block Group 1 has 10.6 percent of the population living below the poverty level. This is slightly above the Sumner County level of 10.2 but below the state average of 17.8 percent and national level of 15.6 percent. Census Tract 301.01, Block Group 1 has 3.1 percent of the population living below the poverty level, and Census Tract 302.04, Block Group 2 has 2.5 percent of the population living below the poverty level. These are below the Wilson County level as well as below the state and

the national levels of 17.8 and 15.6 percent, respectively. Therefore, residents of the block groups in the vicinity of the GAF site are not considered low-income populations.

**Table 3.18-2. 2014 Poverty Level Data**

| Area | Total Population (1) | Persons Below Poverty Level | Percent of Persons Below Poverty Level |
|---|---|---|---|
| Block Group 1 Census Tract 209.01 (Sumner County) | 1477 | 157 | 10.6 |
| Block Group 1 Census Tract 301.01 (Wilson County) | 2107 | 65 | 3.1 |
| Block Group 2 Census Tract 302.04 (Wilson County) | 4229 | 105 | 2.5 |
| Sumner County | 164,761 | 16,818 | 10.2 |
| Wilson County | 117,846 | 12,308 | 10.4 |
| Tennessee | 6,290,532 | 1,121,344 | 17.8 |
| United States | 306,226,394 | 47,755,606 | 15.6 |

(1) Population for whom poverty status is determined.
Note: 2010-2014 American Community Survey 5-Year Estimates.
Sources: U.S. Census Bureau 2016c; U.S. Census Bureau 2016d.

## 3.18.2 Environmental Consequences

### *3.18.2.1 Alternative A – No Action*

Under the No Action Alternative, TVA would not construct the dewatering facility. There would be no project related changes to population under this alternative. Under the No Action Alternative current employment trends in the area would likely continue with most of the employment in the existing economic sectors of retail trade and government. There would be no new job creation. Minority and low-income populations in the area would not be impacted. Therefore, no impacts to socioeconomics or to environmental justice would be anticipated under the No Action Alternative.

### *3.18.2.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System*

Construction and Operation

All work for the proposed project would be conducted onsite and would create temporary construction jobs for approximately 100 to 125 full-time construction workers over an 18- to 24-month period, adding short-term benefits to the economy of the region. The dewatering facility would be operated through existing employees in the main power plant. There would be a temporary increase in employment and income and the purchase of materials, equipment, and services. This increase would be local or regional, depending on where the workers, goods, and services were obtained. It is likely that some of the construction workforce would be from local or regional sources. A portion could potentially come from out-of-state, temporarily increasing the local population. Also, some materials and services would be purchased locally in the

Sumner County and Wilson County area. The direct impact to the economy associated with construction of the dewatering facility would be short-term and beneficial.

The majority of the indirect employment and income impacts would be from expenditure of the wages earned by the construction workforce, as well as the local workforce used to provide materials and services. Construction and operation of the dewatering facility would have minor beneficial indirect impacts to short-term employment and income levels in Sumner and Wilson counties as well as the surrounding region.

The environmental justice impact analysis addresses potential disproportionately high and adverse human health or environmental effects of an action on minority and low-income populations. No minority or low-income populations have been identified in the potentially affected area for the GAF. Therefore, no disproportionate impacts to environmental justice populations are expected to occur as a result of implementation of Alternative B.

#### *3.18.2.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream*

Construction and Operation

The impacts of implementing Alternative C would be similar to those described for Alternative B as the majority of the processes are the same. The construction period would be similar, with construction of the recirculation system expected to take place over a 12- to 18-month period. Temporary construction jobs for over 125 full-time workers are anticipated. The direct and indirect impacts associated with employment and income as well as purchase of materials and services would be greater based on the additional labor and materials required for construction of the recirculation system in addition to the dewatering facility. The operation of the recirculation system and associated equipment would not change the maintenance requirements considerably, so no additional operational jobs would be required. As described for Alternative B existing employees would handle operations associated with the dewatering system. Therefore, as described for Alternative B, the direct and indirect employment and income impacts from construction of the dewatering facility and recirculation system would be short-term and beneficial.

No disproportionate impacts to environmental justice populations are expected to occur as a result of implementation of Alternative C.

## 3.19 Safety

### 3.19.1 Affected Environment

GAF is bounded by the Cumberland River to the west, south, and east. The areas north of GAF are sparsely populated.

The site is accessible via Steam Plant Road, which is off I-40, Highway 109 and Odom's Bend Rd. The GAF campus is surrounded by a chain link security fence, with guarded entrance gates. Additionally, GAF is on a peninsula with a single road, Steam Plant Road, as the only vehicle access point. Population in the immediate area (within approximately 0.75-mile radius) is very sparse, with only a few dwellings in the vicinity. A recreation area and a public boat access are located north of and adjacent to GAF on Steam Plant Road less than 1 mile from the plant. Prior to 2017, the Gallatin Gun Club operated a shooting range onsite. This lease has been terminated on account of internal agency security concerns. In addition, portions of GAF west

of Steam Plant Road and south of Pond B were designated as wildlife management areas. These have also been closed due to the construction of the approved onsite landfill, further limiting public access to the facility and surrounding area. Public hunting is still permitted on the east side of Steam Plant Road and on both the north and south side of Odom's Bend Road, north of Pond B. Because activity related to the Project would take place within the GAF property boundary, health and safety-related impacts to the general population would be insignificant.

Numerous workers and subcontractors work at GAF each day. It is TVA policy that contractors have in place a site-specific health and safety plan prior to conducting construction activities at TVA properties. A health and safety plan would also be required for workers responsible for operating the systems after construction is complete.

### 3.19.2 Environmental Consequences

#### *3.19.2.1 Alternative A – No Action*

If Alternative A is selected, TVA would continue to follow the current operating plan, which includes the ongoing maintenance of the coal-fired powerhouse and its related structures and parking. No changes to current public health and safety concerns associated with GAF are anticipated under this alternative. There would be no impacts to public health and safety under Alternative A.

#### *3.19.2.2 Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System*

Construction and Operation

Alternative B would involve construction and operation of the proposed dewatering facility. Public health and safety concerns related to this activity would be minor and would consist primarily of potential incidents with construction and construction traffic to and from the facility. No hazardous materials that might affect human safety are expected to be utilized under this alternative. Therefore, the impacts to public health and safety are expected to be minor and temporary under Alternative B.

#### *3.19.2.3 Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream*

Construction and Operation

Alternative C would involve construction and operation of the coal ash dewatering system with a recirculated bottom ash sluice basin. As with Alternative B, public health and safety concerns related to this activity would be minor and would consist primarily of potential incidents with construction or construction traffic to and from the facility. No hazardous materials that might affect human safety are expected to be utilized under this alternative. Therefore, the impacts to public health and safety are expected to be minor and temporary under Alternative C.

## 3.20 Cumulative Impacts

Cumulative impacts are defined in the *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (CEQ 2005) as follows:

> "Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable

future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

This section discusses those resources and receptors that could result in perceivable, but insignificant, cumulative impacts from TVA's alternative actions. For the proposed alternative, no substantive cumulative impacts are expected.

### 3.20.1 Onsite activities

The GAF reservation is currently using the approved onsite landfill for fly ash and scrubber waste dry storage. This use of the landfill would continue in addition to the storage of the dry bottom ash materials. As the landfill is currently in use and all haul roads and associated infrastructure have already been constructed, cumulative impacts from the addition of the dry bottom ash to the waste stream are not anticipated.

In June of 2016, TVA issued a Final Programmatic Environmental Impact Statement (PEIS) that analyzed methods for closing ash impoundments that hold CCR materials at TVA fossil plants. In this document, TVA identified specific screening and evaluation factors to help frame its assessment of ash impoundment closures at additional facilities. A Record of Decision was released in July 2016 that would allow future environmental reviews of CCR impoundment closures to tier from the PEIS. Although the decision regarding the handling of ash impoundments at GAF has not been made at this time, future facility modifications could potentially include the closure of the majority of the ash impoundment complex and the creation of an approved lined EQ basin. Any future modifications would be evaluated under a separate NEPA document that would tier form the PEIS. The proposed bottom ash dewatering processing project related to coal ash management would be designed to reduce potential water quality impacts. Any cumulative impacts incurred would likely be minor, but primarily beneficial.

### 3.20.2 Federal Activities

There is one Federal Project in the planning stages in the vicinity of the GAF reservation. The USACE is planning on rehabilitating Unit #4 at the Old Hickory Powerhouse. This is a hydroelectric generator located approximately 15 miles west of the GAF reservation on the east side of Hendersonville. Due to the distance, and the proposed construction date of 2018, this project should not contribute to cumulative impacts concurrent with the dewatering facility (USACE 2016).

The TWRA receives federal funding for the operation of fish hatcheries, upgrading fishing piers to accommodate handicapped anglers, renovation and construction of boat ramps, acquisition of stream access sites, evaluation of length limits and stocking success on reservoirs, stream habitat improvement projects, statewide construction and maintenance of fish attractors, habitat protection which includes investigating pollution problems and fish population surveys on reservoirs, lakes, and streams. As the GAF is located along a reservoir which has several water access sites in the near proximity – including one on the reservation, it is likely that some of these activities are taking place on or near the GAF. Additionally, the CRAC is located on the GAF reservation. However, as the proposed dewatering facility would be located at the former chemical pond site, which is already considered industrial in terms of land use, none of these activities is likely to be impacted by the construction and operation of the facility. Federally funded TWRA activities on site and in the vicinity of the GAF reservation would not contribute to cumulative impacts (TWRA 2016b).

Federal funding is also used by the TDOT for transportation projects on both federal and state roads. There is one federally funded TDOT project in the GAF reservation area, the State Route (SR) 109 widening project. Currently, this project is underway, and most of the activities in the GAF vicinity are complete. Completed project activities include the Gallatin Bypass, the Cumberland Bridge replacement, the Gallatin Bypass at Portland, and the widening of SR 109 north of I-40 to south of SR 24. The widening of SR 109 from the Cumberland Bridge to the Gallatin Bypass is currently under construction and slated to be complete in 2019. Two additional sections to the south of the bridge are in the planning stages (TDOT 2016). Depending on the routes chosen for material delivery to GAF for the construction of the dewatering facility, minor cumulative negative impacts to traffic could occur in conjunction with the state road widening project. Minor increases in traffic delays could occur if materials are delivered to the GAF using the section of SR 109 that is currently under construction or planned to be under construction. Additional delays may be caused by construction workers living in the area travelling to and from the proposed facility site. However, large numbers of additional vehicles are not anticipated and delays would be temporary and only during construction of the dewatering facility.

### 3.20.3 Local Projects

The Gallatin area is experiencing rapid growth due to its proximity to Nashville. As a result, there are some local projects which could lead to cumulative impacts. The City of Gallatin has recently acquired 207 acres for a new industrial park. Lots became available in 2012 (Gallatin Economic Development Agency 2016). This industrial park is located to the north of the GAF reservation on Airport Road. If major construction of industrial facilities occur simultaneously with the construction of the dewatering facility, minor negative cumulative impacts to transportation could occur. These impacts would only occur during construction however, and are not anticipated to be significant.

Many of the Sumner County schools are undergoing upgrades, renovations and additions. Most of these projects are slated to be completed by December 2016 (Sumner County Board of Education 2016). Due to the size of these multiple projects and the timing, they should not contribute to cumulative impacts in conjunction with the dewatering facility.

### 3.20.4 Private projects

As the Gallatin area is growing rapidly, there are several privately funded developments occurring in the vicinity. The Bradford Company is planning an expansion which will result in an additional 25 jobs at their packaging plant (Tennessee Department of Economic and Community Development 2016).

Multiple residential developments are being constructed in Gallatin and Hendersonville. According to local real estate agents, construction cannot keep up with demand for new residential properties. Thousands of homes have either been recently constructed or are under construction in the area (Memphis Daily News 2016). Although these construction projects may cause minor cumulative negative impacts to transportation, impacts would not be considered significant. The residential and industrial construction projects are not in close proximity to the GAF reservation, and should therefore not result in any significant cumulative impacts as workers and materials would be travelling on different roads.

## 3.21 Unavoidable Adverse Environmental Impacts

Unavoidable adverse impacts are the effects of the project on natural and human resources that would remain after mitigation measures or BMPs have been applied. Mitigation measures and BMPs are typically implemented to reduce a potential impact to a level that would be below the threshold of significance as defined by the CEQ and the courts. Impacts associated with construction of the dewatering and recirculation system have the potential to cause unavoidable adverse effects to several environmental resources.

Under Alternative B and C, unavoidable localized increases in air and noise emissions would occur during construction. Activities associated with the use of construction equipment may result in varying amounts of dust, air emissions and noise. Potential noise impacts also include traffic noise associated with the construction workforce traveling to and from the project site. Emissions from construction activities, and equipment are minimized through implementation of mitigation measures, including proper maintenance of construction equipment and vehicles and dust suppression. During operation, onsite handling and transportation of CCRs to the special waste landfill may generate minor amounts of fugitive dust. Overall, these impacts would be considered minor.

## 3.22 Relationship of Short-Term Uses and Long-Term Productivity

NEPA requires a discussion of the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity. This EA focuses on the analyses of environmental impacts associated with the construction of the dewatering and recirculation system. These activities are considered short-term uses for purposes of this section. The long-term use is considered to be initiated with the cessation of operations at GAF. This section includes an evaluation of the extent that the short-term uses preclude any options for future long-term use of the proposed project site.

GAF will be used exclusively for the purpose of generating electric power for the foreseeable future. Much of the plant site is occupied by generating equipment and associated facilities, such as the coal storage area, switchyard, ash impoundments, and ash disposal areas. However, some portions of the site are vacant, undeveloped areas. The proposed dewatering facility would be constructed on an area currently occupied by a former chemical pond. Because the entire site is dedicated to electric power production, no loss of productivity of other natural resources, such as timber, minerals, etc., is anticipated. Likewise, use of a portion of GAF for the proposed dewatering and recirculation facility is not expected to result in a short-term or long-term loss of productivity of the site.

The proposed dewatering and recirculation facility would be constructed in an area that has been previously disturbed and supports industrial uses. Because the site is dedicated to power production, no loss of productivity of other natural resources is anticipated. In the long term, upon cessation of operations at GAF and after decommissioning, the land could be re-used and made available for other industrial as well as non-industrial uses.

## 3.23 Irreversible and Irretrievable Commitments of Resources

As used here, irreversible commitments of resources include the use or consumption of nonrenewable resources as a result of a decision or implementing a proposed action. For example, extraction of ore is an irreversible commitment. Irretrievable commitments involve the

use or commitment of resources for a period of time, even a long period. An example of an irretrievable resource commitment is the loss of timber production on a newly-cleared transmission line right-of-way through a previously forested area. In that case, removal of the transmission line and the right-of-way would eventually result in the restoration of forest land and timber productivity.

Construction and operation of the proposed dewatering and recirculation facility would result in the irreversible commitment of certain fuels, energy, building materials, and process materials, such as thickening agents. TVA's use of portions of the GAF site for the proposed dewatering facility would constitute a cumulative irretrievable commitment of land resources and land use for the life of GAF. However, as stated above, this land is currently in some form of industrial use and will not include conversion of natural resources or other land use.

# CHAPTER 4 - LIST OF PREPARERS

## 4.1 NEPA Project Management

**Ashley Farless, PE, AICP (TVA)**
Position: NEPA Specialist
Education: BS, Civil Engineering
Experience: 17 years in NEPA compliance
Involvement: Project Management

**Bill Roddy (TVA)**
Position: Project Manager, Environmental Support
Education: Chemical Engineering Tennessee Technological University
Experience: 20 + Years in Environmental Compliance
Involvement: Project Management

**Carol Freeman (AECOM)**
Position: NEPA Support
Education: MS, Geological Sciences and Space Studies; BS, Geology
Experience: 19 years in scientific and technical research, including NEPA and NHPA compliance and geologic field work
Involvement: Project Management

**Roberta Hurley (AECOM)**
Position: Project Manager
Education: MA, Chemistry; BS, Chemistry and Biology
Experience: 30 years of experience in NEPA document preparation
Involvement: Project Management, ITR

**Erika Grace (AECOM)**
Position: AECOM Project Coordinator
Education: MS, Environmental Toxicology; BS, Biological Sciences
Experience: 5 years in NEPA coordination and document preparation
Involvement: Project Management

## 4.2 Other Contributors

**Craig Berhoft (AECOM)**
Position: Geologist
Education: BS, Geology
Experience: 25 years
Involvement: Solid and Hazardous Waste

**Steve Cole (TVA)**
Position: Contract Archaeologist

Education: MA, Anthropology, PhD, Anthropology (Archaeology specialization)
Experience: 12 years in cultural resources, 4 years teaching at universities/colleges
Involvement: Cultural and Historic Resources

**Sarah W. Davis (AECOM)**
Position: Staff Scientist
Education: BS Biology
Experience: 1 year of experience in NEPA document preparation
Involvement: Wildlife, Aquatic Ecology, and Threatened and Endangered Species

**Bob Dover (AECOM)**
Position: Senior Program Manager, Climate Policy
Education: MS and BS, Geology
Experience: 30 years of professional environmental experience
Involvement: Air Quality and Climate Change, Groundwater and Geology

**Zoe Knesl (AECOM)**
Position: Environmental Scientist
Education: MS, Marine Science; BA, Integrative Biology and Studio Art
Experience: 20 years
Involvement: Visual Resources and Noise

**Michael Meulemans, PE (AECOM)**
Position: Civil Engineer
Education: MS, Engineering Management
Experience: 30 years
Involvement: Rail and Roadway Transportation and Safety

**Hayden Orr (AECOM)**
Position: Project Engineer
Education: BS Engineering
Experience: 6 years of experience in NEPA document preparation
Involvement: Transportation, noise, safety, solid and hazardous waste.

**James Orr (AECOM)**
Position: Senior Project Scientist
Education: BS and MS, Biology
Experience: 30 years of experience in NEPA document preparation
Involvement: Vegetation, Wildlife, Aquatic Ecology, Wetlands, and Threatened and Endangered Species

**Susan Provenzano, AICP (AECOM)**
Position: Senior Environmental Scientist
Education: MS, Marine Environmental Sciences; BA, Earth and Space Sciences
Experience: 38 years
Involvement: Natural Areas, Parks & Recreation, Land Use and Prime Farmland, Socioeconomics and Environmental Justice

**Daniel Wade (AECOM)**
Position: Project Scientist
Education: MS, Biosystems Engineering

Experience: 3 years of experience in NEPA document preparation
Involvement: GIS and mapping, Vegetation, Wetlands

**A. Chevales Williams (TVA)**
Position: Environmental Engineer
Education: BS, Environmental Chemical Engineering
Experience: 10 years in water quality monitoring and compliance; 9 years in NEPA planning and environmental services
Involvement: Surface Water

**Carrie Williamson, PE, CFM (TVA)**
Position: Program Manager, Flood Risk
Education: BS and MS, Civil Engineering
Experience: 4 year Floodplains, 3 years River Forecasting, 7 years compliance monitoring
Involvement: Floodplains

**Richard Yarnell (TVA)**
Position: Archaeologist
Education: B.S., Environmental Health
Experience: 39 years, cultural resource management
Involvement: Cultural and Historic Resources

This page intentionally left blank

# CHAPTER 5 - ENVIRONMENTAL ASSESSMENT RECIPIENTS

## 5.1 Federal Agencies

USDA Forest Service, Region 8
U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service

## 5.2 Federally Recognized Tribes

The following federally recognized tribes were contacted regarding the availability of this EA:

Cherokee Nation
Eastern Band of Cherokee Indians
United Keetoowah Band of Cherokee Indians in Oklahoma
The Chickasaw Nation
Muscogee (Creek) Nation of Oklahoma
Alabama-Quassarte Tribal Town
Kialegee Tribal Town
Thlopthlocco Tribal Town
Absentee Shawnee Tribe of Oklahoma
Eastern Shawnee Tribe of Oklahoma
Shawnee Tribe

## 5.3 State Agencies

Tennessee Department of Environment and Conservation
Tennessee Historical Commission
Tennessee Wildlife Resources Agency
Tennessee Department of Transportation
Department of Economic and Community Development, Nashville
Tennessee Department of Agriculture
Natural Resources Conservation Service, Tennessee.
Greater Nashville Regional Council

This page intentionally left blank

# CHAPTER 6 - LITERATURE CITED

Active Captain. 2016. Details for Cherokee Marina. Accessed on 11/14/16 at: https://activecaptain.com/quickLists/marina.php?name=Cherokee_Marina_Lebanon_TN&i=328308610

AECOM. 2016. Final Report – Phase I Summer Habitat Assessment, Gallatin Fossil Plant Bottom Ash Process Dewatering, Environmental Assessment, Gallatin, TN. November.

Barrett, J. and J. Holland. 2012. Phase I Archaeological Survey of the Proposed Stockpile Area at the Gallatin Fossil Plant, Sumner County, Tennessee: Final Report. Prepared by TRC Environmental Corporation, Nashville, Tennessee. Submitted to TVA Cultural Resources Office, Knoxville, Tennessee. April.

Bowen, Abigail; Branum, Jodie; Chandler, Corey; Dattilo, Adam; Dimick, Britta; Gaither, Shea; Henley, Casey; Liskey, Todd; Melton, Joe; Minghini, Cherie; Pearman, Paul; Smithson, Kenton; Turk, Joe; Willard, Emily; and Wilson, Robby. 2012. *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities*. Chattanooga, Tennessee.

Brady, J., T. Kunz, M. D. Tuttle, and D. Wilson. 1982. Gray Bat Recovery Plan. U.S. Fish Wildlife Service 140 pp.

Brahana and Bradley. 1986. *Preliminary Delineation and Description of the Regional Aquifers of Tennessee – The Central Basin Aquifer System*. USGS Water- Resources Investigations. Report 82-4002.

Buonicore, A. J. and W. T. Davis (eds.). 1992. The Air Pollution Engineering Manual. Air & Waste Management Association. New York: Van Nostrand Reinhold Company. Chapter 4.

City of Gallatin. 2016. Parks and Recreation. Accessed on 10/12/16 at: http://www.gallatinleisureservices.com/parks/

Council on Environmental Quality (CEQ), 1997. “Environmental Justice, Guidance Under the National Environmental Policy Act,” Executive Office of the President, Washington, DC, December 10, 1997.

CEQ 2005. Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, Reprint, 40 CFR Parts 1500-1508. 2005. Available online at: https://energy.gov/sites/prod/files/NEPA-40CFR1500_1508.pdf

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetland and Deepwater Habitats of the United States*. Washington, D.C.: United States Fish and Wildlife Publication FWS/OBS-79/31

Deter-Wolf, A. and Wampler, M.E. 2005. Phase I Archaeological Survey of Rail Spur Improvements at the Gallatin Fossil Plant, Sumner County, Tennessee: Final Report. Prepared by TRC Environmental Corporation, Nashville, Tennessee. Submitted to TVA Cultural Resources Office, Knoxville, Tennessee. July.

Electric Power Research Institute (EPRI). 2010. Electric Power Research Institute. Comparison of Coal Combustion Products to Other Common Materials. 1020556. Sept. Available online at: http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000000001020556

U.S. Environmental Protection Agency (EPA). 2012. Local Drinking Water Information. Available online at: http://www.epa.gov/safewater/dwinfo/index.html

EPA. 2014. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012 (April 2014), Report No: EPA 430-R-14-003. Retrieved from https://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2014-Main-Text.pdf

EPA. 2016a. Air Trends Report. Accessed on 10/24/16 at: https://gispub.epa.gov/air/trendsreport/2016/

EPA. 2016b. NAAQS Table. Accessed on 10/24/16 at: https://www.epa.gov/criteria-air-pollutants/naaqs-table

EPA. 2016c. Regional Screening Levels for Chemical Contaminants at Superfund Sites. Accessed 01/16/17. https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016

Federal Emergency Management Agency (FEMA) 2012. Flood Insurance Study Sumner County, TN V.2, 47165CV001C. Plate 21. P. 26. Available at: http://www.sumnertn.org/2-sumner-county-flood-insurance-study-volume-2.pdf

FEMA, 2016. FEMA's National Flood Hazard Layer (Official). Retrieved from http://fema.maps.arcgis.com/home/webmap/viewer.html?webmap=cbe088e7c8704464aa0fc34eb99e7f30&extent=-86.7000321923825,36.29714612900611,-86.19328780761753,36.479556616473495 (accessed September 2016).

Federal Interagency Committee on Noise. 1992. *Federal Agency Review of Selected Airport Noise Analysis Issues.* Federal Interagency Committee on Noise, August 1992. Available at: ftp://ftp.agl.faa.gov/Materials%20Released%20Related%20to%20the%20OM%20EIS/3-31-2005%20World%20Gateway%20Related%20Documents/787_122.pdf

Gallatin Economic Development Agency. 2016. Industrial Center. Accessed on 10/13/16 at: http://www.gallatingetsit.com/properties/industrial-park/

Gallatin Marina. 2016. Boat Slips and Dry Storage at Gallatin Marina. Accessed on 10/12/16 at: http://www.gallatinmarina.com/storage.php

Good Sam Club. 2016. Accessed on 10/12/13 at http://www.goodsamclub.com/search-by-map/#latitude=36.309878673691415&longitude=-86.44492362915036&zoom=12&features=0&list=true

Google Earth. 2016. Measured distance from GAF to Odom's Bend boat access. Accessed on 10/12/16.

Griffith, G.E., J.M. Omernik, J.A. Comstock, S. Lawrence, G. Martin, A. Goddard, V.J. Hulcher, and T. Foster. 2001. *Ecoregions of Tennessee* (color poster with map, descriptive text, summary tables, and photographs). Reston, Virginia: United States Geological Survey (map scale 1:1,700,000).

Hanchar, D.W. 1988. *Geology of an Area Near Brentwood, Williamson County, Tennessee*. USGS Water-Resources Investigations Report 88-4176.

Hileman, Gregg E. and Lee, Roger W. 1993. *Geochemistry of and Radioactivity in Ground Water of the Highland Rim and Central Basin Aquifer Systems, Hickman and Maury Counties*, Tennessee. U,S, Geological Survey, Water-Resources Investigation Report 92-4092.

Hockersmith, K. and Holland, J. 2013. Phase I Archaeological Survey for the Proposed Pond D Spillway Improvements Project at the TVA Gallatin Fossil Plant, Sumner County, Tenneessee: Draft Report. Prepared by TRC Environmental Corporation, Nashville, Tennessee. Submitted to TVA Cultural Resources Office, Knoxville, Tennessee. April.

Hockersmith, K., T. Karpynec, and J. Holland. 2012. Phase I Cultural Resources Survey, New Dry Scrubber Technologies, Area South of the Rail Loop, Gallatin Fossil Plant, Sumner County, Tennessee: Final Report. Prepared by TRC Environmental Corporation, Nashville, Tennessee. Submitted to TVA Cultural Resources Office, Knoxville, Tennessee. June.

Hockersmith, K., J. Holland, and J. Burr. 2013. Phase I Archaeological Survey of 325 Acres for Potential Soil Borrow Areas at the TVA Gallatin Fossil Plant, Sumner County, Tennessee: Draft Report. Prepared by TRC Environmental Corporation, Nashville, Tennessee. Submitted to TVA Cultural Resources Office, Knoxville, Tennessee. August.

Kunkel et al 2013: Regional Climate Trends and Scenarios for the U.S. National Climate Assessment: Part 2. Climate of the Southeast U.S. NOAA Technical Report at https://scenarios.globalchange.gov/sites/default/files/NOAA_NESDIS_Tech_Report_142-2-Climate_of_the_Southeast_U.S_0.pdf

Kurta, A., and S. W. Murray. 2002. Philopatry and migration of banded Indiana bats (*Myotis sodalis*) and effects of radio transmitters. Journal of Mammalogy 83:585-589.

Larson 2016. Aaron Larson. Coal combustion By-products aren't All Bad: The Beneficial Use Solution. Power 10/01/2016 Ed. Avail at: http://www.powermag.com/coal-combustion-products-arent-bad-beneficial-use-solution/?printmode=0

Le Quéré et al 2013. Global Carbon Budget 2013, Earth Syst. Sci. Data 6: 689-760. doi: 10.5194/essd-6-235-2014.

Mack, John J. 2001. *Ohio Rapid Assessment Method for Wetlands, Manual for Using Version 5.0*. Ohio EPA Technical Bulletin Wetland/2001-1-1. Ohio Environmental Protection Agency, Division of Surface Water, 401 Wetland Ecology Unit, Columbus, Ohio.

McKee, L. 2010. Phase I Archaeological Survey, Rail Loop Parcel, Ash Ponds, a Closed Disposal Area at the Gallatin Fossil Plant, Sumner County, Tennessee: Final Report.

Prepared by TRC Environmental Corporation, Nashville, Tennessee. Submitted to TVA Cultural Resources Office, Knoxville, Tennessee. July.

McKee, L. 2011. Phase I Archaeological Survey, Southern Portion of the Rail Loop Parcel at the Gallatin Fossil Fuel Plant, Sumner County, Tennessee: Draft Report. Prepared by TRC Environmental Corporation, Nashville, Tennessee. Submitted to TVA Cultural Resources Office, Knoxville, Tennessee. March.

McKee, L. 2012. Phase I Archaeological Survey, Southern Portion of the Rail Loop Parcel at the Gallatin Fossil Fuel Plant, Sumner County, Tennessee: Final Report. Prepared by TRC Environmental Corporation, Nashville, Tennessee. Submitted to TVA Cultural Resources Office, Knoxville, Tennessee. June.

Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds., 2014: Climate Change Impacts in the United States: The Third National Climate Assessment. U.S. Global Change Research Program.

Memphis Daily News. 2016. Middle Tennessee Construction Can't meet Demand. Accessed on 10/13/16 at: https://www.memphisdailynews.com/news/2016/apr/16/middle-tennessee-construction-cant-meet-demand/

Natural Resources Conservation Service. 2015. Web Soil Survey, Sumner County, Tennessee. U.S. Department of Agriculture. Accessed online December 9, 2016 at http://websoilsurvey.sc.egov.usda.gov/WssProduct/o4hyjgtert4c1zct04nthcwn/o4hyjgtert4c1zct04nthcwn/20161209_10213410476_1_Soil_Map.pdf.

NatureServe, 2016a. Allegheny Woodrat zoological data. Available at: http://explorer.natureserve.org/servlet/NatureServe?searchName=Neotoma+magister Accessed 12/20/2016.

NatureServe. 2016b Southeastern Shrew zoological data. Available at: http://explorer.natureserve.org/servlet/NatureServe?searchName=Sorex longirostris, accessed Jan 5, 2017.

NatureServe, 2016c. Leafy Prairie-Clover zoological data. Available at: http://explorer.natureserve.org/servlet/NatureServe?searchName=Dalea+foliosa. Accessed 10/13/2016.

NatureServe, 2016d. Spring Creek Bladderpod zoological data. Available at: http://explorer.natureserve.org/servlet/NatureServe?searchName=Lesquerella+perforata Accessed 10/13/2016.

Pruitt, L. and TeWinkle, L. (Eds.) 2007. Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. U.S. Fish and Wildlife Service, Fort Snelling, Minnesota. 260 pgs. Retrieved from http://www.fws.gov/midwest/endangered/mammals/inba/pdf/inba_fnldrftrecpln_apr07.pdf

Recreation.gov. 2016. Lone Branch, TN. Accessed on 10/12/16 at: http://www.recreation.gov/camping/Lone_Branch/r/campsiteSearch.do?search=site&page=siteresult&contractCode=NRSO&parkId=71270

Sumner County Board of Education. 2016. Director's Update Regarding Construction Projects. Accessed on 10/13/16 at: http://www.sumnerschools.org/images/slideshow/docs/SCS-Construction-Update.Final.pdf

Tennessee Department of Economic and Community Development. 2016. Bradford Company to Expand in Gallatin. February 18, 2016. Accessed on 12/8/16 at: https://www.tn.gov/ecd/news/37612

Tennessee Department of Environment and Conservation (TDEC). 2007. *Old Hickory Lake Watershed (05130201) of the Cumberland River Basin, Watershed Water Quality Management Plan.* Available online at https://tn.gov/assets/entities/environment/attachments/wr-ws_watershed-plan-old-hickory-2007.pdf. (Accessed October 2016).

TDEC. 2009. "Process Emission Standards," Chapter 1200-3-9 in Rules of Tennessee Department of Environment and Conservation Bureau of Environment. Nashville, Tenn.: TDEC, Division of Air Pollution Control, April 2009 (revised).

TDEC. 2012a. NPDES Permit No. TN0005428, TVA Gallatin Fossil Plant, Gallatin, Sumner County, Tennessee. Issued May 31, 2012. Nashville: TDEC, Division of Water Pollution Control.

TDEC. 2012b. *Tennessee Erosion and Sediment Control Handbook* - Division of Water Resources. Nashville, TN. 4th Edition 2012 Retrieved from <http://tnepsc.org/TDEC_EandS_Handbook_2012_Edition4/TDEC%20EandS%20Handbook%204th%20Edition.pdf>

TDEC. 2013. Rules of the Tennessee Department of Environment and Conservation – Chapter 0400-40-04: Use Classifications for Surface Waters. December. Available at: https://www.epa.gov/sites/production/files/2014-12/documents/tn-chapter1200-4-4.pdf

TDEC. 2014. TVA Gallatin Final Permit. Registration Authorizing Solid Waste Disposal Activities in Tennessee. Registration Number IDL830000219. June 30. Available at: http://environment-online.tn.gov:8080/pls/enf_reports/f?p=19035:34051:::NO::P34051_PERMIT_ID:2361

TDEC. 2016a. Natural Heritage database. (http://tn.gov/environment/article/na-environmental-review), accessed October 13, 2016

TDEC. 2016b. Year 2016 Exceptional Tennessee Waters and Outstanding Natural Resource Waters Database. Division of Water Resources. Nashville, TN. Retrieved from <http://tdec.tn.gov:8080/pls/enf_reports/f?p=9034:34304::::::>

TDEC. 2016c Year 2016 Draft 303 (d) List. Division of Water Resources. Nashville, TN. July. Available at: http://www.tennessee.gov/assets/entities/environment/attachments/wr_wq_303d-2016-draft.pdf

TDEC. 2016d. Year 2016 Posted Stream, Rivers, and Reservoirs in Tennessee. Division of Water Resources. Nashville, TN. November. Available at: https://tn.gov/assets/entities/environment/attachments/wr_wq_fish-advisories.pdf

TDEC. 2016e. *General NPDES Permit for Discharges of Stormwater Associated with Construction Activities. 2016*.

Tennessee Department of Transportation (TDOT). 2013. AADT data.

TDOT. 2016. State Route 109 widening. Accessed on 10/13/16 at: http://www.tn.gov/tdot/article/state-route-109-widening-timeline

Tennessee Valley Authority (TVA). 1967. *The Gallatin Steam Plant: A Report on the Planning, Design, Construction, Costs, and First Power Operations of the Initial Four-Unit Plant*. Technical Report No. 36.

TVA. 1995. *Energy Vision 2020, Volume Two, Technical Documents, Integrated Resource Plan Environmental Impact Statement,* December 1995. Technical Document 1, Section 4: Water Resources. Retrieved from < http://152.87.4.98/environment/reports/energyvision2020/ev2020_vol2fm.pdf>

TVA. 2009. *Installation of Flue Gas Desulfurization System on John Sevier Fossil Plant Draft Environmental Assessment.* May. Available at: http://152.87.4.98/environment/reports/john_sevier_scrubber/draft_ea_for_release.pdf

TVA. 2011. *White Paper on Bottom Ash Sluice Dewatering and Recycle Study*. December 13, 2011. Pages 2 and 4.

TVA. 2013. Final Environmental Assessment: Installation of Emission Control Equipment and Associated Facilities at Gallatin Fossil Plant, Sumner County, Tennessee.

TVA. 2016a. Kingston Fossil Plant Bottom Ash Dewatering Facility Final Environmental Assessment. March. Available at: https://www.tva.gov/file_source/TVA/Site%20Content/Environment/Environmental%20Stewardship/Environmental%20Reviews/Kingston%20Fossil%20Plant%20Bottom%20Ash%20Dewatering%20Facility/20160323_kif_dewatering_final_ea__reduced_file_size_for_web.pdf

TVA 2016b. Shawnee Fossil Plant Bottom Ash Process Dewatering Facility Final Environmental Assessment. September. Available at: https://www.tva.gov/file_source/TVA/Site%20Content/Environment/Environmental%20Stewardship/Environmental%20Reviews/Shawnee%20Fossil%20Plant%20Bottom%20Ash%20Process%20Dewatering%20Facility/2016-0913%20SHF%20Dewatering%20Final%20EA.pdf

TVA. 2016c. TVA Biomonitoring Results 2001 – 2014, email from Tyler Baker (TVA).

TVA. 2016d. Natural Heritage Project Database, 2016. *TVA Natural Heritage Library*.

TVA. 2016e. Gallatin Fossil Plant Non-Registered Site #83-1324. Groundwater Assessment Monitoring Report. July.

TVA. 2016f. Gallatin Completes Dry Ash Storage Initiative July 5, 2016. https://www.tva.gov/Newsroom/Gallatin-Completes-Dry-Ash-Storage-Initiative

TVA 2016g. Project Planning Document. GAF Bottom Ash Dewatering Project Number #203532, Project Work Order #420494. June 8. Rev. 0.

Tennessee Wildlife Resources Agency (TWRA). 2016a. 2016-2017 Waterfowl Hunting Guide. Available at: http://www.tn.gov/assets/entities/twra/attachments/waterfowlguide.pdf

TWRA. 2016b. Federal Aid (Wallop-Breaux) Projects. Accessed on 10/17/16 at: https://www.tn.gov/twra/article/federal-aid-projects

Tuttle, M. D. 1976. Population ecology of the gray bat (*Myotis grisescens*): factors influencing growth and survival of newly volant young. Ecology 57:587-95.

URS. 2016. Summary Report, Gallatin Units 1-4 FGD & Baghouse Addition Project Acoustical Survey to Determine Noise Effects on Surrounding Community

U.S. Army Corps of Engineers (USACE). 2012a. Nashville District—Old Hickory Lake, Project History. Retrieved from<http://www.lrn.usace.army.mil/op/old/rec/project.htm>

USACE. 2012b. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0)*. Eds. J. S. Weakley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-12-9. Vicksburg, Mississippi: U.S. Army Engineer Research and Development Center. Available at: http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/reg_supp/EMP_Piedmont_v2b.pdf

USACE. 2012-2015. Data from Monitoring Station 3OLD20007 (CuRM 263.1, upstream approximately 19.9 river miles) and 3OLD20004 (CuRM 236.0, downstream 6.9 river miles). Data retrieved by TVA request made in 2016.

USACE. 2016. Old Hickory Unit #4 Turbine-Generator Rehab Project. Accessed on 10/13/16 at: http://www.lrn.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/562071/old-hickory-unit-4-turbine-generator-rehab-project/.

U.S. Bureau of Economic Analysis, 2016a. CA25N Total Full-Time and Part-Time Employment by NAICS Industry. Sumner County, Wilson County, Tennessee, and United States. Last updated 11/19/2015. Retrieved from http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=5#reqid=70&step=1&isuri=1 (accessed 11/1/2016).

U.S. Bureau of Economic Analysis, 2016b. CA1Personal Income Summary: Personal Income, Population, Per Capita Personal Income. Sumner County, Wilson County, Tennessee, and United States. Last updated 11/19/2015. Retrieved from http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=5#reqid=70&step=1&isuri=1 (accessed 10/31/2016).

U.S. Census Bureau. 2016a. DP05, ACS Demographic and Housing Estimates, 2010-2014 American Community Survey 5-Year Estimates. Retrieved from http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml (accessed 11/1/2016).

U.S. Census Bureau. 2016b. B03002, Hispanic or Latino Origin by Race, 2010-2014 American Community Survey 5-Year Estimates. Retrieved from

http://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t (accessed 11/3/2016).

U.S. Census Bureau. 2016c. B17021, Poverty Status of Individuals in the Past 12 Months by Living Arrangement, 2010-2014 American Community Survey 5-Year Estimates. Retrieved from http://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t (accessed 11/1/2016).

U.S. Census Bureau. 2016d. S1701, Poverty Status of Individuals in the Past 12 Months, 2010-2014 American Community Survey 5-Year Estimates. Retrieved from http://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t (accessed 11/2/2016).

U.S. Department of Agriculture (USDA). 1997. Soil Survey of Sumner County, Tennessee. United States Department of Agriculture, Natural Resources Conservation Service in cooperation with Tennessee Agricultural Experiment Station. Accessed online December 8, 2016 at https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/tennessee/sumnerTN1997/Sumner.pdf.

U. S. Fish and Wildlife Service (USFWS). 2009. Gray bat (*Myotis grisescens*) 5-year review: summary and evaluation. USFWS, Missouri Ecological Services Field Office, Columbia, MO.

USFWS. 2013. 12-month finding on a petition to list the eastern small-footed bat and the northern long-eared bat as endangered or threatened species; listing the northern long-eared bat as an endangered species. Federal Register 78(191):61046-61080. October 2.

USFWS, 2016. Information for Planning and Conservation (IPaC) Trust Resource Report. Retrieved from https://ecos.fws.gov.ipac/ (generated September 27, 2016).

U.S. Geological Survey (USGS). 2005. Online Publications Directory—03426310 Cumberland River at Old Hickory Dam (Tailwater), TN. Retrieved from <http://pubs.usgs.gov/wdr/2005/wdr-tn-05/PDF/03426310.2005.sw.pdf> and http://pubs.usgs.gov/wdr/2005/wdr-tn-05/PDF/

USGS. 2011. Geochemical database of feed coal and coal combustion products (CCPs) from five power plants in the United States: U.S. Geological Survey Data Series 635. Available online at: https://pubs.usgs.gov/ds/635/

U.S. Shorebird Conservation Plan Partnership. 2016. U.S. Shorebirds of Conservation Concern ─ 2016. <http://www.shorebirdplan.org/science/assessment-conservation-status-shorebirds/>

U.S. Water Resources Council. 1978. Guidelines for Implementing Executive Order 11988, Floodplain Management.

# Appendix A – Response to Comments

## Appendix A – Public and Agency Comments Received on the Draft EA and TVA's Response to Comment

### INTRODUCTION

A Draft Environmental Assessment (EA) of the proposed Gallatin Fossil Plant Bottom Ash Dewatering Facility was released for public review and comment on March 23, 2017. The comment period closed on April 24, 2017. The Draft EA was transmitted to various agencies and federally recognized tribes. It was also posted on Tennessee Valley Authority's (TVA's) public National Environmental Policy Act (NEPA) review website. A notice of availability (NOA) including a request for comments on the Draft EA was published in newspapers serving the Gallatin area. Comments were accepted via TVA's website, mail, and e-mail.

TVA received comment letters on the Draft EA from the Tennessee Department of Environment and Conservation (TDEC) and from one private citizen. These comments are included at the end of this appendix. TVA's responses to comments to these comments are provided below.

**TDEC Comment #1:** The project as proposed will include the disturbance of more than one acre, and will therefore require a NPDES – General Stormwater Construction Permit, as well as a Storm Water Pollution Prevention Plan and Best Management Practices Plan. TDEC acknowledges that this consideration is included in the Draft EA and recommends that it be included in the Final EA.

***Response:*** Comment noted. The requirement for a NPDES – General Stormwater Construction Permit, as well as a Storm Water Pollution Prevention Plan and Best Management Practices Plan will be included in the Final EA.

---

**TDEC Comment #2:** TVA NPDES Individual Permit # TN0005428 is currently undergoing reissuance due to the changes in wastewater stream(s). It is likely that TVA's Individual NPDES permit would have to be further modified or reissued to address the changes under the preferred action alternative. TVA noted that the use of wastewater treatment additives to help with pH control, the settling of solids, and the reduction of metals during dewatering operations would be implemented on an as needed basis; this could also change the character of the discharge. The Storm Water Multi-Sector Permit would also require modification. Once the system is operational, wastewater characterization of the discharge of this facility and the Outfall 001 discharge would have to be evaluated to ensure that these waste streams comply with all NPDES permit limits and Tennessee Water Quality Criteria. TDEC recommends that this consideration be included in the Final EA.

***Response:*** Comment noted. The Final EA will continue to state that TVA's current NPDES Permit would be evaluated to determine if a modification is necessary due to the potential alteration of the waste water stream(s). In addition, the Final EA has been revised to include modification of the Storm Water Multi-Sector Permit.

---

**TDEC Comment #3:** The water withdrawal for TVA GAF is currently "grandfathered" and has not been required to have coverage under an individual water withdrawal permit under the Aquatic Resource Alteration Permit (ARAP). The proposed withdrawal of an additional 0.8 million gallons per day (MGD) as a part of the ash dewatering facility would result in the loss of water withdrawal permit exemptions granted through the grandfathering of the facility. Therefore, this increase in withdrawals would necessitate an ARAP withdrawal permit and require TVA to obtain a permit for the overall withdrawal from the Cumberland River. TDEC recommends that this consideration be included in the Final EA.

***Response:*** Currently the bottom ash sluice system at GAF requires approximately 13.2 MGD for bottom ash sluice operations. This water requirement would not be expected to change significantly under Alternative B and thus would not be expected to trigger any additional withdrawal permitting. Under the conditions of Alternative C, the withdrawal rate used by the sluice system with the dewatering system and the recirculation system would actually reduce the withdrawal rate from 13.2 MGD to approximately 1 to 2 MGD. This is a reduction of approximately 11 MGD and thus, would not be expected to trigger any additional withdrawals and would not be expected to require any additional permitting.

---

**TDEC Comment #4:** The project may require revisions to the facility's existing Title V Operating Permit # 561209 due to changes in potential fugitive dust emissions associated with the proposed action alternative, which will require modifications to the ash collection and handling systems that are utilized for operation of the current wet process, and described in the existing Title V Operating Permit. Any proposed equipment modifications that require an alteration to existing Title V Operating Permits may require an Air Quality Construction Permit prior to the commencement of the proposed construction. TDEC acknowledges that this consideration is included in the Draft EA and recommends that it be included in the Final EA.

***Response:*** Comment noted. The Final EA will continue to indicate that the project will require revisions to TVA's CAA Title V Permit for operations. Air permitting regulations under the Clean Air Act (CAA) may require TVA to secure an Air Pollution Control Permit to Construct prior to the commencement of the proposed construction.

---

**TDEC Comment #5:** The coal used at the TVA GAF is 100% Powder River Basin coal with little to no pyrites (sulfur) in the coal, "Low Sulfur". The proposed project includes the capability for the GAF to burn higher sulfur Illinois Basin coal. A fuel change (going from low sulfur to higher sulfur coal), may also require a permit modification based on differences in emission characteristics (although emissions of sulfur are already limited by the current permit and as long as the facility remains at or under their current limits, may not require a revision to the sulfur dioxide limits). TDEC recommends that this consideration be included in the Final EA.

***Response:*** Comment is noted; however, potential fuel changes have already been addressed in the construction permitting process for the new Selective Catalytic Reduction (SCR) systems and the Spray Dryer Absorbers (SDA) currently under construction at Gallatin.

---

**TDEC Comment #6:** The only air quality impacts described in the Draft EA are those associated with minor short term fugitive dust emissions during the construction phases of the project. The procedures outlined for fugitive dust control appear to be adequate and may require the use of additional road cleaning sweepers or water wash trucks if it is determined that track out is occurring either in an on or off site storage/disposal solution.

***Response:*** Comment noted.

---

**TDEC Comment #7:** The assumption presented in the Draft EA that fugitive emissions are estimated to be minimal is in line with actual assessments where adequate fugitive dust controls are implemented and maintained. The historic and current CCR storage and cleanup processes are well understood as are the methods and techniques to repurpose and reuse the CCR materials and therefore the reporting of the new dewatering process handling and process rates should be easily verified. As there will be no reported changes in the coal combustion process or in the newly installed control equipment (only changes to the ash handling process), there is not expected to be an appreciable effect as a result of increased emissions from the permitted source.

***Response:*** Comment noted.

---

**Public Comment #1:** We are not given enough time to study the environmental impact of coal ash management at the Gallatin Fossil Plant. There was an article in April 13, 2017's Gallatin paper. The deadline of April 24, 2017 to make comments.

***Response:*** The Notice of Availability (NOA) of the Draft EA was published on the TVA website on March 23, 2017. In addition, the NOA was published in The News-Examiner on March 24th and in The Gallatin News on March 29th. These notices were published to provide the public 30 days to review and comment on the Draft EA.

---

**Public Comment #2:** Has there been a study of the coal ash and the health of the Gallatin residents?

***Response:*** To TVA's knowledge there have been no specific studies related to coal ash and the health of the Gallatin residents; however, a Public Health Assessment was conducted by the Tennessee Department of Health in the wake of the 2008 ash spill from TVA's Kingston fossil plant. In particular, this study found that the coal ash did not impact municipal drinking water,

did not impact private well or spring water, did not limit recreational opportunities, and did not increase particulate matter or metals concentrations in ambient air around the fossil site. The study results can be accessed at https://tn.gov/health/article/coal-ash-spill.

---

**Public Comment #3:** My reaction is to move the ash “as is” to a location far away from Gallatin as it is, and to convert it to dry ash in an area far away from the Cumberland River. Too many people get their drinking water from the Cumberland.

***Response:*** Thank you for your comment; however, this EA addresses the analysis of ash dewatering not long-term ash storage. Relocation of the ash is outside the scope of this analysis.

**STATE OF TENNESSEE**
**DEPARTMENT OF ENVIRONMENT AND CONSERVATION**
NASHVILLE, TENNESSEE 37243-0435

**ROBERT J. MARTINEAU, JR.**
COMMISSIONER

**BILL HASLAM**
GOVERNOR

April 24, 2017

**Via Electronic Submittal at TVA.gov**
Attn: Ashley Farless, NEPA Compliance Specialist
Tennessee Valley Authority
1101 Market St., BR4A
Chattanooga, TN 37402

Dear Ms. Farless:

The Tennessee Department of Environment and Conservation (TDEC) appreciates the opportunity to provide comments on the Tennessee Valley Authority (TVA) *Gallatin Fossil Plant* (GAF) *Bottom Ash Process Dewatering Facility* Draft Environmental Assessment (EA). Please note that these comments are not indicative of approval or disapproval of the proposed action or its alternatives, nor should they be interpreted as an indication regarding future permitting decisions by TDEC. TDEC's comments are also being provided independent of any ongoing litigation regarding this site. TVA is proposing to construct a bottom ash process dewatering facility at GAF, which TVA believes would enable dry storage of bottom ash and further foster TVA's compliance with present and future regulatory requirements related to coal combustion residuals (CCR) production and management. TVA's preferred alternative is Alternative C which enables a wet-to-dry bottom ash conversion that fully complies with the Effluent Limitations Guidelines (ELG) requirements.

Actions considered in detail within the Draft EA include[1]:

- **Alternative A – No Action Alternative**. The No Action Alternative results in TVA not constructing the process dewatering facility. Bottom ash would continue to be wet-sluiced to the ash impoundments where it would settle out of the sluice water. After settling, the bottom ash would be dug up out of the impoundments and allowed to dry in piles on the ground. After further dewatering and drying, the bottom ash would be transported and stored in an approved onsite landfill.

- **Alternative B – Construction of a Bottom Ash Process Dewatering Facility Utilizing a Continuous or "Once Through" System**. Under Alternative B, TVA would construct a mechanical bottom ash dewatering facility at GAF to cr dry CCR for storage in an approved onsite landfill. The dewatering equipment would be constructed on an approximately 10-acre site; an additional 10 acres would be used for temporary equipment laydown and mobilization during construction. Bottom ash would be dewatered using equipment that would operate continuously while GAF is generating. Excess water from the process water tanks would be conveyed to either a wastewater treatment equalization basin or directly to the

[1] All three of the proposed action alternatives are required to comply with the Environmental Protection Agency (EPA) CCR regulations 40 CFR Parts 257 and 261 Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities; Final Rule published April 17, 2015. This includes discharge of wastewater containing CCR constituents into surface impoundments.

National Pollutant Discharge Elimination System (NPDES) outfall. The proposed process dewatering facility would be designed to remain operational during a 24-hour rainfall event with a recurrence interval of 25 years. During normal operations, process water and contact water (i.e., additional water from rainfall and surface runoff) would be processed through the bottom ash dewatering system.

- **Alternative C – Construction of a Bottom Ash Dewatering Facility with a Recirculated Bottom Ash Effluent Stream**. Under Alternative C, TVA would construct the same dewatering facility as described under Alternative B, and would also construct a recirculation system. Instead of discharging water from the dewatering process through the existing NPDES-permitted outfall, the effluent would be rerouted back into the powerhouse for future sluicing operations. The recirculation system would be contained within the same project boundary described for Alternative B. The recirculation system would include additional recirculating pumps, additional power from the electrical room, and a water containment facility. Water would be pumped to the intake side of the bottom ash sluice pumps at the powerhouse or a new set of pumps will be installed to provide water back to the boiler bottom. No bottom ash sluice water would be discharged from the NPDES-permitted outfall, thus reducing this discharge. However, the recirculated water stream would also require a make-up water stream, a blowdown wastewater stream, and an outage wastewater stream.[2]

The Department has the following comments regarding the proposed action.[3]

**Water Resources**

- The project as proposed will include the disturbance of more than one acre, and will therefore require a NPDES – General Stormwater Construction Permit, as well as a Storm Water Pollution Prevention Plan and Best Management Practices Plan.[4] TDEC acknowledges that this consideration is included in the Draft EA and recommends that it be included in the Final EA.

- TVA NPDES Individual Permit # TN0005428 is currently undergoing reissuance due to the changes in wastewater stream(s). It is likely that TVA's Individual NPDES permit would have to be further modified or reissued to address the changes under the preferred action alternative. TVA noted that the use of wastewater treatment additives to help with pH control, the settling of solids, and the reduction of metals during dewatering operations would be implemented on an as needed basis; this could also change the character of the discharge. The Storm Water Multi-Sector Permit would also require modification. Once the system is operational, wastewater characterization of the discharge of this facility and the Outfall 001 discharge would have to be evaluated to ensure that these waste streams comply with all NPDES permit

[2] Make-up water is new water added to the effluent to make up for the water lost through evaporation during the bottom ash dewatering treatment process. This would result in slightly increasing the water withdrawal rate from the river, but would not significantly increase the total plant-wide withdrawals. Blowdown wastewater is recirculated water that is intentionally flushed out to avoid the concentration of impurities. When effluent from the bottom ash dewatering facility is recycled again and again, water evaporates, and the mineral content (calcium carbonate, magnesium, sodium, salts, etc.) of the remaining water increases in concentration of minerals. If left undiluted, these minerals will cause scaling on equipment surfaces; possibly damaging the system. It is assumed that 15 percent blowdown would be required in order to maintain a balance in the recirculating system. The blowdown water would be contained and reused to support current operations. Outage wastewater is water used to purge the system during plant outages. This outage waste stream could range between 0.2 and 0.5 million gallons per day (MGD). The outage waste stream would be managed in accordance with the ELG.

[3] TDEC's Division of Natural Areas (DNA) and Division of Solid Waste Management (DSWM) have reviewed the draft EA and have no specific comments regarding the proposed action or its alternatives. Please note that they Tennessee Wildlife Resources Agency (TWRA) manages information related to state listed rare animal species, and should be consulted in addition to the Division of Natural Areas.

[4] For more information on NPDES Stormwater Construction Permitting please visit http://www.tn.gov/environment/article/permit-water-npdes-stormwater-construction-permit

limits and Tennessee Water Quality Criteria. TDEC recommends that this consideration be included in the Final EA.

- The water withdrawal for TVA GAF is currently "grandfathered" and has not been required to have coverage under an individual water withdrawal permit under the Aquatic Resource Alteration Permit (ARAP).[5] The proposed withdrawal of an additional 0.8 million gallons per day (MGD) as a part of the ash dewatering facility would result in the loss of water withdrawal permit exemptions granted through the grandfathering of the facility. Therefore, this increase in withdrawals would necessitate an ARAP withdrawal permit and require TVA to obtain a permit for the overall withdrawal from the Cumberland River. TDEC recommends that this consideration be included in the Final EA.

**Air Pollution Control**

- The project may require revisions to the facility's existing Title V Operating Permit # 561209 due to changes in potential fugitive dust emissions associated with the proposed action alternative, which will require modifications to the ash collection and handling systems that are utilized for operation of the current wet process, and described in the existing Title V Operating Permit.[6] Any proposed equipment modifications that require an alteration to existing Title V Operating Permits may require an Air Quality Construction Permit prior to the commencement of the proposed construction.[7] TDEC acknowledges that this consideration is included in the Draft EA and recommends that it be included in the Final EA.

- The coal used at the TVA GAF is 100% Powder River Basin coal with little to no pyrites (sulfur) in the coal, "Low Sulfur". The proposed project includes the capability for the GAF to burn higher sulfur Illinois Basin coal. A fuel change (going from low sulfur to higher sulfur coal), may also require a permit modification based on differences in emission characteristics (although emissions of sulfur are already limited by the current permit and as long as the facility remains at or under their current limits, may not require a revision to the sulfur dioxide limits). TDEC recommends that this consideration be included in the Final EA.

- The only air quality impacts described in the Draft EA are those associated with minor short term fugitive dust emissions during the construction phases of the project. The procedures outlined for fugitive dust control appear to be adequate and may require the use of additional road cleaning sweepers or water wash trucks if it is determined that track out is occurring either in an on or off site storage/disposal solution.

- The assumption presented in the Draft EA that fugitive emissions are estimated to be minimal is in line with actual assessments where adequate fugitive dust controls are implemented and maintained. The historic and current CCR storage and cleanup processes are well understood as are the methods and techniques to repurpose and reuse the CCR materials and therefore the reporting of the new dewatering process handling and process rates should be easily verified. As there will be no reported changes in the coal combustion process or in the newly installed control equipment (only changes to the ash handling process), there is not expected to be an appreciable effect as a result of increased emissions from the permitted source.

---

[5] TDEC DWR Rule 0400-40-07-.04(5)(c), http://sos.tn.gov/effective-rules. For more information on the ARAP program please visit http://www.tn.gov/environment/article/permit-water-aquatic-resource-alteration-permit.
[6] For more information on Title V Operating Permits please visit http://www.tn.gov/environment/article/permit-air-title-v-operating-permit.
[7] For more information on Air Quality Construction Permits please visit https://www.tn.gov/environment/article/permit-air-air-quality-construction-permit.

TDEC appreciates the opportunity to comment on this Draft EA. Please note that these comments are not indicative of approval or disapproval of the proposed action or its alternatives, nor should they be interpreted as an indication regarding future permitting decisions by TDEC. These comments are also being provided independent of any ongoing litigation regarding this site. Please contact me should you have any questions regarding these comments.

Sincerely,

Kendra Abkowitz, PhD
Director of Policy and Planning
Tennessee Department of Environment and Conservation
Kendra.Abkowitz@tn.gov
(615) 532-8689

cc: Lacey Hardin, TDEC, APC
Chuck Head, TDEC, Bureau of Environment
Lisa Hughey, TDEC, SWM
Tom Moss, TDEC, DWR
Joe Sanders, TDEC, Office of General Counsel
Stephanie Williams, TDEC, DNA

Jean Heidel
529 Joslin Ave
Gallatin, TN 37066

NASHVILLE TN 370
22 APR 2017 PM 3 L


Ashley Farless
TVA
1101 Market St.
BR 4A
Chattanooga, Tn. 37402

37402-280199

529 Jaslin Ave,
Gallatin, Tn. 37066
April 22, 2017

Ashley Farless
TVA
1101 Market St.
BR 4A
Chattanooga, Tn. 37402

Subject: Public Comment:
Gallatin Fossil plant

We are not given enought time to study the environmental impact of coal ash management at the Gallatin fossil plant. There was an article in april 13, 2017's Gallatin paper. The deadline of April 24, 2017 to make comments.

This is of great concern for me since I have had two kinds of Cancer, and my friend has had three types of Cancer. Has there been a study of the Coal Ash and the health of the Gallatin residents?

My reaction is to move the Ash "as is" to a location "far away" from Gallatin as it is, and to convert it to dry Ash in an area far away from the Cumberland River. Too many people get their drinking water from the Cumberland.

yours,
Jean Heidel

# TVA seeks input on Gallatin fossil plant

STAFF REPORTS

The Tennessee Valley Authority is seeking public comment on potential environmental impacts of building a facility to remove and recirculate water used in the coal ash management process at Gallatin Fossil Plant in Gallatin, Tennessee.

TVA is proposing to build a dewatering facility for bottom ash at Gallatin as part of its commitment to convert from wet to dry storage of ash and other coal combustion residuals. The facility would include a system to recycle water, which is used to move ash, back into the powerhouse for continued use. The dry ash would then be stored onsite.

This project would also foster TVA's compliance with current and future regulations, both state and federal, related to the management of coal combustion residuals. TVA is inviting the public to comment on a draft Environmental Assessment which considers the potential environmental impacts of several alternatives, including construction of the dewatering facility or taking no action.

TVA's preferred alternative is to construct the dewatering facility, which enables a wet-to-dry bottom ash conversion at Gallatin. It is the only alternative that fully complies with Environmental Protection Agency limitations on waste water, or effluent, finalized in 2015. TVA would implement its preferred alternative in phases, starting with the construction of the once-through dewatering facility in the first phase and then adding the recirculating system in a second phase.

Comments on the draft EA must be received or postmarked no later than April 24, 2017. You can learn more about the alternatives and provide comments online at www.tva.com/nepa or by email to arfarless@tva.gov. Comments can be submitted in writing to Ashley Farless Tennessee Valley Authority, 1101 Market St., BR 4A, Chattanooga, TN, 37402. All information received including name address and phone number becomes part of the official public record.

TVA's Gallatin Fossil Plant is located on 1,950 acres of land on the north bank of the Cumberland River in Sumner County, Tennessee. It has four coal-fired generating units with a combined summer net capacity of 976 megawatts, enough to supply power to more than 500,000 homes.

This page intentionally left blank

# Appendix B – Summary of Environmental Permits and Applicable Regulations

- Any entity wishing to construct an air contaminant source, or to modify an existing air contaminant source, is required to obtain a construction permit from the Tennessee Division of Air Pollution Control (APC) in accordance with the requirements of APC Rule Chapter 1200-3-9. Modification of the existing Title V Permit must be done in accordance with the requirements of TDEC Rule Chapter 1200-3-9-.02 and .04.
- Modification of the existing NPDES Permit for GAF involves submittal of the proper EPA Application Forms and must be done in accordance with the requirements of TDEC Rule Chapter 0400-40-01, 03, 04 and 05; TCA 69-3-108(b)(1), (2), (3), (4), and (6); and the Clean Water Act.
- Storm water runoff from construction sites is regulated under the NPDES program. Currently, construction projects where 1 acre or more of land will be disturbed require a NPDES Permit. The NPDES has its origin in the Clean Water Act. The program requires permits for the discharge of treated municipal effluent, treated industrial effluent, and storm water. The permits establish the conditions under which the discharge may occur and establish monitoring and reporting requirements. Application for coverage under the Tennessee General NPDES Permit for Discharges of Storm Water Associated with Construction Activities will require preparation of an SWPPP.
- The addition of a storm water pond would require selection and implementation of standard Erosion Prevention and Sediment Control measures in accordance with the TDEC *Erosion and Sediment Control Handbook* (TDEC 2012b).
- Under EO 13186, federal agencies are encouraged to implement conservative measures to avoid or minimize adverse impacts on migratory bird resources when conducting agency actions.

This page intentionally left blank

# Appendix C – TVARAM and USACE Wetland Forms

**TENNESSEE VALLEY AUTHOROITY RAPID ASSESSMENT MEHTOD: Assessing Wetland Condition, Functional Capacity, Quality**

**TVARAM FIELD FORM**

| **Site:** TVA, GAF W1 (dewatering) | **Rater(s):** JRO, DW | **Date:** October 24, 2016 |
|---|---|---|

| 3 | 3 |
|---|---|
| max 6 pts. | subtotal |

## Metric 1. Wetland Area (size)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

Select one size class and assign score.

- ☐ >50 acres (>20.2 ha) (6 pts)
- ☐ 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
- ☐ 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
- ☑ 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
- ☐ 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
- ☐ 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
- ☐ <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):

| 3 | 6 |
|---|---|
| max 14 pts. | subtotal |

## Metric 2. Upland Buffers and Surrounding Land Use

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- ☐ WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
- ☐ MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
- ☑ NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
- ☐ VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- ☐ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- ☐ LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
- ☑ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
- ☑ High. Urban, industrial, open pasture, row cropping, mining, construction (1)

| 7 | 13 |
|---|---|
| max 30 pts. | subtotal |

## Metric 3. Hydrology

3a. Sources of water. Score all that apply.

- ☐ High pH groundwater (5)
- ☐ Other groundwater (3) [BR/CM (5)]
- ☑ Precipitation (1) [unless BR/CM primary source (5)]
- ☐ Seasonal/intermittent surface water (3)
- ☐ Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- ☐ 100-year floodplain (1)
- ☐ Between stream/lake and other human use (1)
- ☑ Part of wetland/upland (e.g., forest), complex (1)
- ☐ Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only one and assign score.

- ☐ >0.7 m (27.6 in.) (3)
- ☐ 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
- ☑ <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]

3d. Duration inundation/saturation. Score one or dbl. check & avg.

- ☐ Semi- to permanently inundated/saturated (4)
- ☐ Regularly inundated/saturated (3) [BR/CM (4)]
- ☐ Seasonally inundated (2) [BR/CM (4)]
- ☑ Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- ☐ None or none apparent (12)
- ☐ Recovered (7)
- ☑ Recovering (3)
- ☐ Recent or no recovery (1)

Check all disturbances observed

- ☐ ditch
- ☐ tile (including culvert)
- ☐ dike
- ☐ weir
- ☐ stormwater input
- ☐ point source (nonstormwater)
- ☑ filling/grading
- ☑ road bed/RR track
- ☐ dredging
- ☐ other _____

| 10 | 23 |
|---|---|
| max 20 pts. | subtotal |

## Metric 4. Habitat Alteration and Development

4a. Substrate disturbance. Score one or double check and average.

- ☐ None or none apparent (4)
- ☐ Recovered (3)
- ☑ Recovering (2)
- ☐ Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- ☐ Excellent (7)
- ☐ Very good (6)
- ☐ Good (5)
- ☑ Moderately good (4)
- ☐ Fair (3)
- ☐ Poor to fair (2)
- ☐ Poor (1)

4c. Habitat alteration. Score one or double check and average.

- ☐ None or none apparent (9)
- ☑ Recovered (6)
- ☑ Recovering (3)
- ☐ Recent or no recovery (1)

Check all disturbances observed

- ☐ mowing
- ☐ grazing
- ☐ clearcutting
- ☐ selective cutting
- ☐ farming
- ☐ toxic pollutants
- ☐ shrub/sapling removal
- ☐ herbaceous/aquatic bed removal
- ☐ woody debris removal
- ☐ sedimentation
- ☐ dredging
- ☐ nutrient enrichment

| 23 |
|---|

| **Site:** TVA, GAF W1 (dewatering) | **Rater(s):** JRO, DW | **Date:** October 24, 2016 |
|---|---|---|

23
subtotal previous page

3 (max 10 pts.) | 26 (subtotal)

# Metric 5. Special Wetlands

3
**raw score***

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- ☐ Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- ☐ Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- ☐ Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- ☐ Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- ☐ Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- ☐ Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- ☑ Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- ☐ Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- ☐ Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- ☐ Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- ☐ Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

10 (max 20 pts.) | 36 (subtotal)

# Metric 6. Plant Communities, Interspersion, Microtopography

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- ☐ Aquatic bed
- 1 Emergent
- 1 Shrub
- 2 Forest
- ☐ Mudflats
- ☐ Open water <20 acres (8 ha)
- ☐ Moss/lichen. Other _____

**Vegetation Community Cover Scale**

0 = Absent or <0.1 ha (0.25 acre) contiguous acre [For BR/CM <0.04 ha (0.1 acre)]
1 = Present and either comprises a small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2 = Present and either comprises a significant part of wetland's vegetation and is of moderate quality, or comprises a small part and is of high quality
3 = Present and comprises a significant part or more of wetland's vegetation and is of high quality

6b. Horizontal (plan view) interspersion.
Select only one.

- ☐ High (5)
- ☐ Moderately high (4) [BR/CM (5)]
- ☑ Moderate (3)[BR/CM (5)]
- ☐ Moderately low (2) [BR/CM (3)]
- ☐ Low (1) [BR/CM (2)]
- ☐ None (0)

**Narrative Description of Vegetation Quality**

low = Low species diversity &/or dominance of nonnative or disturbance tolerant native species
mod = Native species are dominant component of the vegetation, although nonnative &/or disturbance tolerant native species can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare, threatened or endangered species
high = A predominance of native species with nonnative sp &/or disturbance tolerant native sp absent or virtually absent, and high sp diversity and often but not always, the presence of rate, threatened, or endangered species

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- ☐ Extensive >75% cover (-5)
- ☐ Moderate 25-75% cover (-3)
- ☑ Sparse 5-25% cover (-1)
- ☐ Nearly absent <5% cover (0)
- ☐ Absent (1)

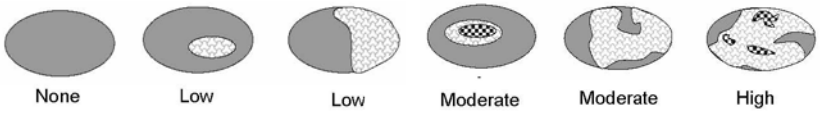
**Mudflat and Open Water Class Quality**

0 = Absent <0.1 ha (0.25 acres) [For BR/CM <0.04 ha (0.1 acre)]
1 = Low 0.1 to <1 ha (0.25 to 2.5 acres) [BR/CM 0.04 to <0.2 ha (0.1 to 0.5 acre)]
2 = Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <02 ha (0.5 to 5 acre)]
3 = High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

6d. Microtopography.
Score all present using 0 to 3 scale.

- ☐ Vegetated hummocks/tussocks
- 1 Coarse woody debris >15 cm (6 in.)
- 1 Standing dead >25 cm (10 in.) dbh
- ☐ Amphibian breeding pools

**Hypothetical Wetland for Estimating Degree of Interspersion**




**Microtopography Cover Scale**

0 = Absent
1 = Present in very small amounts or if more common of marginal quality
2 = Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3 = Present in moderate or greater amounts and of highest quality

36 **GRAND TOTAL (max 100 pts)**

0- 29 = Category 1, low wetland function, condition, quality**
30- 59 = Category 2, good/moderate wetland function, condition, quality**
60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: http://www.epa.state.oh.us/dsw/401/401.html

## WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: TVA-GAF - Dewatering Site City/County: Gallatin/Sumner County Sampling Date: 10/24/16
Applicant/Owner: TVA State: TN Sampling Point: W1
Investigator(s): Jim Orr, Daniel Wade Section, Township, Range:
Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Slope (%): 0-1
Subregion (LRR or MLRA): LRR Lat: 36.320 Long: -86.411 Datum: WGS84
Soil Map Unit Name: Sf NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes [✔] No [ ] (If no, explain in Remarks.)
Are Vegetation [ ], Soil [ ], or Hydrology [✔] significantly disturbed? Are "Normal Circumstances" present? Yes [✔] No [ ]
Are Vegetation [ ], Soil [ ], or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes [✔] | No [ ] | **Is the Sampled Area within a Wetland?** Yes [✔] No [ ] |
| Hydric Soil Present? | Yes [✔] | No [ ] | |
| Wetland Hydrology Present? | Yes [✔] | No [ ] | |

Remarks:
Large wetland area west of dewatering site, site lies in a depression bordered by raised road beds, soils are hydric but may include ash

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [✔] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] True Aquatic Plants (B14)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [✔] Sparsely Vegetated Concave Surface (B8)
- [✔] Drainage Patterns (B10)
- [✔] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [✔] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes [ ] No [✔] Depth (inches):
Water Table Present? Yes [ ] No [✔] Depth (inches):
Saturation Present? (includes capillary fringe) Yes [ ] No [✔] Depth (inches):

**Wetland Hydrology Present?** Yes [✔] No [ ]

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Wetland hydrology currently recovering, drainage patterns throughout. drainage to the south to a french drain under road - no culvert.

**VEGETATION (Five Strata) – Use scientific names of plants.** Sampling Point: W1

| Tree Stratum (Plot size: 30 ft) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. Eastern Cottonwood (Populus deltoides) | 25 | Yes | FAC |
| 2. Eastern Red Cedar (Juniperus virginiana) | 20 | Yes | FACU |
| 3. Red Maple (Acer rubrum) | 10 | | FAC |
| 4. American Sycamore (Plantanus occidentalis) | 8 | | FACW |
| 5. Winged Elm (Ulmus alata) | 6 | | FACU |
| 6. Sweetgum (Liquidambar styraciflua) | 3 | | FAC |
| | 72 = Total Cover | | |
| 50% of total cover: 36 | 20% of total cover: 14.4 | | |
| Sapling Stratum (Plot size: ) | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | = Total Cover | | |
| 50% of total cover: | 20% of total cover: | | |
| Shrub Stratum (Plot size: 15 ft) | | | |
| 1. Diervilla lonicera | 10 | Yes | FAC |
| 2. Stiff Dogwood (Cornus foemina) | 5 | | FACW |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | 15 = Total Cover | | |
| 50% of total cover: 7.5 | 20% of total cover: 3 | | |
| Herb Stratum (Plot size: 15 ft) | | | |
| 1. Equisetum hyemale | 90 | Yes | FACW |
| 2. Microstegium vimineum | 15 | | FAC |
| 3. Phragmites australis | 5 | | FACW |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| | 110 = Total Cover | | |
| 50% of total cover: 55 | 20% of total cover: 22 | | |
| Woody Vine Stratum (Plot size: 30 ft) | | | |
| 1. Toxicodendron radicans | 6 | Yes | FAC |
| 2. Vitis sp. | 5 | | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | 11 = Total Cover | | |
| 50% of total cover: 5.5 | 20% of total cover: 2.2 | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | Multiply by: |
|---|---|
| OBL species | x 1 = |
| FACW species | x 2 = |
| FAC species | x 3 = |
| FACU species | x 4 = |
| UPL species | x 5 = |
| Column Totals: (A) | (B) |

Prevalence Index = B/A =

**Hydrophytic Vegetation Indicators:**

- [x] 1 - Rapid Test for Hydrophytic Vegetation
- [ ] 2 - Dominance Test is >50%
- [ ] 3 - Prevalence Index is ≤3.0[1]
- [ ] 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Five Vegetation Strata:**

**Tree** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

**Sapling** – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

**Shrub** – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

**Herb** – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

**Woody vine** – All woody vines, regardless of height.

**Hydrophytic Vegetation Present?** Yes [x] No [ ]

Remarks: (Include photo numbers here or on a separate sheet.)

**SOIL**

Sampling Point: W1

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-4 | 7.5Y 2.5/1 | 100 | | | | | Silt | |
| 4-8 | 2.5Y 4/1 | 95 | | | | | Silty Sand | looks like ash material. |
| | | | 2.5Y 7/8 | 5 | RM | M | Sandy cla | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) **(LRR N)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ☐ Sandy Gleyed Matrix (S4)
- ☑ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ☐ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ☐ Umbric Surface (F13) **(MLRA 136, 122)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ☐ Red Parent Material (F21) **(MLRA 127, 147)**

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 2 cm Muck (A10) **(MLRA 147)**
- ☐ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ☐ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

**Hydric Soil Present?** **Yes** ☑ **No** ☐

Remarks:

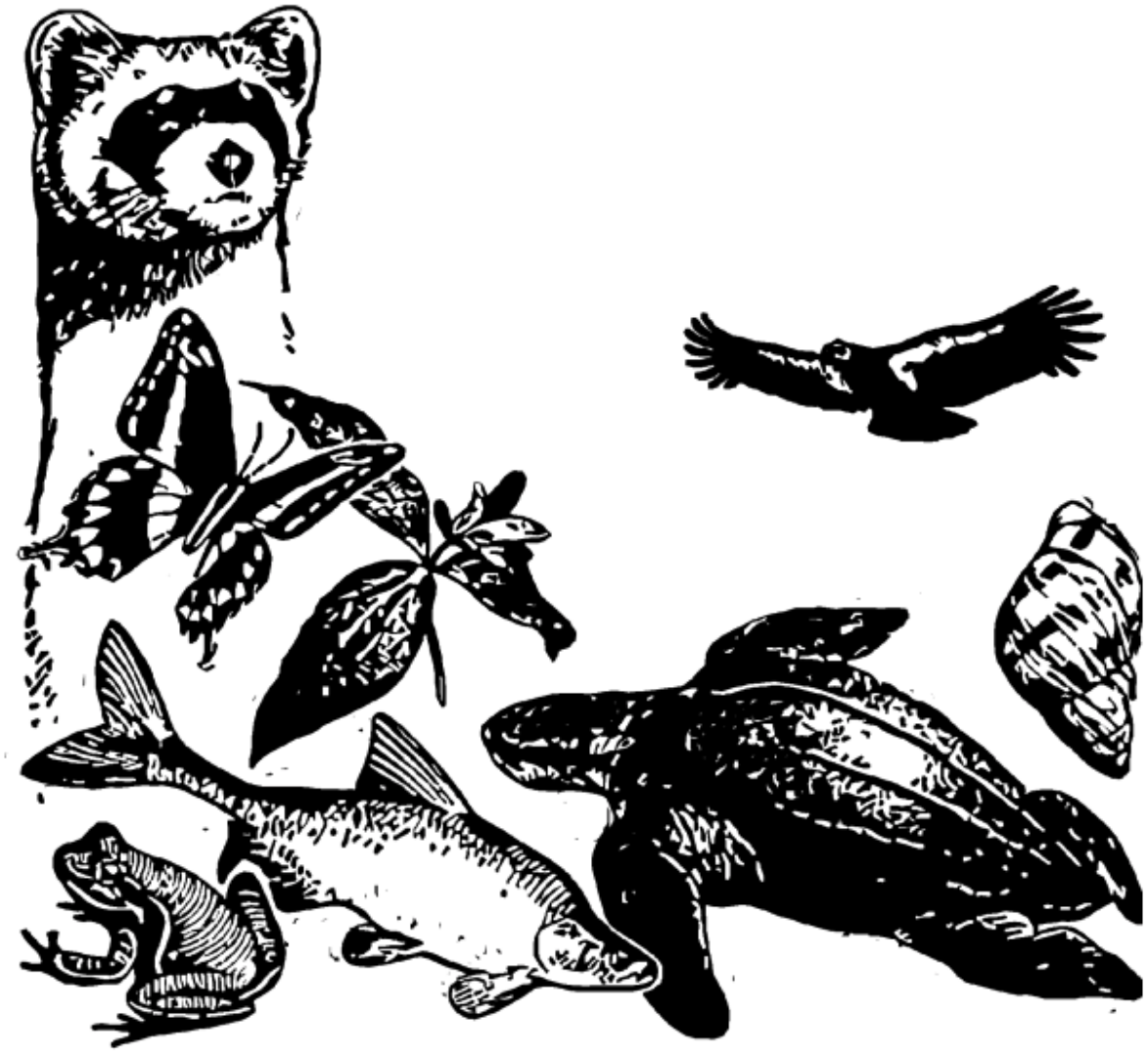
**U.S. Fish & Wildlife Service**

# GAF Dewatering EA

## *IPaC Trust Resources Report*

Generated September 27, 2016 07:33 AM MDT, IPaC v3.0.9

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

# Table of Contents

U.S. Fish & Wildlife Service

# IPaC Trust Resources Report

NAME

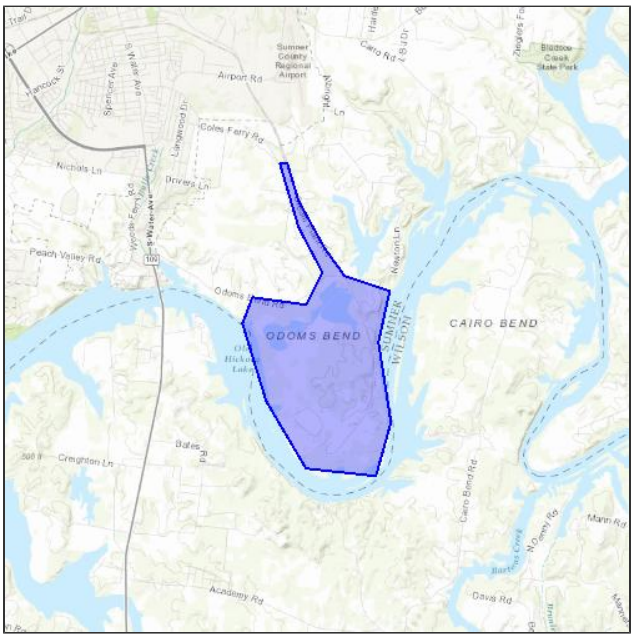
GAF Dewatering EA

LOCATION

Sumner and Wilson counties, Tennessee

IPAC LINK

https://ecos.fws.gov/ipac/project/J6U5K-2RLMJ-A5DGD-U477M-43NIP4




## U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

**Tennessee Ecological Services Field Office**
446 Neal Street
Cookeville, TN 38501-4027
(931) 528-6481

# Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

**This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.**

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

**A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.**

The list of species below are those that may occur or could potentially be affected by activities in this location:

## Flowering Plants

**Braun's Rock-cress** Arabis perstellata — Endangered

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q1SY

**Leafy Prairie-clover** Dalea foliosa — Endangered

CRITICAL HABITAT
**No critical habitat** has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q28M

**Spring Creek Bladderpod** Lesquerella perforata — Endangered

CRITICAL HABITAT
**No critical habitat** has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q13H

# Mammals

**Gray Bat** Myotis grisescens — Endangered

CRITICAL HABITAT

**No critical habitat** has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A04J

**Indiana Bat** Myotis sodalis — Endangered

CRITICAL HABITAT

**No critical habitat** has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A000

**Northern Long-eared Bat** Myotis septentrionalis — Threatened

CRITICAL HABITAT

**No critical habitat** has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A0JE

# Critical Habitats

**There are no critical habitats in this location**

# Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

---

1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.birdscanada.org/birdmon/default/datasummaries.jsp

The following species of migratory birds could potentially be affected by activities in this location:

**Bald Eagle** Haliaeetus leucocephalus — Bird of conservation concern
Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

**Black-billed Cuckoo** Coccyzus erythropthalmus — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HI

**Blue-winged Warbler** Vermivora pinus — Bird of conservation concern
Season: Breeding

**Chuck-will's-widow** Caprimulgus carolinensis — Bird of conservation concern
Season: Breeding

**Dickcissel** Spiza americana — Bird of conservation concern
Season: Breeding

**Fox Sparrow** Passerella iliaca — Bird of conservation concern
Season: Wintering

**Kentucky Warbler** Oporornis formosus — Bird of conservation concern
Season: Breeding

**Least Bittern** Ixobrychus exilis
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B092

**Loggerhead Shrike** Lanius ludovicianus — Bird of conservation concern
Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FY

**Prairie Warbler** Dendroica discolor — Bird of conservation concern
Season: Breeding

**Prothonotary Warbler** Protonotaria citrea — Bird of conservation concern
Season: Breeding

**Red-headed Woodpecker** Melanerpes erythrocephalus — Bird of conservation concern
Season: Year-round

**Rusty Blackbird** Euphagus carolinus — Bird of conservation concern
Season: Wintering

**Sedge Wren** Cistothorus platensis — Bird of conservation concern
Season: Migrating

**Short-eared Owl** Asio flammeus — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

**Wood Thrush** Hylocichla mustelina — Bird of conservation concern
Season: Breeding

**Worm Eating Warbler** Helmitheros vermivorum — Bird of conservation concern
Season: Breeding

# Wildlife refuges and fish hatcheries

**There are no refuges or fish hatcheries in this location**

# Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

This location overlaps all or part of the following wetlands:

## Freshwater Emergent Wetland

**PEM1Ch**
**PEM1F**
**PEM1Fh**

## Freshwater Forested/shrub Wetland

**PFO1/UBFh**

**PFO1C**
**PFO1Ch**
**PFO1F**
**PSS1/EM1Ch**

## Freshwater Pond

**PUBFh**
**PUBFx**
**PUBH**
**PUBHh**
**PUBHx**

## Lake

**L1UBHh**
**L2USAh**
**L2USCh**

A full description for each wetland code can be found at the National Wetlands Inventory website: http://107.20.228.18/decoders/wetlands.aspx

This page intentionally left blank

# Appendix D – Coordination

**Tennessee Valley Authority**, 400 West Summit Hill Drive, Knoxville, TN 37902

February 3, 2017

To Those Listed:

TENNESSEE VALLEY AUTHORITY (TVA), GALLATIN FOSSIL PLANT, BOTTOM ASH DEWATERING PROJECT, SUMNER COUNTY, TENNESSEE
36° 19' 44" N, 86° 24' 19" W

TVA proposes to design and erect a new facility that would dewater coal combustion residuals (CCR), specifically ash and pyrite, at Gallatin Fossil Plant (GAF) in Sumner County, Tennessee. The resulting dry ash would be transported to the onsite landfill. This project would support TVA's plan to end wet storage of coal ash and gypsum and convert to dry storage. TVA has determined that this proposed bottom ash dewatering project at GAF constitutes an undertaking (as defined at 36 CFR § 800.16(y)) of the type that has potential to cause effects on historic properties. In this letter, we are initiating consultation with your office regarding this undertaking under Section 106 of the National Historic Preservation Act.

TVA has determined that the area of potential effects (APE) for archaeological sites consists of an approximately 20-acre site within which the dewatering facility would be constructed. The dewatering facility would have an approximately 10-acre footprint, and about 10 additional acres would be used as a temporary equipment laydown area. The facility would be 45 feet in height. TVA has determined that the APE for historic architectural resources consists of areas within a half-mile radius of the proposed facility that would have unobstructed views to the facility. Figures 1.1-1 and 1.1-2 (below), from TVA's draft environmental assessment (*Gallatin Fossil Plant Bottom Ash Process Dewatering Facility, Draft Environmental Assessment, Sumner County, Tennessee*), show the project location. Figure 1.1-3 shows the current project design. Figure 1 shows previously recorded archaeological sites in the GAF property, and a half-mile radius surrounding the center of the proposed facility. Figure 3.3-1, from the draft EA, shows the proposed construction site.

TVA conducted a desktop review of the APE. The APE has not been surveyed by archaeologists and no archaeological sites have been recorded in the APE. The desktop review included a careful examination of historic and current maps, as well as historic records (including TVA, 1967, *The Gallatin Steam Plant: A Report on the Planning, Design, Construction, Costs, and First Power Operations of the Initial Four-Unit Plant. Technical Report No. 36*). This information documents that the archaeological APE is within the site of the former chemical pond. Construction of the chemical pond resulted in the removal or mixing of the original soils and sediments. As a result, there does not appear to be any potential for the presence of intact archaeological sites that could be eligible for inclusion in the National Register of Historic Places (NRHP) within the APE.

The architectural APE is limited to lands within TVA's GAF reservation and the Cumberland River. We conducted an architectural assessment of GAF in 2012 to support TVA's section 106 compliance for the then-proposed dry scrubbers technology project. Based on that assessment TVA proposed that GAF is ineligible for listing in the NRHP as an architectural property due to its lack of unique features of architectural style or workmanship, a lack of association with any important historical event or series of events, and losses to its physical and historic integrity resulting from modern alterations. Therefore, TVA finds there are no NRHP-listed or –eligible above ground properties in the architectural APE.

Based on this review of existing documents, TVA finds that there are no historic properties within the undertaking's APE.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with the following federally recognized Indian tribes regarding historic properties within the APE that may be of religious and cultural significance and are eligible for listing in the NRHP: Cherokee Nation, Eastern Band of Cherokee Indians, United Keetoowah Band of Cherokee Indians in Oklahoma, The Chickasaw Nation, Muscogee (Creek) Nation of Oklahoma, Alabama-Quassarte Tribal Town, Kialegee Tribal Town, Thlopthlocco Tribal Town, Absentee Shawnee Tribe of Oklahoma, Eastern Shawnee Tribe of Oklahoma, and Shawnee Tribe.

By this letter, pursuant to 36 CFR§ 800.2(c)(2)(ii), 800.3(f)(2), and 800.4(a)(4)(b), TVA is providing notification of these findings and is seeking your comments regarding any properties that may be of religious and cultural significance and may be eligible for inclusion in the NRHP.

Please respond by March 3 if you have any comments on the proposed undertaking. If you have any questions, please contact me by phone, (865) 632-6461, or by email, pbezzell@tva.gov.

Sincerely,

Pat Bernard Ezzell

Patricia Bernard Ezzell
Senior Program Manager
Tribal Relations and Corporate Historian

SCC:ABM
Enclosures
cc (Enclosures):

## Grace, Erika

**Subject:** FW: TVA, Gallatin Fossil Plant, Bottom Ash Dewatering Project, Summer County, TN
**Attachments:** TVA Gallatin Fossil Plant.jpg; TVA Gallatin Fossil Plant 2.jpg

---

**From:** Tonya Tipton [mailto:tonya@shawnee-tribe.com]
**Sent:** Thursday, February 16, 2017 3:34 PM
**To:** Ezzell, Patricia Bernard
**Cc:** ben.barnes@gmail.com
**Subject:** TVA, Gallatin Fossil Plant, Bottom Ash Dewatering Project, Summer County, TN



In response to the above referenced project.

Second Chief, Ben Barnes would like to be a consulting party on this project.

You may contact Ben via e-mail at ben.barnes@gmail.com.

Thank you,
Tonya Tipton

## Grace, Erika

**Subject:** FW: TVA, GALLATIN FOSSIL PLANT, BOTTOM ASH DEWATERING PROJECT, SUMNER COUNTY, TENNESSEE

**From:** Section106 [mailto:Section106@mcn-nsn.gov]
**Sent:** Thursday, February 16, 2017 4:08 PM
**To:** Ezzell, Patricia Bernard
**Subject:** RE: TVA, GALLATIN FOSSIL PLANT, BOTTOM ASH DEWATERING PROJECT, SUMNER COUNTY, TENNESSEE

**TVA External Message. Please use caution when opening.**

Pat Bernard Ezzell
Sr. Program Manager and Federal Preservation Officer
Tennessee Valley Authority
400 W. Summit Hill Drive
Knoxville, TN 37902

Ms. Ezzell,

Thank you for the correspondence regarding the proposal to design and erect a new facility that would dewater coal combustion residuals. The project area located in Sumner County, TN is within our historic area of interest. The Muscogee (Creek) Nation is **unaware of any Muscogee cultural or sacred sites located within the immediate project area**. We concur that there should be **no effects to any known historic/cultural properties** and that work should proceed as planned. However, as the project is located in an area that is of general historic interest to the Tribe, we request that work be stopped and our office contacted immediately if any Native American cultural materials are encountered. This stipulation should be placed on the construction plans to insure contractors are aware of it. Please feel free to contact me with any further questions or concerns.

**Ms. Corain Lowe-Zepeda**
Historic and Cultural Preservation Department, THPO
Muscogee (Creek) Nation
P. O. Box 580
Okmulgee, OK 74447
T 918.732.7835
clowe@mcn-nsn.gov

---

**From:** Ezzell, Patricia Bernard [mailto:pbezzell@tva.gov]
**Sent:** Friday, February 03, 2017 1:49 PM
**To:** sheila-bird@cherokee.org; hollymaustin94@gmail.com; Eric Oosahwee-voss (eoosahwee-voss@ukb-nsn.gov); HPO@chickasaw.net; Section106; AQhpo@mail.com; dc13.dc4@gmail.com; 'E. Spain'; ethompson@astribe.com; 'Robin Dushane'; 'Kim Jumper (kim.jumper@shawnee-tribe.com)'
**Cc:** Russell Townsend; 'kpritchett@ukb-nsn.gov'; 'Dee Gardner'
**Subject:** TVA, GALLATIN FOSSIL PLANT, BOTTOM ASH DEWATERING PROJECT, SUMNER COUNTY, TENNESSEE

Good Afternoon,
I hope you are ready for the weekend! By this email message, I am transmitting the attached letter regarding TVA's proposal to design and erect a new facility that would dewater coal combustion residuals (CCR), specifically ash and pyrite, at Gallatin Fossil Plant (GAF) in Sumner County, Tennessee. The resulting dry ash would be transported to the

onsite landfill. This project would support TVA's plan to end wet storage of coal ash and gypsum and convert to dry storage.

The referenced figures are part of the attached letter.

As always, please do not hesitate to contact me if you have any questions. Please respond no later than March 3, 2017, if you have any comments on this proposed undertaking.

Thank you.

Sincerely,

Pat

Pat Bernard Ezzell
Senior Program Manager and
Federal Preservation Officer
Community Relations
Communications and Marketing
Tennessee Valley Authority
400 W. Summit Hill Drive
460 WT 7-K
Knoxville, Tennessee 37902
865-632-6461 (office)
865-304-9251 (work cell)
pbezzell@tva.gov

## Grace, Erika

**Subject:** FW: TVA, GALLATIN FOSSIL PLANT, BOTTOM ASH DEWATERING PROJECT, SUMNER COUNTY, TENNESSEE

**From:** Robin Dushane [mailto:RDushane@estoo.net]
**Sent:** Monday, February 06, 2017 1:45 PM
**To:** Ezzell, Patricia Bernard
**Subject:** RE: TVA, GALLATIN FOSSIL PLANT, BOTTOM ASH DEWATERING PROJECT, SUMNER COUNTY, TENNESSEE



Dear Mrs. Ezzell,
In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470f), and implementing regulation, 36 CFR 800, "Protection of Historic Properties" the Eastern Shawnee Tribal Historic Preservation Office is responding to your request for identifying properties of significance to our Tribe within Gallatin, Sumner County, TN.

Currently this office is unaware of properties of significance to inform you of that would be involved in the proposed construction of TENNESSEE VALLEY AUTHORITY's (TVA), GALLATIN FOSSIL PLANT, BOTTOM ASH DEWATERING PROJECT at
36° 19' 44" N, 86° 24' 19" W
specifically for ash and pyrite.
This office concurs with the finding of no properties effected.
Best regards,

Robin Dushane
Tribal Historic Preservation Officer
Eastern Shawnee Tribe
70500 E 128 Rd.
Wyandotte, OK 74370
918 533 4104-cell
rdushane@estoo.net

---

**From:** Ezzell, Patricia Bernard [mailto:pbezzell@tva.gov]
**Sent:** Friday, February 03, 2017 1:49 PM
**To:** sheila-bird@cherokee.org; hollymaustin94@gmail.com; Eric Oosahwee-voss (eoosahwee-voss@ukb-nsn.gov) <eoosahwee-voss@ukb-nsn.gov>; HPO@chickasaw.net; 'Section106' <Section106@mcn-nsn.gov>; AQhpo@mail.com; dc13.dc4@gmail.com; 'E. Spain' <espain@tttown.org>; ethompson@astribe.com; Robin Dushane <RDushane@estoo.net>; 'Kim Jumper (kim.jumper@shawnee-tribe.com)' <kim.jumper@shawnee-tribe.com>
**Cc:** Russell Townsend <RussellT@nc-cherokee.com>; 'kpritchett@ukb-nsn.gov' <kpritchett@ukb-nsn.gov>; Dee Gardner <dgardner@estoo.net>
**Subject:** TVA, GALLATIN FOSSIL PLANT, BOTTOM ASH DEWATERING PROJECT, SUMNER COUNTY, TENNESSEE

Good Afternoon,
I hope you are ready for the weekend! By this email message, I am transmitting the attached letter regarding TVA's proposal to design and erect a new facility that would dewater coal combustion residuals (CCR), specifically ash and

pyrite, at Gallatin Fossil Plant (GAF) in Sumner County, Tennessee. The resulting dry ash would be transported to the onsite landfill. This project would support TVA's plan to end wet storage of coal ash and gypsum and convert to dry storage.

The referenced figures are part of the attached letter.

As always, please do not hesitate to contact me if you have any questions. Please respond no later than March 3, 2017, if you have any comments on this proposed undertaking.

Thank you.

Sincerely,

Pat

Pat Bernard Ezzell
Senior Program Manager and
Federal Preservation Officer
Community Relations
Communications and Marketing
Tennessee Valley Authority
400 W. Summit Hill Drive
460 WT 7-K
Knoxville, Tennessee 37902
865-632-6461 (office)
865-304-9251 (work cell)
pbezzell@tva.gov

**TENNESSEE HISTORICAL COMMISSION**
**STATE HISTORIC PRESERVATION OFFICE**
**2941 LEBANON PIKE**
**NASHVILLE, TENNESSEE 37243-0442**
**OFFICE: (615) 532-1550**
**www.tnhistoricalcommission.org**

February 8, 2017

Mr. Clinton E. Jones
Tennessee Valley Authority
Biological and Cultural Compliance
400 West Summit Hill Drive
Knoxville, TN 37902

RE: TVA / Tennessee Valley Authority, Gallatin Fossil Plant, Bottom Ash Dewatering Project, Sumner County, TN

Dear Mr. Jones:

In response to your request, we have reviewed the documents you submitted regarding your proposed undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicant for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

After considering the documentation submitted, we concur with your agency that there are no National Register of Historic Places listed or eligible properties affected by this undertaking. We have made this determination because either: no National Register listed or eligible Historic Properties exist within the undertaking's area of potential effects, the specific location, size, scope and/or nature of the undertaking and its area of potential effects precluded affects to Historic Properties, the undertaking will not alter any characteristics of an identified eligible or listed Historic Property that qualify the property for listing in the National Register, or it will not alter an eligible Historic Property's location, setting or use. We have no objections to your proceeding with your undertaking.

If your agency proposes any modifications in current project plans or discovers any archaeological remains during the ground disturbance or construction phase, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. You may direct questions or comments to Jennifer M. Barnett (615) 741-1588, ext. 105. This office appreciates your cooperation.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jmb

Eastern Band of Cherokee Indians
Tribal Historic Preservation Office
P.O. Box 455
Cherokee, NC 28719
Ph: 828-359-6852  Fax 828-488-2462

DATE:  27 – February – 17

TO:  Tennessee Valley Authority
ATTN: Patricia Bernard Ezzell
400 West Summit Hill Drive
Knoxville, TN  37902

**PROJECT:  Gallatin Fossil Plant Bottom Ash Dewatering Site, Sumner County, Tennessee.**

Program Manager Ezzell:

The Tribal Historic Preservation Office of the Eastern Band of Cherokee Indians (EBCI THPO) accepts the invitation to comment on this proposed section 106 activity under §36CFR800.

It is the opinion of the EBCI THPO that no cultural resources important to the Cherokee people should be adversely impacted by this proposed federal undertaking. As such, the proposed undertaking may proceed as planned. In the event that project design plans change, or cultural resources or human remains are inadvertently discovered, the EBCI THPO requests that all work cease and be notified so we may continue the nation-to-nation consultation process as stipulated under §36CFR800.

If we can be of further service, or if you have any comments or questions, please feel free to contact me at (828) 359-6852.

Sincerely,

Holly Austin
Tribal Historical Preservation Office
Eastern Band of Cherokee Indians

This page intentionally left blank