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COLBERT FOSSIL PLANT DECONTAMINATION AND DECONSTRUCTION
DRAFT ENVIRONMENTAL ASSESSMENT
Colbert County, Alabama

DRAFT

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Symbols, Acronyms, and Abbreviations

µm	micrometers
AADT	Average Annual Daily Traffic
ACM	Asbestos-Containing Material
ADEM	Alabama Department of Environmental Management
APE	Area of Potential Effect
AR4	Intergovernmental Panel on Climate Change Fourth Assessment
BMP	Best Management Practice
CBMPP	Construction Best Management Practices Plan
CFR	Code of Federal Regulations
CH_4	Methane
CO_2e	Carbon Dioxide Equivalent
COF	Colbert Fossil Plant
dB	decibel
dBA	A-weighted decibel
EA	Environmental Assessment
EO	Executive Order
EPA	Environmental Protection Agency
FFCA	Federal Facilities Compliance Agreement
HFC	Hydrofluorocarbon
HUC	Hydrologic Unit Code
IPCC	Intergovernmental Panel on Climate Change
kV	kilovolt
L_{dn}	Day-Night Sound Level
LOS	Level of Service
mph	miles per hour
MW	Megawatt
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
PCB	Polychlorinated Biphenyl
PFC	Perfluorocarbon
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
RCRA	Resource Conservation and Recovery Act
RFAI	Reservoir Fish Assemblage Index
SCR	Selective Catalytic Reduction
SF_6	Sulfur Hexafluoride
SHPO	State Historic Preservation Office
SMZ	Streamside Management Zone
SR	State Route
TRM	Tennessee River Mile
TVA	Tennessee Valley Authority
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service

CHAPTER 1 - PURPOSE OF AND NEED FOR ACTION

1.1 Introduction and Background

The Tennessee Valley Authority (TVA) Colbert Fossil Plant (COF), located near Tuscumbia in Colbert County, Alabama, is slated for retirement. There are five coal-fired generating units at COF and eight Combustion Turbine Units. Coal-burning Units 1 through 4 were constructed in the 1950s with all four units in commercial operation by November 1955. Units 1 through 4 had a generating capacity of 200 megawatts (MW) each. Unit 5 was authorized for construction in the spring of 1959 and entered commercial operation in the summer of 1965. Unit 5 had a generating capacity of 500 MW. COF ceased all power generation on March 23, 2016; all units are now shut down. All Combustion Turbine units at COF will continue to operate and are not considered in this Environmental Assessment (EA).

Decommissioning activities at COF have already begun on Unit 5 under an agreement that TVA entered into with the United States (U.S.) Environmental Protection Agency (EPA) in April 2011. Decommissioning is the performance of activities required to ready a facility for deactivation and demolition. Work to be performed includes removal of equipment, components, and parts that can be used at other TVA sites, draining of oil/fluids from equipment, removal of ash from boilers, removal of polychlorinated biphenyl (PCB) transformers, removal of furniture/furnishings, removal of information technology assets, removal of plant records, etc.

TVA's agreement with EPA is a Federal Facilities Compliance Agreement (FFCA) that resolved a dispute over how the Clean Air Act's New Source Review program applied to maintenance and repair activities at TVA's coal-fired power plants. TVA also entered into a judicial consent decree with the States of Alabama, Kentucky, Tennessee, and North Carolina, and three environmental advocacy groups (1) the Sierra Club, (2) the National Parks Conservation Association, and (3) Our Children's Earth Foundation. The consent decree is substantively similar to the FFCA. These agreements (collectively called the "EPA Agreements") require TVA to reduce emissions across its coal-fired generating system and take other actions at its coal plants, including retiring some of its units (hence TVA's retirement of COF Units 1-5). The EPA Agreements do not affect the operation of the Combustion Turbine units.

TVA is investigating the future disposition of the COF plant. Options include securing and maintaining the entire plant, securing and maintaining portions of the plant, deconstructing/demolishing the plant, or leaving the plant as is and taking no actions. Securing and maintaining part or all of the plant entails de-energizing the facilities and placing COF in an "idle and vacant" status during which basic maintenance is continued to prevent safety issues.

Figure 1-1 shows the location of COF in northwestern Alabama. The study area for this project includes the buildings and structures labeled on Figures 1-2 through 1-6. Deconstruction/demolition of the buildings and structures at COF could include the following:

- Powerhouse Units 1 through 5
- Service Bay
- Office Wing
- Precipitators, Selective Catalytic Reduction (SCR), and Ammonia Tank Farm
- Ash Disposal Piping
- Condensate Tanks
- Water Treatment Building

- Removal of the intake pump station equipment, concrete structure remains
- Transformer Yard
- Selective Catalytic Reduction Transformer Yard
- Vacant warehouses and miscellaneous storage buildings west of powerhouse
- Carport west of powerhouse
- Hydrogen Trailer Ports A and B
- Utility Building
- Above ground diesel and gasoline storage tanks near Utility Building
- Lighting off Oil Tank, associated piping and concrete containment
- Coal conveyors and hoppers
- Conveyor Control Building
- Coal Barge Unloaders No. 1 and 2
- Dry Fly Ash Storage Silos
- Select plant roads and parking lots
- Six stacks
- Emergency Notification System poles, sirens, windsocks, and hardware
- Riverfront Fuel Oil Unloading System structure and associated piping

Figure 1-2 shows the COF deconstruction area and overview map. The deconstruction area covers approximately 86 acres within the 1,354-acre COF property. Figures 1-3 to 1-6 show the COF structures included in the deconstruction study area:

- Figure 1-3: Powerhouse Area
- Figure 1-4: Northeast Area
- Figure 1-5: Ash Silo Area
- Figure 1-6: West Area (Laydown Area and Ammonia Farm).

The impact of activities associated with the closure of the ash and gypsum ponds, remediation of any contaminated soils associated with the coal yard, closure of the coal yard runoff pond, and closure of the National Pollutant Discharge Elimination System (NPDES) outfalls in conjunction with closure of discharge and stormwater permits will be assessed in future environmental reviews since all such activities would occur independent of the deconstruction of COF.

1.1 Purpose and Need

The purpose of the proposed action is to appropriately manage disposition of the buildings and physical structures at COF that are no longer used for their original purpose to support power generation. TVA needs to manage the disposition of the COF site to provide necessary structures and facilities for ongoing site activities while considering capital costs, long-term operations and maintenance costs, environmental risks, and safety and security at the plant site.

1.2 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 to assess, close, and secure power production facilities, and implement an operations and maintenance program to maintain structures and equipment for all or part of the plant; demolish the facility to grade; or to take no action. TVA is working with the Alabama Department of Environmental Management (ADEM), Alabama Department of Conservation and Natural

Resources, U.S. Fish and Wildlife Service (USFWS), and Alabama Historical Commission in assessing the impacts of its decision.

1.3 Related Environmental Reviews and Consultation Requirements

Related environmental documents and materials were reviewed concerning this assessment. These items included environmental assessments and reviews at COF and the surrounding area for actions related to the proposed deconstruction of the facility. The contents of these documents help describe the COF deconstruction project area and are incorporated by reference as appropriate. Documents reviewed are listed below.

- *TVA, 2015, COF Fuel Gas Emissions Draft Environmental Assessment*
- *TVA, 2015, Draft Ash Impoundment Closure Programmatic Environmental Impact Statement.*
- *TVA, 2003, Colbert Fossil Plant Units 1 through 5 Reduction Systems for Control of Nitrogen Oxides.*

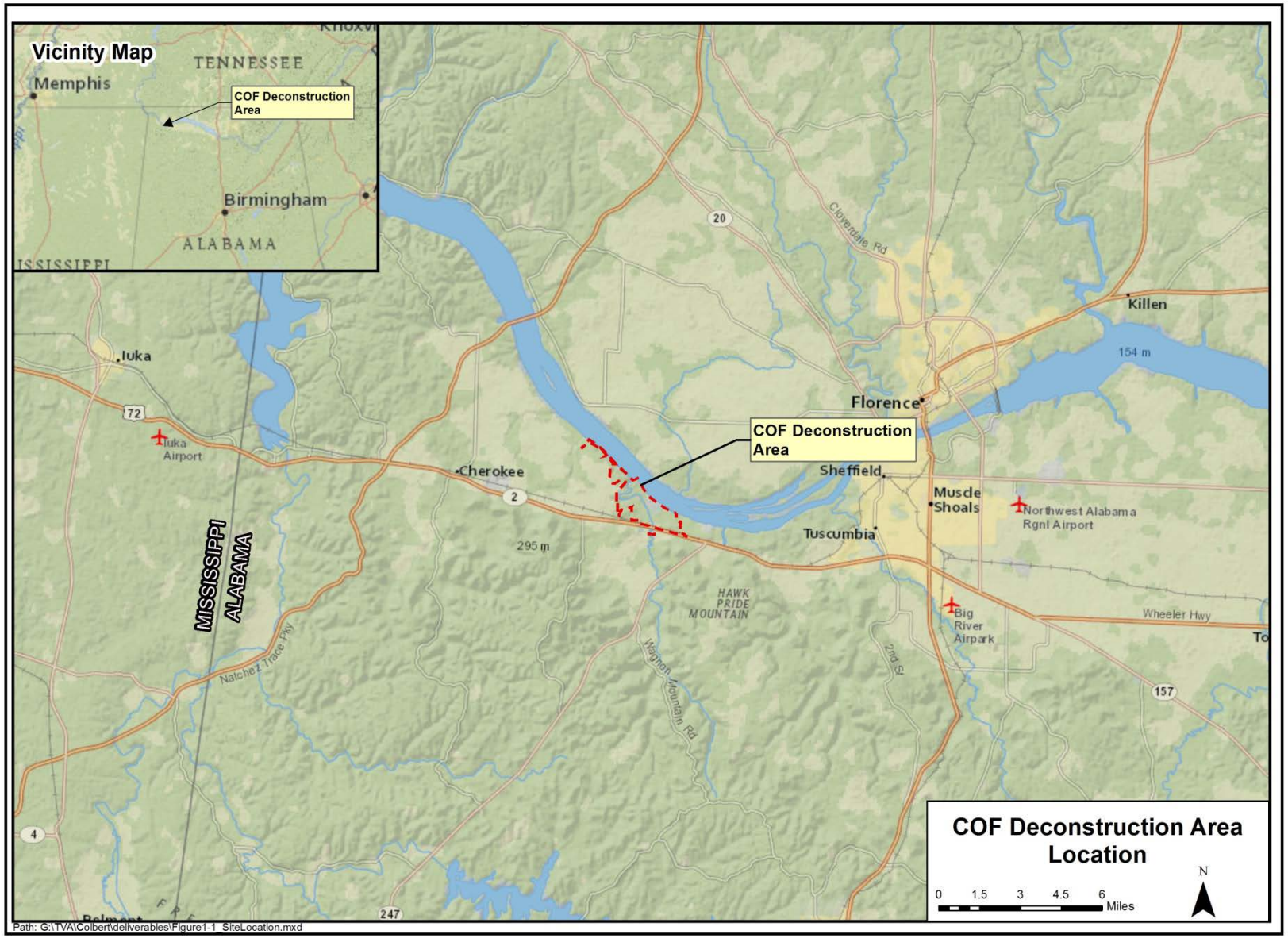

Figure 1-1. Location of COF

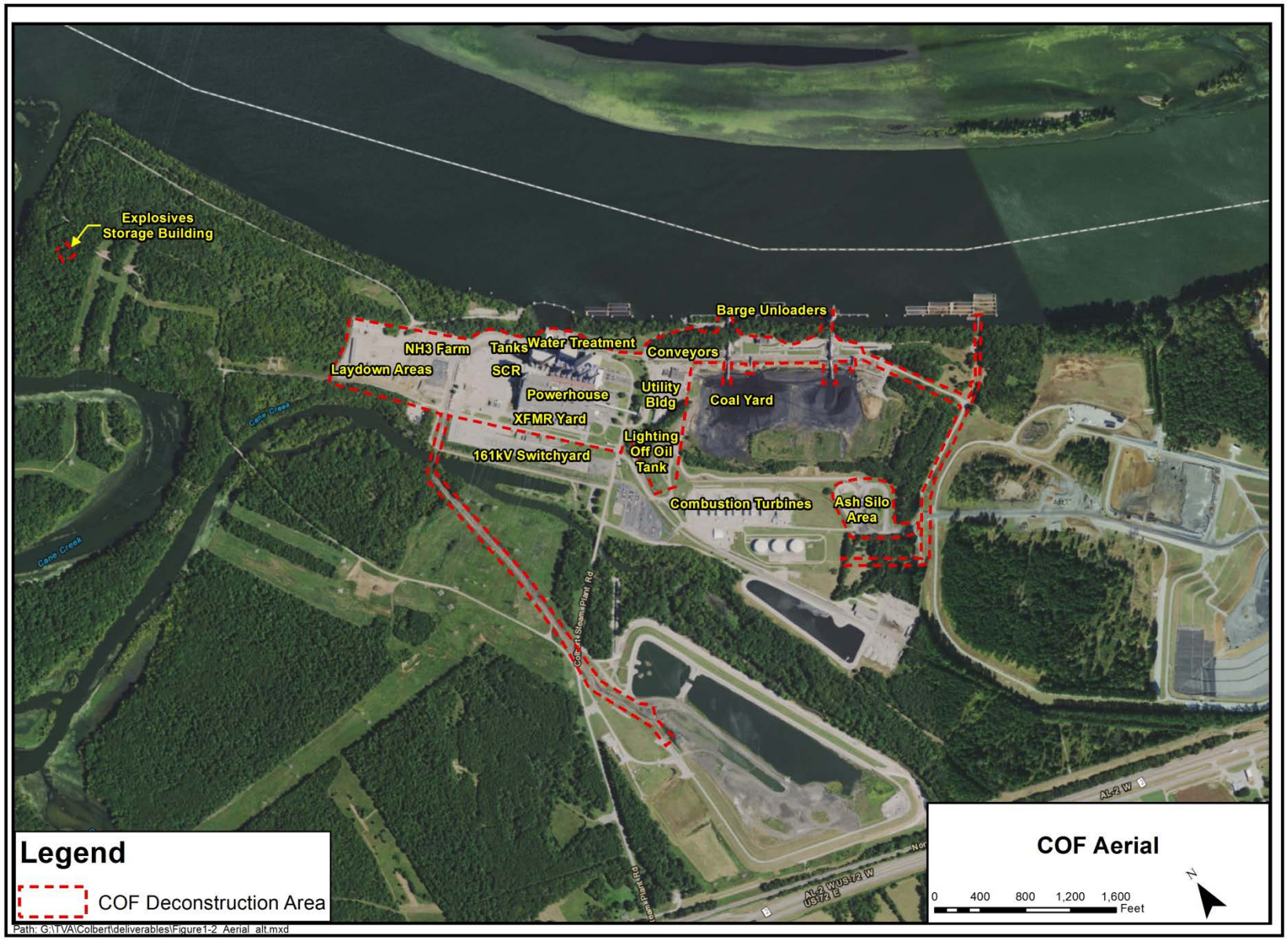

Figure 1-2. COF Deconstruction Area and Overview Map

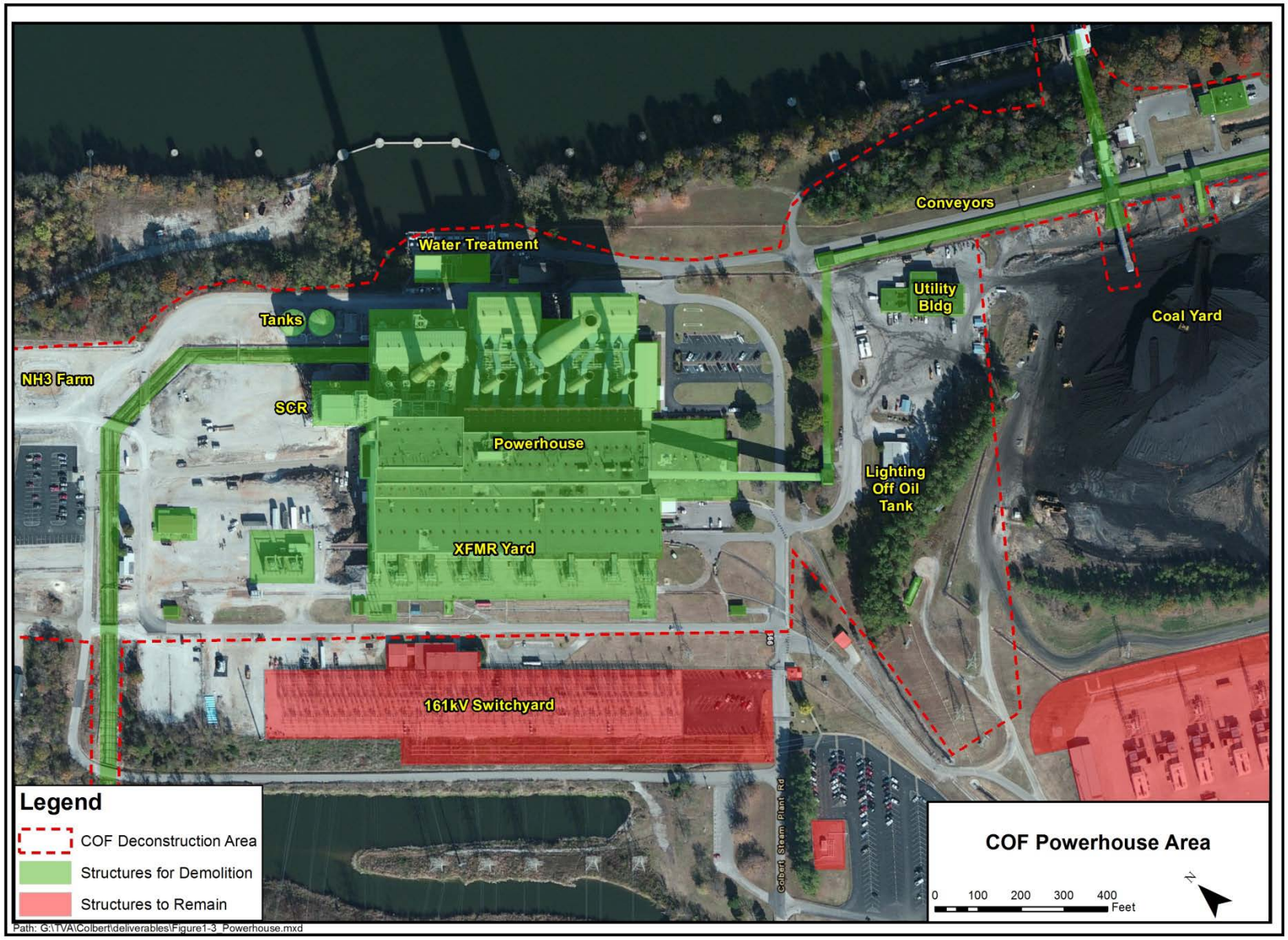

Figure 1-3. COF Units 1-5 Powerhouse Area

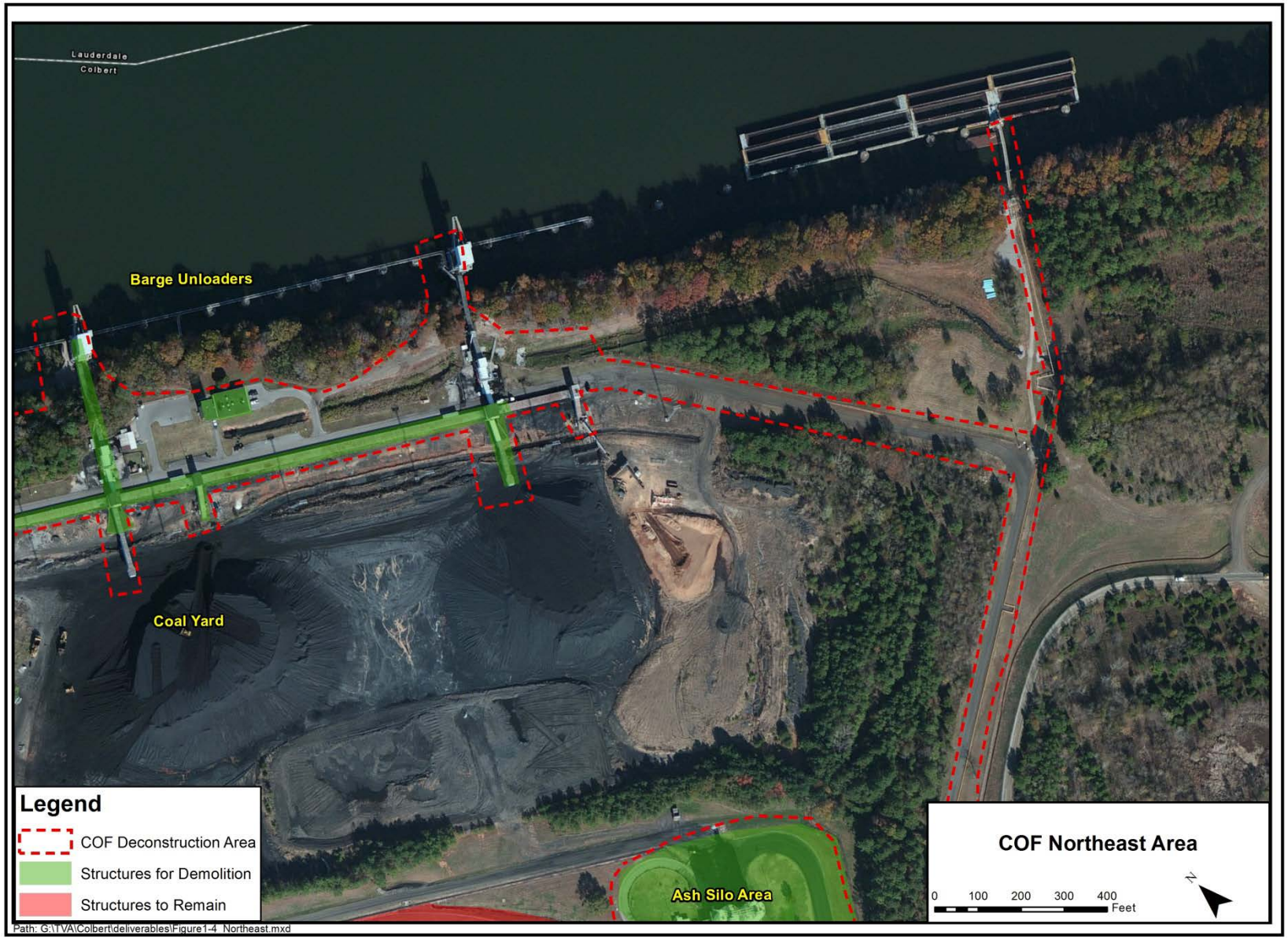

Figure 1-4. COF Northeast Area

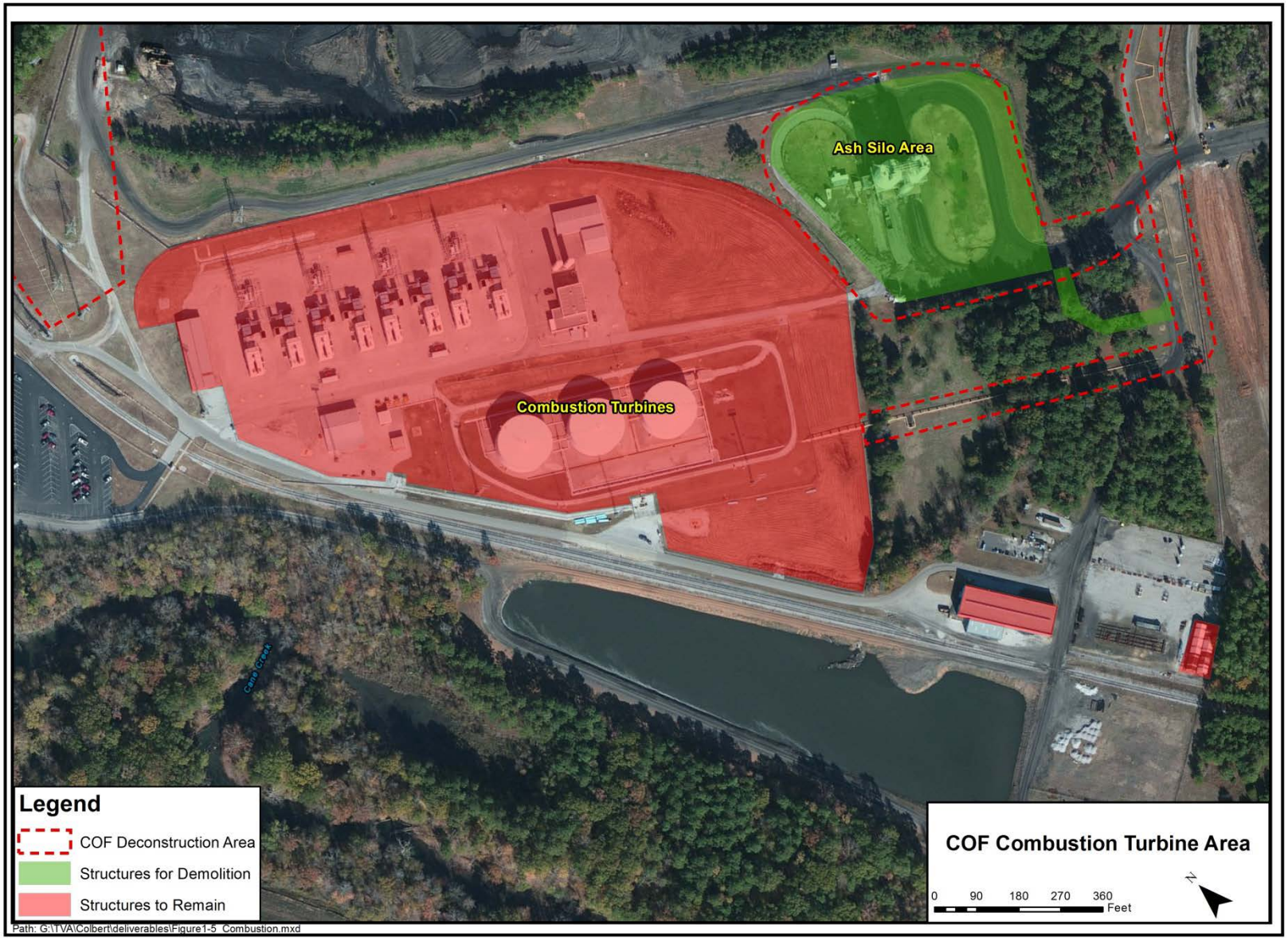

Figure 1-5. COF Ash Silo Area

Figure 1-6. COF West Area (Laydown Area and Ammonia Farm)

1.4 Scope of the Environmental Assessment

TVA has prepared this EA to comply with the National Environmental Policy Act (NEPA) and associated 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; thus, the following environmental resources are addressed in detail in this EA.

- Land Use and Prime Farmland
- Geology and Groundwater
- Surface Water
- Floodplains
- Wetlands
- Aquatic Ecology
- Wildlife
- Vegetation
- Threatened and Endangered Species
- Air Quality and Climate Change
- Hazardous Materials and Solid and Hazardous Waste
- Transportation
- Noise
- Visual Impacts
- Natural Areas, Parks, and Recreation
- Cultural Resources
- Utilities and Service Systems
- Safety
- Socioeconomics and Environmental Justice

1.5 Necessary Permits or Licenses

Information regarding the following permits or coordination is provided in Appendix A.

- Resource Conservation and Recovery Act (RCRA) Hazardous Waste Part A Permit Application, EPA Form 8700-12 (Office of Management and Budget #2050-0024).
- RCRA Hazardous Waste Part A Permit Application EPA Form 8700-23 (OMB #2050-0024).
- Air Construction Permit and modification of existing Title V Permit.
- Modification of the existing NPDES Permit for COF.
- Permits associated with disposal of sewage and sanitary wastewater into the onsite septic system.
- Underground storage tank registrations and permits, provided the tanks are abandoned or removed.
- Oil Spill Prevention, Control, and Countermeasure Plan or Integrated Pollution Prevention and Spill Response Plan.
- Coverage under Alabama General NPDES Permit for Discharges of Stormwater Associated with Construction Activities.
- Standard best management practices (BMPs) and Integrated Pollution Prevention Plan for the addition of a stormwater pond if required.
- Coordination with USFWS as needed to disturb or remove mussels in the water intake channel if needed.

- U.S. Army Corps of Engineers (USACE) Section 401/404 permit, if wetland in the project area is filled or dredged.
- Notification of Demolition (State of Alabama and EPA).

No permits or licenses would be required specifically for solid or hazardous materials transportation-related activities under any of the potential alternatives with the exception of hauling hazardous materials for the purpose of disposal offsite. The selected contractor would be responsible for ensuring necessary permits are obtained and implemented, manifests completed, and hazardous waste disposal properly reported.

CHAPTER 2 - ALTERNATIVES

This chapter presents descriptions of the proposed action and its alternatives, a brief comparison of their environmental effects, and TVA's preferred alternative.

2.1 Description of Alternatives

The following are summaries for each alternative proposed for this EA.

2.1.1 Alternative A – Assess, Close, and Secure Units 1-5, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

The objective of Alternative A is to de-energize non-essential systems at COF Units 1-5 and associated facilities, minimize environmental and safety risks, and to close the powerhouse and associated facilities to a "cold, dark, and dry" status. Existing COF buildings, structures, and equipment within the study area shown on Figure 1-2 would remain in place. Activities associated with Alternative A include:

- Maintenance of fire protection, fire detection and fire alarm systems, if present, in all buildings;
- Maintenance of all HVAC systems, if present, required for cooling of electrical equipment or life safety;
- Addition of heat tracing for critical fire protection supply lines for an unheated environment;
- Periodic roof and structural inspections;
- Periodic hazardous materials condition surveys and removal of hazardous materials over time;
- Monitoring of all PCB-containing and PCB-contaminated electrical equipment as well as any known PCB contaminated areas (as required by federal regulation);
- Maintain stack lighting according to FAA regulations;
- Maintain building lighting, necessary elevator(s), emergency lighting, exit signs required for walk downs and maintenance or egress;
- Maintain the operation of select sump pumps to prevent below-grade flooding or unpermitted discharges to the environment; and
- Continue investigation of retired equipment that could be used at other TVA facilities.

Under Alternative A, the plant staff and regular maintenance activities would be greatly reduced, and personnel from other TVA sources would be used, as necessary, to assist with performing operations and maintenance activities.

2.1.2 Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

This alternative includes the decontamination of all buildings, structures, conveyers, and silos, associated with plant operations to remove hazardous materials and demolishing the powerhouse and all associated structures, conveyors, and silos to 3 feet below final grade (Figures 1-3 through 1-6). All below-grade building areas will be backfilled and the site will be restored to grade while providing proper drainage. Demolition could occur through the use of explosives, manual deconstruction, or a combination of these processes. The estimated cost for the demolition portion in this estimate includes the salvage value of all scrap metal. All clean concrete, masonry and asphalt will be processed and used for backfill as appropriate.

This option includes the assumption that all buried utilities would be cut and capped at the project boundary and abandoned in place. All hollow pipe utilities would be decommissioned and sealed with a mechanical cap or plug. Septic systems would be emptied and hauled for offsite disposal and the empty tanks will be closed in accordance with all rules and regulations. This work is normally done during deactivation.

This alternative includes the deconstruction item of sealing the intake and discharge tunnels with bulkheads. Three options for disposing of the cooling water intake and discharge tunnels include: sealing with bulkheads, sealing with bulkheads and flow-fill, or removal. Sealing would consist of erecting bulkheads within the intake and discharge tunnels. Sealing with flow-fill would include closing the tunnels with bulkheads and then pumping a mixture of water, cement, and fine aggregate in to fill the tunnels. (Use of flow-fill would be evaluated during design and engineering of the demolition.) Tunnel removal would include complete demolition of the structures. The decision whether to use either sealing or removal would be made during Phase 2 of the COF Deconstruction project after detailed engineering plans have been developed. However, this EA assesses the impacts of all options, including filling all electrical cable tunnels with engineered fill. Under this alternative, it is assumed that the intake concrete structure will remain but all equipment will be removed.

The following structures or facilities are not part of this Alternative:

- 161-kilovolt (kV) Switchyard
- Ash Stack 5 and Coal Yard
- Electrical Control Building
- Guard House
- Plant Perimeter Fencing
- Fuel Oil Truck Unloading Facility for the Combustion Turbines
- Combustion Turbine Plant
- Coal Yard Runoff Pond
- Mooring Cells and walkways along the river shoreline and intake trash boom
- Combustion Turbine Site Storage Buildings

Refer to Figures 1-3 through 1-6 for the locations of buildings and other structures included or excluded from this study.

2.1.3 Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

The objective of Alternative C is to de-energize all operational systems, minimize environmental and life safety risks and remove outlying buildings. Specific buildings within the Deconstruction Study area (Figure 1-2) would remain in place. This alternative is the same as Alternative A plus further reducing future maintenance costs and risk by removing outlying buildings. Removal of just the outlying buildings has minimal impact on the future maintenance cost and risk.

2.1.4 Alternative D – No Action

Under the No Action Alternative, TVA would not perform any deconstruction or other disposition activities. Consequently, COF Units 1-5 would be left in place in their current condition. Additionally, TVA would take no action to maintain the units in operable condition. The plant would not generate power, and it would not be possible to restart the units. The plant would not be heated, cooled, or supplied with electricity. TVA would continue to restrict access to the COF. Periodic inspections and critical maintenance would be performed as needed. TVA would maintain the NPDES permit, implement the Integrated Pollution Prevention Plan, and perform

environmental monitoring and reporting as required. If the facility is left in the “as-is” condition, it likely would present a higher risk than Alternatives A, B, and C for the potential to contaminate soil and groundwater as systems and structures degrade.

2.2 Comparison of Alternatives

The environmental impacts of the alternatives are summarized in Table 2-1. These summaries are derived from the information and analyses provided in Chapter 3.

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

Resource Area	Impacts from Alternatives			
	A	B	C	D
Land Use and Prime Farmland	None	Minor (Beneficial)	Minor (Beneficial)	None
Geology and Groundwater	Minor	None	Minor	Minor
Surface Water	Minor	None	Minor	Minor
Floodplains	None	Minor and Temporary	Minor and Temporary	None
Wetlands	None	None	None	None
Aquatic Ecology	None	None	None	None
Wildlife	None	None	None	None
Vegetation	None	None	None	None
Threatened and Endangered Species (Aquatic Species)	None	None	None	None
Threatened and Endangered Species (Terrestrial Ecology)	None	Minor and Temporary	Minor and Temporary	None
Threatened and Endangered Species (Plants)	None	None	None	None
Air Quality and Climate Change	None	Minor and Temporary	Minor and Temporary	None
Hazardous Materials, and Solid and Hazardous Waste	Minor	None	Minor	Minor
Transportation (Rail and Roadway)	Minor and Temporary	Minor and Temporary	Minor and Temporary	None
Noise	None	Minor and Temporary	Minor and Temporary	None
Visual Resources	None	Minor (Beneficial)	None	None
Natural Areas, Parks and Recreation	None	None	None	None
Cultural and Historic Resources	None	None	None	None
Utilities and Service Systems	Minor	Minor	Minor	None
Safety	Minor	Minor and Temporary	Minor	None
Socioeconomics	Minor (Beneficial)	Minor (Beneficial) and Temporary	Minor (Beneficial)	None
Environmental Justice	None	None	None	None

2.3 Identification of Mitigation Measures

2.3.1 Surface Water

Alternatives B and C include land disturbance, which would require a Construction Best Management Practices Plan (CBMPP). The current NPDES permit, Stormwater Multi-Sector Permit, and Spill Prevention, Control, and Countermeasure Plan may need to be modified for all alternatives. Turbidity curtains or other BMPs would be installed as necessary to minimize potential impacts to surface waters during explosive demolition activities.

2.3.2 Wildlife

Inactive structures may be used by migratory birds for nesting. To avoid impacts to aggregations of migratory birds, a survey of the buildings and structures within the project footprint would be performed at least one month prior to demolition to determine whether any migratory birds are actively using these structures. To prevent nesting prior to demolition, openings would be closed to the extent possible; deterrents may also be put in place. If active nests are present and demolition activities must occur within the active nesting season, TVA would coordinate with USFWS to ensure the assessment and appropriate mitigation of impacts to migratory birds.

2.3.3 Threatened and Endangered Species

Though at the time of publication of the Draft EA no threatened or endangered species were identified that could be potentially impacted by the proposed action, inactive structures may be used in the future by federally listed gray bats, Indiana bats, and northern long-eared bats for roosting . To minimize roosting prior to demolition, openings would be closed to the extent possible and deterrents may also be put in place. An extensive survey would be performed a minimum of one month prior to deconstruction of the control tower, office, powerhouse, service bay, Units 1-5, utility building, water treatment building and any other connected structures to determine if listed bat species are utilizing these buildings. If listed bats are found, these buildings must not be demolished until one of two actions occurs: 1) bats are transitioned out of the buildings; or 2) consultation with USFWS is completed.

2.3.4 Air Quality and Climate Change

Dust control would be required under Alternatives B1, B2, and B3 when any demolition activity takes place, during site grading, and during the transportation of demolition debris. Primary efforts in mitigation will be the control of dust leaving the site. This will occur when the demolition takes place, during transportation of demolition debris, and during removal of hazardous and solid waste. The demolition contractor would be required to remove ash from the facility proposed for deconstruction prior to demolition of that facility and would implement dust control measures during demolition to prevent the spread of dust, dirt, and debris. These methods may include wetting equipment and demolition areas, covering waste or debris piles, using covered containers to haul waste and debris, and wetting unpaved vehicle access routes during hauling. Wet suppression can reduce fugitive dust emissions from roadways and unpaved areas. TVA also routinely requires onsite contractors to maintain engines and equipment in good working order.

Stack demolition would result in a one-time emission of fugitive dust. To mitigate the potential volumes of dust produced, BMPs may include treated fall zones, misting, and tackifier applied inside the stacks. The fall zones would have berms to reduce the lateral extent of the dust cloud. Also, a hardened berm near the base of the stack would act as a backstop to prevent rock and debris spreading from the base of the stacks during demolition. Water or another

approved material may be applied to the clean soil to discourage it from becoming airborne when the stack comes down. A misting system would be used to saturate the air inside the fall zone and help to bind fugitive dust as it becomes airborne, hastening its resettling and preventing undue spread off site. Cleaning the inside of the stack and removing any fibrous materials would occur to mitigate additional dust generation.

2.3.5 Hazardous Materials and Solid and Hazardous Waste

Under Alternatives A, B, and C TVA would remove hazardous materials from the facility. Removal is mitigation for the potential release of hazardous material. BMPs would be implemented as hazardous materials are removed by the demolition contractor. Under Alternatives A and C, TVA would additionally maintain security at the facility with fencing and security personnel. With Alternative B TVA would maintain the fencing and security but to a lesser degree as the potential hazards of a standing facility would not exist.

Under Alternatives A and C, TVA would assess periodically the condition of remaining site facilities and potential hazardous materials as structures deteriorate and determine whether selective demolition or additional remediation would be needed at some point in the future.

2.3.6 Transportation

Under Alternative B, should blasting be used to demolish the chimneys, river traffic would be restricted in the vicinity and select public roadways would be closed for public safety and to facilitate site security. Water and road traffic closures would vary from approximately three hours before and up to three hours after the blast. The road closure would not likely affect a large number of local residents due to the sparse population in the area. The demolition contractor would create a detailed plan for road closures that would be distributed to affected parties, including emergency personnel.

The Norfolk Southern Railroad would be contacted to discuss the potential stoppage of train movement in the area during the blasting event. If appropriate, after demolition, a railroad-provided team would inspect the track prior to reopening for rail service. No barge or boat traffic would be allowed in the area during the event. Due to the temporary nature of demolition operations, no impacts to rail and navigational traffic are expected.

2.3.7 Noise and Vibration

A documentation services company would be contracted to evaluate the potential for vibration impacts under Alternative B. The documentation services company would use site-specific data provided by the blasting contractor to prepare a vibration model simulating the effects of discharge of the explosives or vibrations due to the stack hitting the ground. The model results would be compared to thresholds developed by the United States Bureau of Mines for vibration damage. The study would assess structures within a 0.5 mile radius of the stack.

Onsite power transmission equipment at COF would have the potential for minor effects from vibrations caused by explosive demolition of the stacks. Minor effects could include temporary power disruption. Mitigation measures to minimize potential impacts would be determined during the construction planning process and could include switchyard alignment, staging personnel in the Electrical Control Building, and scheduling the demolition during off-peak hours. Use of such mitigation measures would immediately address any power disruptions.

2.3.8 Visual Resources

TVA would notify the FAA and follow all local, state, and federal guidelines regarding removal of the obstruction lighting in association with demolition of the chimneys.

2.3.9 Cultural Resources

TVA would require the demolition contractor develop and implement a blast plan in order to minimize vibration effects to cultural resource sites. Although the sites are not safely accessible, the sites are visible from the walkway and would be monitored during deconstruction for damage or other adverse effects and should damage occur, all work would stop immediately.

A 20 meter buffer would be placed around Sites 1CT630, 1CT631, and 1CT626, prior to any work the areas will be flagged, and during any deconstruction activities these sites would be avoided. TVA would require that if project plans change and if any soil disturbance or grading greater than 40 centimeters below surface would occur in the vicinity of Site 1CT116, additional testing and evaluation would be required.

2.3.10 Safety

TVA would maintain security at the facility under all alternatives, but at a greater level with Alternatives A, C, and D than B due to remaining structures. Fencing and security personnel would remain for all alternatives. TVA would also periodically assess the condition of remaining site facilities as they deteriorate.

Under Alternative B, explosives, if used, would be managed under the direction of a licensed blaster; 24-hour security would be provided to monitor the explosives. Detailed security plans would be developed and provided to area emergency response agencies. Security details, including any information about the transport and storage of explosives, would be limited to authorized personnel only. Site security on the day of the event would be strictly enforced, and trespassing would not be tolerated. Notifications to the public would be issued prior to the use of explosives for demolition. Prior to the demolition, the area would be prepared, and a circular fall exclusion zone equal to 1.5 times the height of the structure being demolished would be established. During the blast event, no personnel would be allowed in the fall exclusion zone.

2.4 Preferred Alternative

TVA’s preferred alternative is Alternative B, Demolition of Units 1-5 and other structures to 3 feet below final grade (brownfield) including the six stacks.

Alternatives A and D have a higher potential for environmental impacts than the other action alternatives since existing structures would be left in place at the facility. Alternatives B and C would have similar impacts, which are minor and insignificant. Alternative B; however, has the lowest cumulative cost of all action alternatives.

CHAPTER 3 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Land Use and Prime Farmland

3.1.1 Affected Environment

COF is located in Colbert County, Alabama. Colbert County does not have land use zoning throughout the county, and the project area is currently not zoned. Current land use at the COF project area is heavy industrial, i.e., coal-fired power production. Almost all of the COF project area is used for the facility buildings and structures, with a few small areas of trees and grass. The COF site is surrounded on three sides by low, wooded hills, gently sloping farmland, and sparse residential development. Pickwick Reservoir borders the COF site along the north side. As shown in Figure 3-1, land cover in most of the COF vicinity is characterized by agricultural land (pasture/hay and cultivated crops) and mixed forests (deciduous and evergreen), with areas of medium and high intensity development along the Pickwick Reservoir (U.S. Geological Survey [USGS] 2014).

The COF project area contains approximately 86 acres within the 1,354-acre COF property. As shown in Figure 3-2, the majority of the soils within the COF property are urban, predominantly Urban land (Ub) mostly covered by streets, parking lots, buildings, and other structures (62 percent), as well as Decatur-Urban land complex (DeB), which is a mixture of Decatur soil and urban land (29 percent). The remaining soil types present with the project area are forms of silt loam, including Fullerton cherty silt loam (FaB), Fullerton gravelly silt loam (FaD), and Fullerton-Bodine complex (FbF) (U.S. Department of Agriculture [USDA] Natural Resources Conservation Service [NRCS] 2016).

Approximately 4.5 percent (3.9 acres) of the project area is designated as prime farmland by the NRCS, consisting of the Fullerton cherty silt loam soil type (USDA NRCS 2016) (Figure 3-2). The Farmland Protection Policy Act (7 United States Code [USC] 4201 et seq.) requires Federal agencies to take into account the adverse effects of their actions on prime or unique farmlands. Form AD 1006, “Farmland Conversion Impact Rating,” must be completed with assistance from the NRCS before an action is taken when prime farmland is involved. However, since the COF has been producing power since 1955 and because the project site is on land currently in industrial development and has been for over 50 years, the completion of Form AD 1006 and consultation on prime farmlands is not required (Farmland Protection Policy Act, 7 USC 4201).

3.1.2 Environmental Consequences

3.1.2.1 Alternative A – Assess, Close, and Secure Units 1-5, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

Alternative A would not alter the land use or disturb any prime farmland because existing structures would remain in place. Any previously converted prime farmland would remain undisturbed onsite. Overall, there would be no direct or indirect impacts to land use or prime farmland.

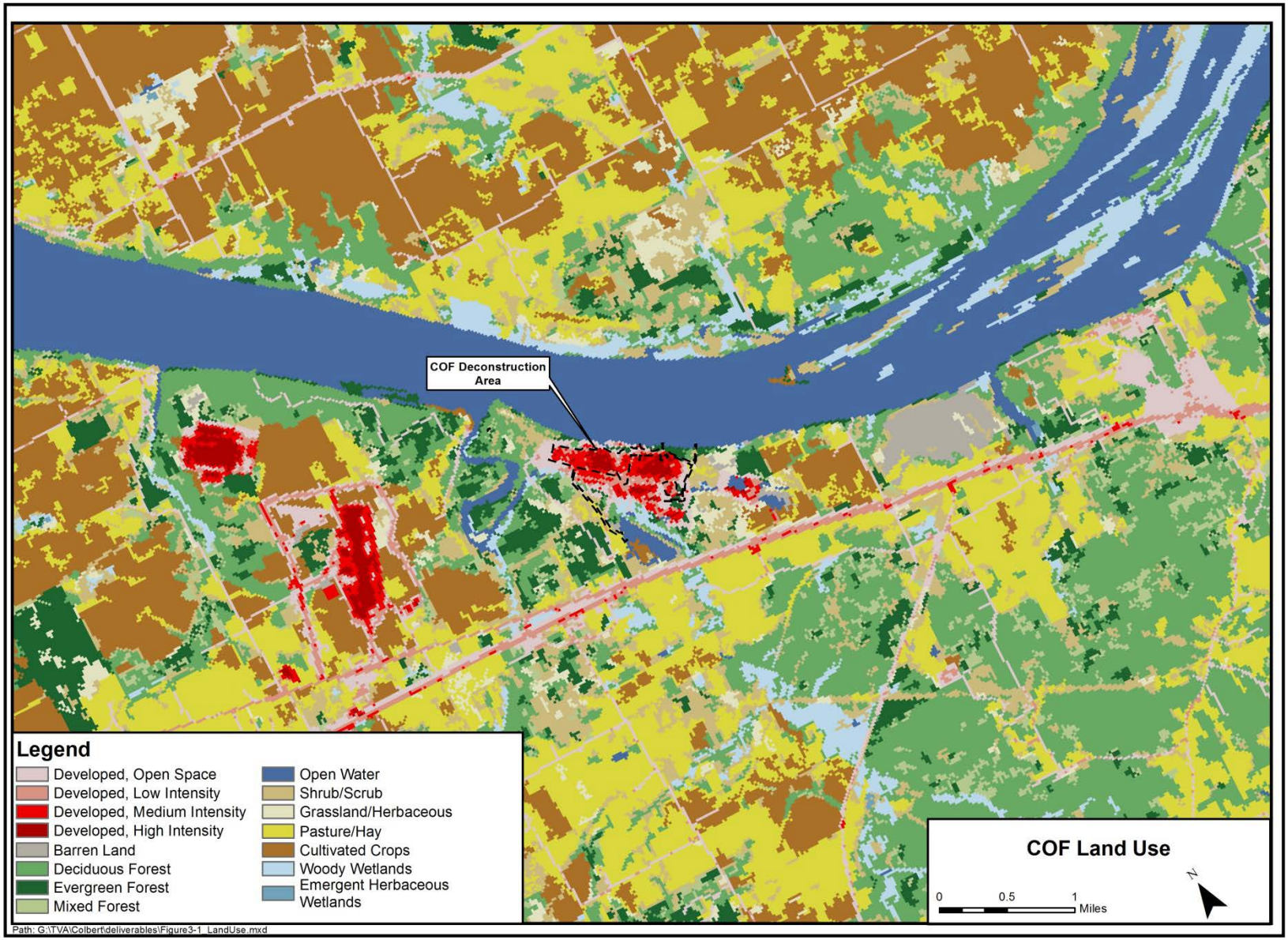

Figure 3.1. COF Land Use

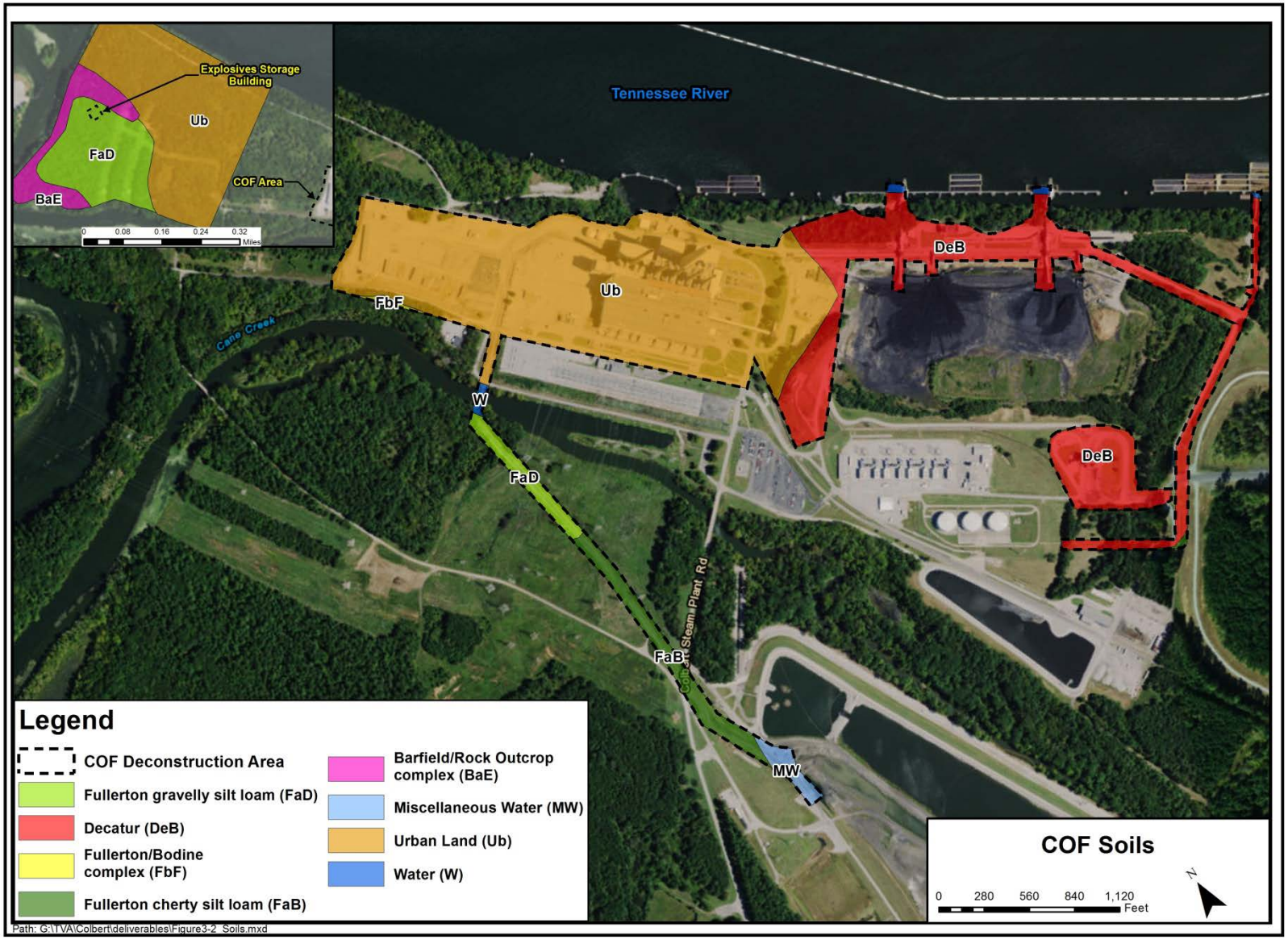

Figure 3-2. Soils within the COF Project Area

3.1.2.2 Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

Under Alternative B, the project area would initially be designated as a Brownfield site and reseeded at project completion. It would become available for potential future redevelopment. As a result, future light industrial or other beneficial use could be realized. No adverse impacts to land use would be anticipated.

Deconstruction/demolition of all aboveground structures within the project area to a depth of 3 feet below grade would result in disturbance of the soil in the immediate vicinity of the structures. The basement areas of the facility would be filled with material from the deconstruction process, as well as imported fill. This alternative would result in a net increase in the amount of uncovered land within the project area. Considering that the entire project area is previously developed and would continue to be designated for nonagricultural purposes, no direct or indirect impacts to prime farmland would be anticipated.

3.1.2.3 Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

The removal of outlying buildings under Alternative C would alter land use in those portions of the project area, making those areas available for future development. No adverse impacts on land use would be anticipated. Deconstruction/demolition of those particular structures would result in an increase in the amount of uncovered land. As described for Alternative B, there could be potential beneficial impacts to land use and no direct or indirect impacts to prime farmland would be anticipated because these portions of the project area were previously developed.

3.1.2.4 Alternative D – No Action

Similar to Alternative A, the adoption of Alternative D would mean that the COF structures would remain in place with no impact to existing land use or prime farmland.

3.2 Noise and Vibration

3.2.1 Affected Environment

Noise is measured in logarithmic units called decibels (dB). Given that the human ear cannot perceive all pitches or frequencies of sound, 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 (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 is the constant sound level that conveys the same sound energy as the actual varying instantaneous sounds over a given period. It averages the fluctuating noise heard over a specific period as if it had been a steady sound. The day-night sound level (L_{dn}) is the 24-hour average noise level with a 10-dBA penalty between 10 p.m. and 7 a.m. to account for the fact that most people are more sensitive to noise while they are sleeping.

The area surrounding COF consists of open rural property. The closest residences are located approximately 1.25 miles from the COF site. Trees growing between the site and those residences block the line of site and help to attenuate noise from COF. The COF Units 1-5 and the associated coal facilities do not currently generate any significant noise since operations ceased completely as of March 23, 2016. Coal unloading has historically been one of the dominant noise-generating activities on the site; however, coal unloading has also been

terminated. Current operations at COF will produce much less noise than what has been previously reported, and no additional noise study has been deemed necessary at this time.

There are no federal, state, or local regulations for community noise levels in Colbert County; however, EPA (1973) guidelines recommend that L_{dn} not exceed 55 dBA. Research by the United States Air Force (USAF) has established suggested levels of annoyance experienced by nearby receptors to various background L_{dn} levels (Table 3-1).

Table 3-1. 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: USAF et al. 1992

Should explosive demolition be used to remove the Unit 1-5 stacks, noise and vibrations would be generated both from the explosion and from the collapse of the stacks onto the ground. The fact that this noise and vibration generation would be a one-time event removes it from the background/constant/continuing intermittently category that defines L_{dn} and corresponding levels of annoyance within the community. For example, the Occupational Safety and Health Administration permissible noise exposure in the workplace is 90 dB (e.g., a lawn mower) for eight hours per day, or 115 dB (e.g., emergency vehicle siren) for 0.25 hour. The blast event at the source may be equivalent to a thunderclap (120 dB). Notifications to the public, including area emergency services, and to Norfolk Southern Railroad would be issued prior to the use of explosives for demolition.

3.2.2 Environmental Consequences

3.2.2.1 Alternative A – Assess, Close, and Secure Units 1-5, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

If Alternative A is selected, TVA would continue to follow the current operating plan, which includes ongoing maintenance of the retired coal-fired powerhouse and its related structures and parking. No increases in current noise levels surrounding the COF are anticipated under this alternative. No impact to noise is anticipated with Alternative A.

3.2.2.2 Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

Under Alternative B, demolition activities would last approximately 15 to 18 months. Most of the work would occur during the day on weekdays. However, demolition activities could occur at night or on weekends, if necessary. Demolition activities would increase traffic on roads near the plant, which could also increase intermittent noise at some nearby residences. During the demolition phase, noise would be generated by a variety of construction equipment, including explosives, compactors, front loaders, backhoes, graders, and trucks.

Vibrations from explosive demolition events can potentially affect nearby structures. A documentation services company would be contracted to evaluate the potential for vibration impacts. The documentation services company would use site-specific data provided by the

blasting contractor to prepare a vibration model simulating the effects of discharge of the explosives or vibrations due to the stack hitting the ground. The model results would be compared to thresholds developed by the U.S. Bureau of Mines for vibration damage. The study would assess structures within a 0.5 mile radius of the stack. The installation of imported fill, dirt binder and geofabric would also serve as a form of noise/vibration control.

As described previously, seismologic analyses carried out at recent demolitions of other tall industrial chimneys in the United States strongly suggest that the vibrations would not result in measurable effects on nearby structures (Protec 2008, 2009, and 2013). These seismological analyses were conducted to measure the effects from demolition-related vibrations on standing structures in the vicinity of the chimney demolitions. In each case, vibrations were below the recommended limits set by the U.S. Bureau of Mines Report (Siskind et al. 1980). The report authors in each case concluded the demolitions would not cause damage to structures within the radius of influence. Vibrations resulting from the demolition of COF chimneys would be of similar magnitude. Therefore, no damage to structures is anticipated. In order to add further protection, TVA would require the demolition contractor develop and implement a blast plan in order to minimize vibration effects at COF and in the vicinity. Due to the temporary nature of the operation, implementation of the blast plan, the site's rural location, and distance to nearest receptors (over one 1 mile), noise and vibration effects on the environment are expected to be minor and temporary.

3.2.2.3 Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

This alternative is the same as Alternative A with further reductions in both future maintenance costs and risk as a result of removing outlying buildings. Due to the temporary and intermittent nature of demolition and the site's rural location, and distance to nearest receptors (over 1 mile), impacts related to noise from Alternative C would be similar to those described for both Alternatives A and B. Impacts associated with Alternative C are expected to be minor and temporary and less than those associated with Alternative B.

3.2.2.4 Alternative D – No Action

Under the No Action Alternative, TVA would not perform any deconstruction or other disposition activities. If the facility remains in the "as-is" condition, there would be no impact on noise for the general public under this alternative.

3.3 Geology and Groundwater

3.3.1 Affected Environment

The primary bedrock underlying the COF site is Tuscumbia limestone, a cherty limestone characterized by fine to medium grained fossils and layers of chert nodules (TVA 2015a, USGS 2016). This Mississippian age bedrock may be overlain by residual and alluvial deposits. Depth to bedrock is highly variable ranging from the surface to more than 70 feet below ground surface with differential solution activity and weathering producing an irregular, "pinnacle and cutter" bedrock surface (TVA 2015a).

Pinnacle and cutter topography is a type of karst topography where rainfall dissolves limestone along fractures and contacts producing deep bedrock cuts, or cutters, and sharp peaks, or pinnacles. Karst topography also includes underground streams, caves, and sinkholes. A former sinkhole was located within the COF boundary in the forested area between the Ash Silo Area and Ash Pond 3 (TVA 2015a). The closest identified sinkhole beyond the COF boundary is approximately 1.33 miles southeast of the facility toward Pride Landing Road. Another sinkhole near Pride Landing Road is approximately 1.47 miles east southeast of COF. Two other

sinkholes are located approximately 1.42 miles and 1.54 miles northwest of COF beyond Cane Creek Road (ArcGIS 2016).

The regional aquifer underlying the COF is the Tuscumbia-Fort Payne Aquifer. Depth to groundwater ranges from seven to more than 50 feet below ground surface over much of the site with the exception of the area to the east of Ash Pond 4, where groundwater is encountered between 3.5 to 5.2 feet below ground surface (TVA 2015a). This aquifer is hydrologically connected to Cane Creek and the Pickwick Reservoir The groundwater flow direction is toward the north northeast to the Tennessee River/Pickwick Reservoir away from any residential wells (TVA 2015a). Extra care may need to be taken with contaminated equipment because of the ease with which contaminants can move through karst conduits.

3.3.2 Environmental Consequences

3.3.2.1 Alternative A – Assess, Close, and Secure Units 1-5, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

Alternative A would not alter the geology or groundwater because existing structures would remain in place and would be monitored for environmental and safety hazards. Periodic inspections and maintenance would be performed as needed to ensure that any contaminated equipment would not impact the geology or groundwater. However, with materials remaining in place over the long-term, degradation and contamination of groundwater may occur, especially because of the ease with which contaminants can move through karst conduits. The potential for groundwater contamination would also create a risk of degrading the highly erodible, karst topography that underlies much of the COF. Therefore, although maintained and monitored, there could be minor impacts to the geology or groundwater over time from these remaining sources.

3.3.2.2 Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

Under Alternative B, all identified aboveground structures would be deconstructed to a depth of 3 feet below final grade, including the six stacks. Demolition could occur through the use of explosives, manual deconstruction, or a combination of these processes. Removal of the stacks and structures would result in vibrations in the immediate vicinity as described in Section 3.2. Additional minor vibrations would be generated throughout the course of grading and backfilling the facility. There would be no impacts anticipated to the existing geology or groundwater as a result of the proposed actions.

3.3.2.3 Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

Under Alternative C, all outlying buildings would be removed and all operational systems would be de-energized; minimizing environmental and life safety risks. As shown in Figure 1-2, specific buildings within the Deconstruction Study area remain in place. Although outlying buildings are removed, many structures, including the powerhouse, may degrade over the long-term. The deterioration of the remaining structures could increase the potential for groundwater contamination, especially because of the ease with which contaminants can move through karst conduits. The potential for groundwater contamination would also create a risk of degrading the highly erodible, karst topography that underlies much of the COF. Therefore, there could be minor impacts to the geology or groundwater over time.

3.3.2.4 Alternative D – No Action

Under Alternative D, the COF structures and powerhouse would remain in place with no immediate change to the existing geology or groundwater. Under this alternative, there would be

a higher potential for long-term impacts to groundwater quality because of the higher risk of contamination as the structures degrade. The potential for groundwater contamination would also create a risk of degrading the highly erodible, karst topography that underlies much the COF. Overall, the potential impacts of this alternative on geology and groundwater would be minor, but greater than the other alternatives because more materials that can deteriorate remain in the structures on the site.

3.4 Surface Water

3.4.1 Affected Environment

The COF is located on TVA's Pickwick Reservoir on the Tennessee River in Alabama at Tennessee River Mile (TRM) 245 east of the community of Barton. The nearest major cities are Florence, Sheffield, Muscle Shoals, and Tuscumbia, Alabama, all located about 10 miles east of the site. The site is drained by Cane Creek, which is classified for the uses of swimming and fish and wildlife. The Tennessee River is classified for the uses of public water supply, fish and wildlife, swimming, and other whole body water contact sports (ADEM Water Quality Criteria, 2014).

River flow rates past the site are regulated by Wilson Dam upstream and Pickwick Dam downstream. The Tennessee River in the vicinity of the site has experienced historical pollution problems due to poor treatment from municipal and industrial treatment facilities and nonpoint sources (TVA 2003).

The overall ecological health condition of the Pickwick Reservoir was rated fair in 2012, with a score of 63 (out of a total possible of 100). The Pickwick Reservoir has scored lower the past three years (2013 – 2015) primarily due to three indicators (dissolved oxygen, chlorophyll, and bottom life). This has resulted in ratings near the low end of the reservoirs historic ranges at several monitoring locations. The Pickwick Reservoir, however, typically scores near (slightly above or slightly below) the break point between a good and fair rating, with year-to-year variation primarily dependent on chlorophyll concentrations (which are affected by reservoir flows), and conditions in the Bear Creek embayment, which generally rates lower than other monitoring locations on the reservoir (TVA 2015b).

The ADEM has designated the section of Pickwick Reservoir that extends from the Alabama - Tennessee state line to the lower end of Seven Mile Island for public water supply, swimming, and fish and wildlife. ADEM has also listed this section on their 2014 303(d) list as impaired because of nutrients from agriculture (AL 303(d) list, 2014).

The Alabama Department of Public Health states in their Fish Consumption Advisories, released June 2015, that there are no restrictions on Pickwick Reservoir or on Cane Creek (Alabama Department of Public Heath 2015).

3.4.1.1 Process and Stormwater

NPDES Permit number AL0003867 (ADEM 2005) covers water discharges at the COF. Drainage from the COF site discharges to both Cane Creek and the Tennessee River. Process wastewater discharges from the facility are permitted under an NPDES permit and include outfalls that are sampled, monitored, and reported on monthly discharge monitoring reports. These include DSN001a (intermittent discharges of treated sanitary wastewater to Pond 4); Outfalls 001b (Metal Cleaning Wastes to Pond 4); Outfall 001 (Ash Impoundment Discharge); Outfall 002 (Once-through Condenser Cooling Water); DSN 003 (Intake Screen Backwash water); DSN 010 (Pond #4 Discharge from stormwater and dry ash stacking area); and DSN013

(Constructed wetland discharge from seepage of Pond #4). Additionally several stormwater/air conditioner cooling water discharges are also permitted (DSN 004, DSN005, DSN 006, DSN008, DSN009, and DSN012. AL0003867 has been administratively continued since May of 2010.

Units 1-5 are all idle. Most process flows stopped when the plant ceased to generate in March 2016. Precipitation-driven flows, some sump flows, and possibly some dewatering flows may continue as needed.

3.4.1.2 Ash Impoundment

Historical sources of flows to Ash Impoundment #4 are listed in Table 3-2.

Table 3-2. Historical Inflow Sources to Ash Impoundment #4

Source	Annual Average Inflow to Ash Impoundment (mgd)
Bottom Ash sluice water	5.407
Power House Sumps	2.092
Precipitation into Pond	0.166
Evaporation from Pond	0.116
Coal Yard Run-off Pond	0.931
Non-chemical metal cleaning wastes	0.060
Non thermal Sump	0.032
Precipitator and Air Heater Wastes	0.021
Septic Waste (01a)	0.009
Extension Area Unwatering Sump	0.004
Treated Chemical Metal Wastes	
Total	8.606

Source: NPDES permit application

3.4.2 Environmental Consequences

3.4.2.1 Alternative A – Assess, Close, and Secure Units 1-5, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

Under Alternative A, it is assumed that TVA would be required to continue operating some sumps and stormwater systems at the retired facility. Leaving the facility in place with only periodic monitoring activities would increase the potential for direct discharges of chemicals, hazardous waste, and even solid waste (including, but not limited to, friable asbestos) releases to receiving streams through sump discharges, stormwater releases, and directly to adjacent surface waters. The intake and discharge tunnels would need to continue to be inspected and maintained to reduce the risk of integrity issues. The implementation of BMPs, protocols to respond to onsite spills prior to discharge, and site clean-up would help to prohibit any releases to surface waters.

Permits would continue to be renewed with applicable monitoring requirements included. Permits and associated pollution prevention plans would be modified to indicate the changes from current conditions. The scope of this document does not include the management of the

onsite ponds, but the discharge of the sumps and stormwater would need to be addressed when the ash pond system is evaluated to ensure these discharges are still appropriately handled through the ADEM NPDES permit program.

Surface water could be potentially impacted due to increased silt loading resulting from runoff during soil disturbing activities. Proper implementation of BMPs would be expected to result in minor direct and indirect impacts to surface waters. Any discharges into surface waters would comply with all NPDES permit limits and local, State and Federal regulations. These impacts would not be expected to be significant.

3.4.2.2 Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

Under this alternative, all buildings and structures would be decontaminated to remove all hazardous material. All designated buildings and equipment would then be demolished and backfilled to a depth of 3 feet below the ground, resulting in a “Brownfield” site. The intake channel would be sealed with bulkheads and flow-fill, or removed. With the implementation of appropriate BMPs, none of the activities described below would result in significant impacts to surrounding surface waters.

Surface Water

As per the affected environment, the majority of flows from the facility, other than precipitation-driven flows and initial sump discharges, would have ceased. Withdrawals for this facility would also stop.

Raw and potable waters and stormwater flows associated with this project would remain at ambient temperatures; therefore, no thermal impacts would be anticipated.

Under Alternative B, sumps and stormwater systems would still be operated and utilized initially, but eventually these flows would be altered and permits would be modified to manage altered discharges. Ultimately, the sumps would be demolished and any flows would be managed with portable pumps.

Demolition/Construction Impacts

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

Surface Runoff

Demolition activities have the potential to temporarily affect surface water via stormwater runoff. TVA would comply with all appropriate state and federal permit requirements. Demolition and construction activities of the associated project would be located on the plant property. TVA would obtain a Construction Stormwater Permit from ADEM prior to beginning demolition. Surface water impacts resulting from disturbance during selective demolition would be mitigated by the use of stormwater pollution prevention BMPs to minimize the extent of disturbance and erosion. Stormwater would discharge via either NPDES-permitted discharge points or the designated construction stormwater outfalls. Silt fences, sediment basins and/or other sediment and erosion control measures, as described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority* (Bowen et al. 2012), would be installed, inspected, and maintained for the duration of demolition as needed to avoid contamination of surface water adjacent to the project area. Therefore, no significant impacts to surface water

would be expected due to surface water runoff from the construction site. All proposed project activities would be conducted in a manner to ensure that waste materials are contained, and the introduction of pollution materials to the receiving waters would be minimized.

Work conducted in waters of the State may require USACE and ADEM permits depending on the project impacts and location. Anticipated impacts to Waters of the State or United States associated with the proposed projects would be mitigated with the use of BMPs and implementation of a maintenance program. In the event a permit is required, any mitigation would be identified through the USACE and ADEM Section 404/401 joint permitting process, providing for compensation for the loss of wetlands or stream reaches. Additionally, the shoreline of the Tennessee River would receive a 50 foot minimum streamside management zones (SMZ) buffer width and/or protection of the existing riparian buffer zone. Potential surface water impacts during demolition would be mitigated, and the impacts would be minor with the implementation of BMPs, as well as compliance with the requirements of the USACE and ADEM permitting process.

Currently, active industrial stormwater outfalls are monitored, depending on the NPDES requirements either every six months or annually. This monitoring, in addition to all required NPDES monitoring, would continue throughout the demolition process, with modifications as directed by the CBMPP. Following demolition, permits could be modified or reduced based on the change in operation at the facility. Permit modifications would be negotiated with ADEM as required throughout the demolition process.

Chimney/Stack Demolition

Stack demolition has the potential to have direct impacts due to the potential for discharge of fill and residual ash to Waters of the State or United States. These demolition activities would be designed in a way to minimize the risk of any impacts to adjacent waters. Development of a blast plan would minimize the risk of material falling in the adjacent waters. Use of mitigation measures, such as turbidity curtains in adjacent waters, would be considered to help mitigate any incidental discharge of fill to receiving streams. With the blast plan, mitigation measures, and BMPs in place, incidental discharges to the main stream Tennessee River or Cane Creek due to these activities would be minimized.

Cooling Water Intake Channel Sealing

The sealing options of the cooling water intake and discharge tunnels would bulkhead the internal portion of the tunnels and would leave the tunnels in place. With this proposed option there is a potential risk for integrity issues that should be taken into account. This sealing process would work within the tunnel and with the use of appropriate BMPs would minimize both short-term and long-term risks and thus not be expected to cause negative impacts.

Domestic Sewage

Portable toilets would be provided for the additional 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 facility 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 CBMPP for water-only cleaning, and/or NPDES Permit AL0003867.

Hydrostatic Testing

These discharges, if required, would be handled in accordance with NPDES Permit AL0003867 or the ADEM General NPDES Permit for Discharges of Hydrostatic Test Water.

Operational Impacts

The main operational change that would take place with the demolition of the facility would be the change in management of the onsite stormwater and process waste water that is currently treated in impoundments and discharged from the site. Any remaining minor flows would be redirected to other treatment systems as necessary to comply with a modified NPDES permit. This re-routing would conceptually employ onsite non-coal combustion residual impoundments and new ditches or piping to enable the proper handling and treatment of the waste streams. BMPs and waste water treatment would be employed, as needed, to mitigate any pollutant discharge.

With the coal-fired units no longer in operation, the only significant remaining flows would be surface runoff stormwater flows, process stormwater flows, and possibly some sump or dewatering flows. The specific characteristics of future discharges are unknown at this time.

Surface water could be potentially impacted due to increased silt loading resulting from runoff during soil disturbing activities. Proper implementation of BMPs would be expected to result in minor and temporary direct and indirect impacts to surface waters. Any discharges into surface waters would comply with all NPDES permit limits and local, State and Federal regulations. These impacts would not be expected to be significant.

3.4.2.3 Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

This alternative is identical to Alternative A, with the exception of the demolition of the outbuildings and structures. Impacts would be anticipated to be similar to those described under both Alternatives A and B.

3.4.2.4 Alternative D – No Action

Under the No Action Alternative, it is assumed that TVA would be required to continue operating some sumps and stormwater systems at the retired facility. Leaving the facility in place greatly increases the potential for direct discharges of chemicals and solid waste (including, but not limited to, friable asbestos) releases to receiving streams through sump discharges, stormwater releases, and directly to adjacent surface waters. Without maintenance, the intake and discharge tunnels and all chimneys would be at risk of integrity issues, which would likely have direct and indirect impacts on surface water quality through unpermitted releases of sediment, chemical, and solid waste.

Permits would continue to be renewed with applicable monitoring requirements included. Permits and associated pollution prevention plans would be modified to indicate the changes from current conditions. The scope of this document does not include the management of the onsite ponds, but the discharge of the sumps and stormwater would need to be addressed when the ash pond system is evaluated to ensure these discharges are still appropriately handled through the ADEM NPDES permit program. Minor impacts are anticipated with this alternative.

3.5 Floodplains

3.5.1 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 1 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. Floodplains associated with the project area are shown in Figure 3-3.

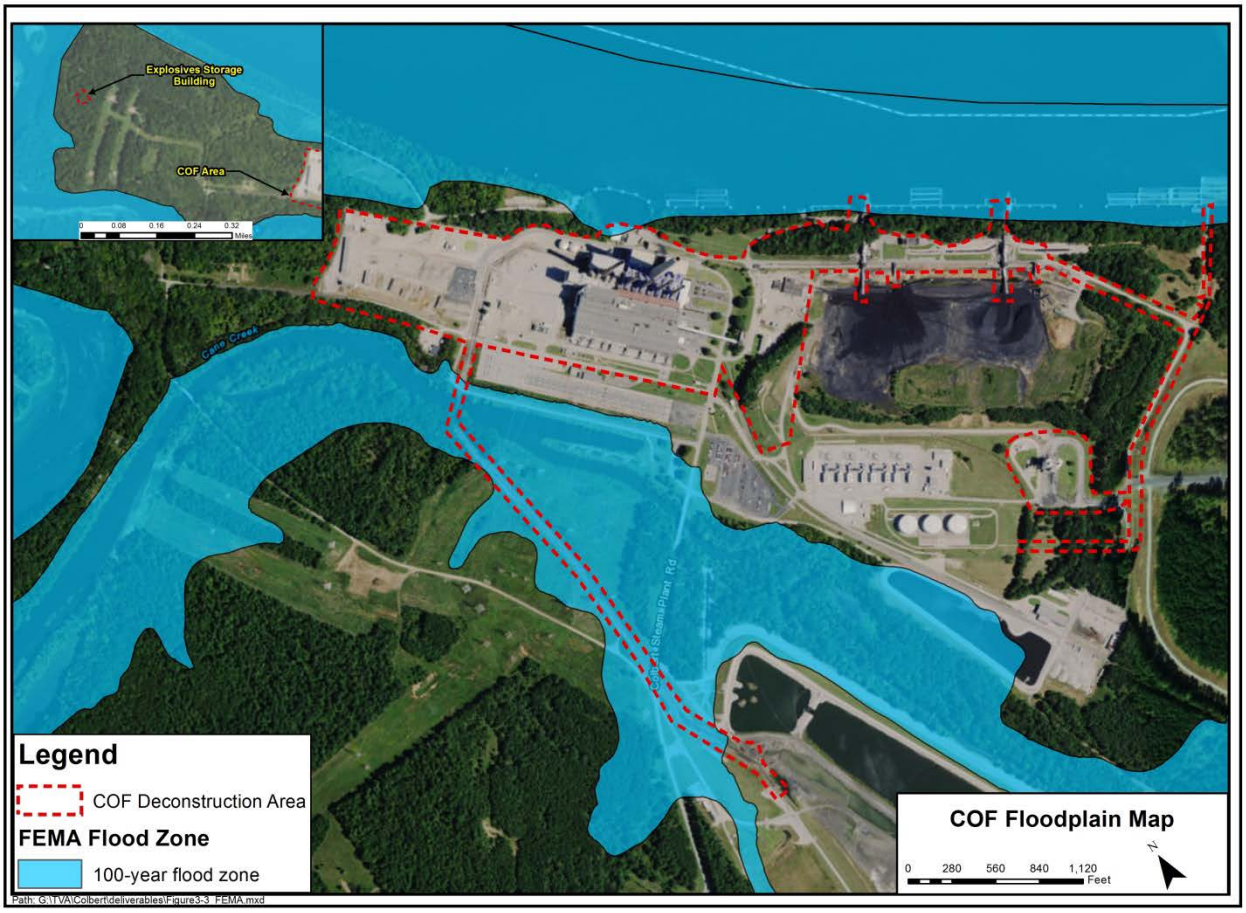

Figure 3-3. Floodplains associated with COF, as shown in the National Flood Hazard Layer (FEMA 2016)

The COF is located at TRM 245 in Colbert County, Alabama, on Pickwick Reservoir. The 100- and 500-year flood elevations at this location are 423.0 and 424.1 feet respectively. The TVA Flood Risk Profile is also 424.1 feet (elevations referenced to National Geodetic Vertical Datum 1929). Portions of the project boundary lie within the 100-year floodplain of either the Tennessee River or Cane Creek.

3.5.2 Environmental Consequences

As a federal agency, TVA is subject to the requirements of Executive Order (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" (United States Water Resources Council 1978). 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.

Of the buildings and structures at COF that could be decontaminated or deconstructed, only the water treatment building, the mooring cells, the trash boom, portions of the ash disposal piping, the riverfront fuel oil unloading facility, and the two coal barge unloaders are located in 100-year floodplains.

3.5.2.1 Alternative A – Assess, Close, and Secure Units 1-5, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

Under Alternative A, the existing buildings and structures would remain in place; therefore, there would be no impacts to floodplains. This would be consistent with EO 11988.

3.5.2.2 Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

Under Alternative B, numerous existing structures would be decontaminated and/or deconstructed to 3 feet below grade. Only the water treatment building, portions of the ash disposal piping, the riverfront fuel oil unloading facility, and the coal barge unloaders that would be decontaminated and/or deconstructed are located within the 100-year floodplain. The mooring cells and trash boom would remain in place. All below-grade building areas would be backfilled and the demolition sites would be restored to grade providing proper drainage. There is no practicable alternative to deconstructing the structures in the floodplain and grading the backfilled areas, as the structures and facilities are located in the floodplain. There would be a slight beneficial impact to the floodplains of the Tennessee River and Cane Creek under Alternative B, due to removal of the structures from the floodplain. All of the other buildings and facilities that would be decontaminated and/or deconstructed are located outside of the 100-year floodplain, which would be consistent with EO11988. Overall, impacts to floodplains would be considered temporary and minor under Alternative B.

3.5.2.3 Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

Under Alternative C, only the water treatment building would be decontaminated and/or deconstructed within the 100-year floodplain. The impacts of Alternative C would be the same as Alternative B, which would be consistent with EO 11988.

3.5.2.4 Alternative D – No Action

Under Alternative D, no permanent decontamination or deconstruction activities would occur at COF; therefore, there would be no changes to impacts to floodplains because there would be no physical changes to the current conditions found within the local floodplains.

3.6 Wetlands

3.6.1 Affected Environment

The USACE regulates the discharge of fill material into waters of the United States, including wetlands pursuant to Section 404 of the CWA (33 USC 1344). Additionally, EO 11990 (Protection of Wetlands) requires federal agencies to avoid, to the extent possible, adverse impacts to wetlands and to preserve and enhance their natural and beneficial values.

As defined in Section 404 of the CWA, wetlands are those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands and wetland fringe areas can also be found along the edges of many watercourses and impounded waters (both natural and man-made). Wetland habitat provides valuable public benefits including flood storage, erosion control, water quality improvement, wildlife habitat, and recreation opportunities.

COF is located within the Eastern Highland Rim subdivision of the Interior Plateau Ecoregion (Griffith et al. 2001). In this region wetlands are primarily associated with floodplains and riparian zones, low-lying poorly drained areas, and the shorelines and embayments of reservoirs.

Wetlands within the boundary of COF were identified using National Wetland Inventory (NWI) maps and field data was compiled for multiple projects on COF during 2015-2016 (Table 3-3, Figure 3-4). For field-verified wetlands, potential jurisdictional Waters of the US were evaluated in accordance with the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0).

Table 3-3. COF Wetlands

Wetland ID	Wetland Type[1]	Size (acres)	Field Verified
W001	PFO1A	5.8	No- NWI
W002	PFO6F	4.2	No - NWI
W003	PEM/PSS1E	1.9	Yes
W004	PEM/PSS/PFO1E	4.1	Yes
W005	PFO1E	3.8	Yes
W006	PEM1A	0.55	Yes
W007	PSS1E	4.3	Yes
Total Acreage		25.65	

[1] Classification codes as defined in Cowardin et al. 1979: PFO1=Palustrine forested, broadleaf deciduous; A = Temporarily flooded; F = Semipermanently flooded; 6 = Deciduous; PEM1= Palustrine emergent, persistent vegetation; E=Seasonally Flooded/Saturated; PSS=Palustrine scrub-shrub.

3.6.2 Environmental Consequences

Impacts would be similar for all proposed alternatives A, B, C, and D. Under Alternatives A, B, and C, areas where work would occur do not contain wetland habitat, under Alternative D no work would occur, thus there would be no direct impacts to wetlands associated with any of the alternatives. Indirect effects upon wetlands could include sedimentation due to construction runoff under Alternatives A, B, and C; this impact would be minimized to an insignificant level via the use of standard BMPs. There would be no indirect impacts to wetlands under Alternative D. Overall, adoption of Alternatives A, B, C, or D would not adversely impact wetlands.

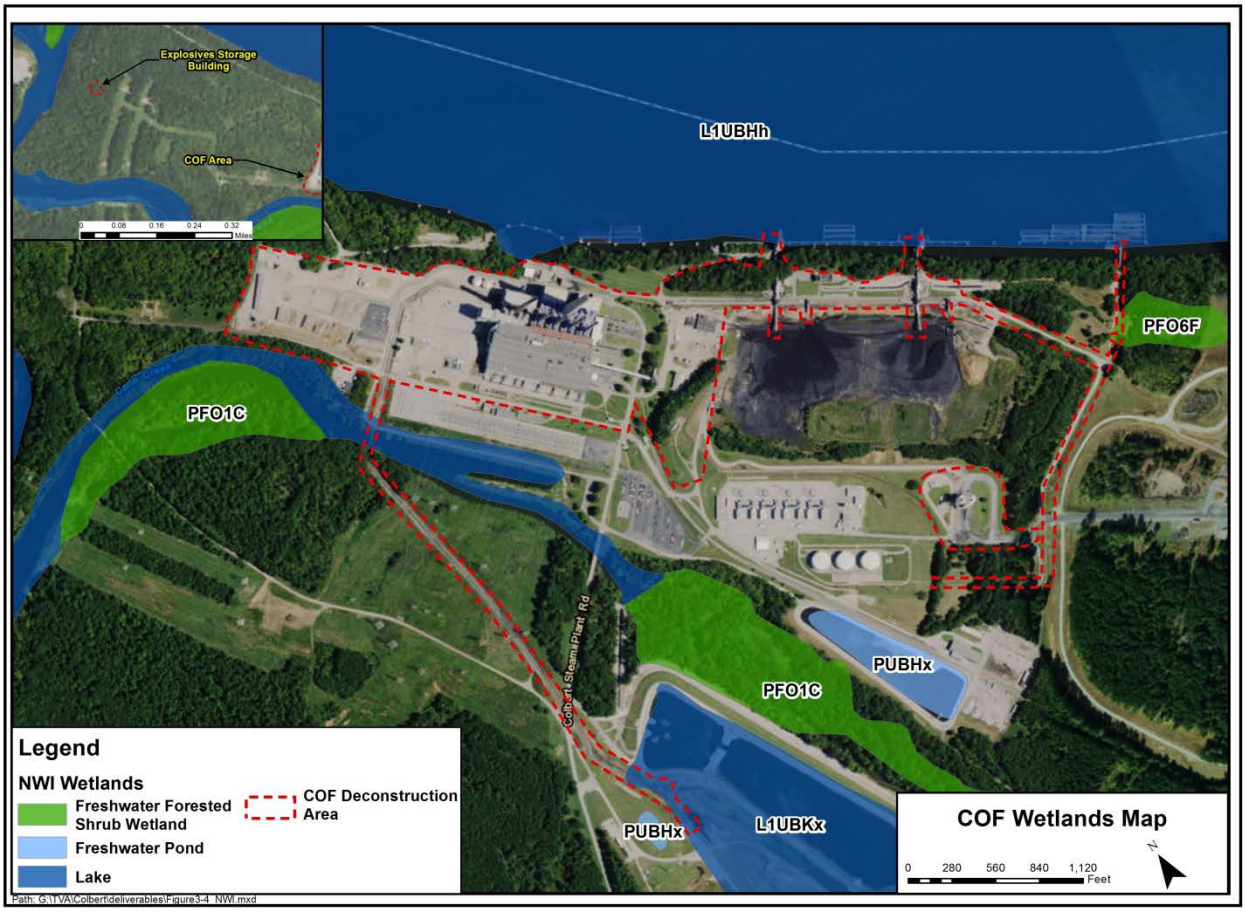

Figure 3-4. Wetlands within the boundary of COF

3.7 Aquatic Ecology

3.7.1 Affected Environment

The COF is located within the Tennessee River-Pickwick Lake watershed. A January 2016 desktop review of the proposed project area documented the main stem of the Tennessee River (Pickwick Reservoir) adjacent to the project boundary and a perennial stream, Cane Creek, within the project boundary. The COF is located on the eastern shore (right descending bank) of the Pickwick Reservoir at TRM 245. The reach of the Tennessee River adjacent to COF has been altered from its former free-flowing character by the presence of Pickwick Dam, located approximately 38 river miles downstream of COF, and Wilson Dam, located approximately 14 miles upstream of COF.

TVA began a program to monitor the ecological conditions of its reservoirs systematically in 1990. Reservoir (and stream) monitoring programs were combined with TVA's fish tissue and bacteriological studies to form an integrated Vital Signs Monitoring Program. Vital signs monitoring activities focus on (1) physical/chemical characteristics of waters; (2) physical/chemical characteristics of sediments; (3) benthic macroinvertebrate community sampling; and (4) fish assemblage sampling (Dycus and Baker 2001). Benthic macroinvertebrates are included in aquatic monitoring programs because of their importance to the aquatic food chain and because they have limited capability of movement, thereby

preventing them from avoiding undesirable conditions. Sampling and data analysis are based on seven parameters that include species diversity, presence of selected taxa that are indicative of good water quality, occurrence of long-lived organisms, total abundance of all organisms except those indicative of poor water quality, proportion of total abundance comprised by pollution-tolerant oligochaetes, proportion of total abundance comprised by the two most abundant taxa, and proportion of samples with no organisms present. Table 3-4 shows benthic community scores that were collected as part of the Vital Signs Monitoring Program.

TVA initiated a study in 2000 to evaluate fish communities in areas immediately upstream and downstream of COF in Pickwick Reservoir using Reservoir Fish Assemblage Index (RFAI) multi-metric evaluation techniques. Fish are included in aquatic monitoring programs because they are important to the aquatic food chain and because they have a relatively long life cycle which allows them to reflect conditions over time. Fish are also important to the public for aesthetic, recreational, and commercial reasons. Monitoring results for each sampling station are analyzed to arrive at a RFAI rating which is based primarily on fish community structure and function. Also considered in the rating is the percentage of the sample represented by omnivores and insectivores, overall number of fish collected, and the occurrence of fish with anomalies such as diseases, lesions, parasites, deformities, etc. The Vital Signs Monitoring Program fish community monitoring results are shown in Table 3-5. Overall results indicate that the fish assemblage in Pickwick Reservoir has been consistently “good” to “fair” from 2000 to 2014.

3.7.2 Environmental Consequences

3.7.2.1 Alternative A – Assess, Close, and Secure Units 1-5, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

Because the structures and many materials within the structures would remain in place under Alternative A, potential leakage of hazardous chemicals or heavy metals could have impacts on water quality in the Tennessee River. Changes to aquatic ecology would likely occur within the watershed over the long term due to factors such as the continuation of agricultural activities and human population growth, however these changes are not associated with and would occur regardless of the TVA action. With appropriate BMPs and SMZs implemented during construction, operation, and maintenance of the proposed deconstruction activities, any direct or indirect impacts to aquatic ecology resulting from the proposed action would be insignificant.

3.7.2.2 Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

Aquatic ecology could be affected by the proposed actions either directly by the alteration of aquatic habitat conditions or indirectly due to modification of the riparian zone by stormwater runoff resulting from construction activities associated with selective demolition. Construction activities associated with the removal of buildings, as well as backfilling underground facilities, could lead to increased siltation and runoff in the Tennessee River adjacent to and downstream of COF. With appropriate BMPs and SMZs implemented during construction, operation, and maintenance of the proposed construction activities, any direct or indirect impacts to aquatic ecology resulting from the proposed action would be insignificant.

3.7.2.3 Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

This alternative is similar to Alternative A, with the exception that TVA would further reduce maintenance cost and risk by removing outlying buildings. Impacts would be similar to those described for Alternatives A and B.

Table 3-4. Benthic community scores collected as part of the Vital Signs Monitoring Program in Pickwick Reservoir at TRM 244, 230, and 207.3

Station	Site	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014
Inflow	TRM 244	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair
Transition	TRM 230	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Poor	Fair	Fair
Forebay	TRM 207.3	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor

Table 3-5. Pickwick Reservoir fisheries assemblage index scores, based on Vital Signs Monitoring Data at TRM 259, 247, 242, 230, and 207.3

Station	Site	2000	2001	2002	2005	2006	2007	2008	2009	2010	2011	2012	2014
Inflow	TRM 259	Good	-	Good	-	Good	-	Good	-	Good	-	Good	Good
Upstream of COF	TRM 247	Good	Good	Fair	Good	Good	Good	Good	Good	-	Good	-	-
Downstream of COF	TRM 242	Good	Fair	Good	Fair	Good	Good	Good	Good	-	Good	-	-
Transition	TRM 230	Good	-	Good	-	Good	-	Fair	-	Fair	-	Good	Good
Forebay	TRM 207.3	Good	-	Good	-	Fair	-	Fair	-	Fair	-	Good	Good

3.7.2.4 Alternative D – No Action

Under the No Action Alternative, TVA would not perform any deconstruction or other disposition activities. If left under current conditions, potential leakage of hazardous chemicals or heavy metals from existing structures could have impacts on water quality in the Tennessee River adjacent to and downstream of COF. These impacts would accrue over a relatively long period of time. Changes to aquatic ecology would likely occur within the watershed over the long term due to factors not associated with and that would occur regardless of the TVA action such as the continuation of agricultural activities and human population growth. With appropriate BMPs and SMZs implemented during operation and maintenance of the inactive facility, any impacts to aquatic ecology would be insignificant.

3.8 Wildlife

3.8.1 Affected Environment

The COF deconstruction footprint encompasses a highly industrialized area including the coal facility, adjacent industrial structures, and parking lots. A few small areas within the project footprint contain early successional vegetation dominated by non-native weeds and clusters of individual deciduous and evergreen trees. Various wildlife species may be present throughout the project footprint.

Mowed herbaceous fields and manicured lawns present at COF offer little suitable habitat for wildlife or rare species but can be used by many common species, especially when the landscape includes a few trees. Birds that utilize grassy areas in industrialized areas such as those found at COF include Canada goose, eastern phoebe, eastern kingbird, eastern meadowlark, killdeer, purple martin, red-tailed hawk, and rock dove. Some birds that utilize planted trees and buildings in industrialized areas include American robin, American goldfinch, blue jay, Carolina chickadee, Carolina wren, chimney swift, eastern towhee, osprey, tufted titmouse, northern cardinal, northern mockingbird, and yellow breasted chat (National Geographic 2002). Mammals that may be found in this type of environment include common mole, ground hog, least shrew, hispid cotton rat, white-footed mouse, common raccoon, Virginia opossum, eastern gray squirrel, and white-tailed deer (Reid 2006). Reptiles that typically occur in such areas include eastern fence lizard, American toad, rat snake, and ring-necked snake (Conant and Collins 1998).

Some wildlife uses man-made structures opportunistically. Common mammals, birds, and reptiles have been observed using parts of buildings abandoned or used infrequently by humans. Several species of bats commonly found in this region may roost in abandoned, dark or quiet areas of these buildings. Species in this area known to use human structures include big brown bat, eastern red bat, southeastern bat, and tricolored bat (Harvey 1992). Migratory birds may also roost in buildings or areas of buildings used infrequently. Birds that have been observed nesting or roosting in TVA fossil plant buildings and structures include American robin, barn swallow, Carolina wren, mourning dove, northern mocking bird, osprey, and rock dove. Other mammals and reptiles that may opportunistically utilize human structures include black rat, black rat snake, deer mouse, eastern gray squirrel, house mouse, northern raccoon, and Virginia possum.

Review of the TVA Regional Natural Heritage database in February of 2016 indicated that twenty-six caves are reported within 3 miles of the project area. Seven caves are located within the project footprint. One of these caves was destroyed during the construction of COF; the analysis in this EA focuses on the remaining six caves. These caves could provide habitat for

the common bat species listed above. No other unique or important terrestrial habitats exist in the action area.

No heronries or other aggregations of migratory birds have been reported within 3 miles of the project area.

3.8.2 Environmental Consequences

3.8.2.1 Alternative A – Assess, Close, and Secure Power Production Facilities, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

Under this alternative, common mammals, and resident and migratory birds would continue to opportunistically use the buildings within the coal facility for shelter or foraging. Northern raccoons, Virginia opossums, rats, and mice would occasionally enter buildings in an attempt to find food, while ospreys, swallows and other birds that nest on man-made structures would continue to use rafters, support beams, lighting fixtures, poles, and building corners as nesting sites. It is likely that under Alternative A, use of buildings by nesting birds and mammals would increase due to reduced human disturbance in the area. Inspections and surveys performed during operations and maintenance activities may disturb common wildlife species sheltering in the area; however, these actions would not destroy any wildlife habitat or destroy any individuals or nests. Actions may displace wildlife temporarily to these surrounding areas until operations and maintenance actions are complete. Terrestrial animals would either not be affected or may benefit from the removal of human activity from the project site.

3.8.2.2 Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

This alternative would result in disturbance and displacement of wildlife in the project footprint due to the permanent removal of some structures and pavement demolition. Displaced wildlife may move into remaining buildings or to adjacent areas with similarly disturbed habitat common around the project site. It is likely that common, opportunistic foragers such as raccoons, opossums, rats and mice would continue to enter the remaining structures in an attempt to find food or shelter. Direct effects of building demolition may occur to some individuals that may be immobile during the time of construction (i.e. juvenile animals or eggs). This could be the case if deconstruction activities took place during breeding/nesting seasons. During a survey on February 9, 2016, no evidence of use by bats or common wildlife was observed within the buildings. However, several buildings including the powerhouse, service bay, office wing, water treatment building, utility building, and the conveyor control building may offer potentially suitable habitat for common wildlife species after buildings are vacated. To minimize nesting prior to demolition, openings would be closed to the extent possible and deterrents may also be put in place. An extensive survey of the buildings listed above would be performed a minimum of one month prior to deconstruction to determine if migratory birds are nesting in these buildings. If active nests are present and demolition activities must occur within the active nesting season, TVA would coordinate with USFWS to ensure the assessment and appropriate mitigation of impacts to migratory birds.

Demolition, particularly the use of explosives and machinery used to break up concrete and pavement may disturb or displace wildlife using the six caves remaining within the project footprint. Any wildlife that are currently utilizing these caves have coexisted with the operation and maintenance of this fossil plant and are thus tolerant of frequent, loud, disturbances. However the use of explosives and other extremely loud/strong ground disturbing/vibrating demolition activities may increase the level of disturbance in caves to that which is not tolerable

by wildlife thus causing common wildlife to disperse from these caves temporarily. Any cave obligate species that are not able to disperse could be directly and indirectly impacted by the demolition, but are not expected to be killed by the actions as actions are not expected to damage the caves themselves. The use of explosives and other ground disturbing demolition activities must be minimized near caves in order to ensure the caves themselves would not be damaged by the proposed actions. TVA would require the demolition contractor develop and implement a blast plan in order to minimize vibration effects to to the caves. It is expected that once demolition actions are complete, wildlife dispersed form these caves would return.

Direct and indirect effects of the projects are considered to be insignificant. Species opportunistically using man-made structures would continue to do so in other outlying buildings during and following proposed actions. Mobile, common wildlife species sensitive to ground disturbance may disperse from caves during proposed actions but are expected to recolonize caves following proposed actions.

3.8.2.3 Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

Under the Alternative C, TVA would de-energize all operational systems, minimize environmental and life safety risks and remove outlying buildings except the power house. Impacts to common wildlife species under this alternative would be a combination of impacts previously discussed under Alternatives A and B and would be minor and temporary.

3.8.2.4 Alternative D – No Action

Under the No Action Alternative TVA would not deconstruct or remove any structures at COF, and would continue to maintain the structures in their current state. Birds, raccoons, opossums, rats, mice and other common species would occasionally enter buildings in an attempt to find food, while ospreys, swallows and other birds that nest on man-made structures would continue to use rafters, support beams, lighting fixtures, poles, and building corners on which to build nests. It is likely that under Alternative D, use of buildings by nesting birds and mammals may increase. Therefore, terrestrial animals and their habitats would either not be affected, or benefit from the removal of human disturbance from the project site.

3.9 Vegetation

3.9.1 Affected Environment

The COF site has been heavily disturbed by construction, maintenance, and operation of the facility. As a result of this wholesale alteration of the physical landscape, no portion of the potential affected area supports a natural plant community. Most areas within the potential affected area on the COF are non-vegetated, but a few very small locations do contain early successional vegetation dominated by non-native weeds and clusters of individual deciduous and evergreen trees.

3.9.2 Environmental Consequences

3.9.2.1 Alternative A – Assess, Close, and Secure Units 1-5, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

Adoption of each of the action alternatives would result in the closure and/or deconstruction, to some extent, of the COF. Areas where work would occur do not contain intact native plant communities and adoption of this alternative would not change that situation. Impacts to vegetation may be permanent, but the vegetation found onsite is comprised of non-native weeds, clusters of individual deciduous and evergreen trees, and early successional plants that

have no conservation value. Adoption of Alternative A would not negatively impact vegetation of the region.

3.9.2.2 Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

Under Alternative B, impacts from the proposed project would be similar to those described under Alternative A.

3.9.2.3 Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

Under Alternative C, impacts from the proposed project would be similar to those described under Alternative A.

3.9.2.4 Alternative D – No Action

Adoption of the No Action Alternative would not result in impacts to the terrestrial ecology of the region. Property within the potential affected area has no conservation value and adoption of the No Action Alternative would not change that situation; the property would remain in its current condition and no work would occur. The few vegetated areas on the parcel 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 and would not be the result of adoption of the No Action Alternative.

3.10 Threatened and Endangered Species

3.10.1 Aquatic – Threatened and Endangered Species

3.10.1.1 Affected Environment

The Endangered Species Act provides broad protection for species of fishes, wildlife, and plants that are listed as threatened or endangered in the United States or elsewhere. The Act outlines procedures for federal agencies to follow when taking actions that may jeopardize federally listed species or designated critical habitat. The policy of Congress is that federal agencies must seek to conserve endangered and threatened species and use their authorities in furtherance of the Act's purposes. The State of Alabama provides protection for species considered threatened, endangered, or deemed in need of management within the state other than those federally listed under the Endangered Species Act. This listing is handled by the Alabama Department of Conservation and Natural Resources; however, the Alabama Natural Heritage Program and TVA both maintain databases of aquatic animal species that are considered threatened, endangered, special concern, or tracked in Alabama.

A review of the TVA Natural Heritage Database on January 28, 2016 indicated 33 species federally listed as endangered, (30 mussels, two fish, and one snail), three species federally listed as threatened (one mussel, and two fish), and 45 state listed species (one insect, one crayfish, 29 mussels, two fish, and 13 snails) within the Tennessee River-Pickwick Lake watershed (Hydrologic Unit Code [HUC] 0603000508) and/or from Colbert County, Alabama (Table 3-6). Freshwater mussels listed as historical (>25 years old) suggest these species are very rare or no longer occur in this area of their former range. Of the 30 federally listed mussels, 16 are considered either historical or extirpated, and are not anticipated to occur in the area. While no known study has surveyed the proposed project area for rare mollusks, it is TVA's experience in large rivers, including impoundments such as Pickwick Reservoir, that listed mussel species are rarely (if ever) encountered in habitat that is dewatered between summer and winter pool elevations. These poor habitat conditions typically extend some 30 feet (or 10 meters) from the edge of the summer pool. Presumably these areas are routinely subject to

emersion (during winter drawdown or drought), relatively greater temperature extremes, and significant disturbance from wave action caused by wind, recreational boating, and commercial tow traffic. Therefore, the amount of potentially suitable habitat available for rare mussels that could be affected by the project is probably less than half of the total area affected by the project.

Additionally, a Nonessential Experimental Population was established in 2001 by the USFWS. This was established, below Wilson Dam in the Tennessee River (TRM 258.0 to TRM 246.0), and extending 5 miles upstream of all tributaries that enter Wilson Dam tailwaters, for 16 federally listed mussels and one aquatic snail in Colbert and Lauderdale counties, Alabama. However, any potential stream impacts resulting from the proposed project would occur downstream of the Nonessential Experimental Population. Therefore, no impacts to any of the federally listed species within the Nonessential Experimental Population area are expected to occur.

Table 3-6. Records of the federal and state-listed aquatic animal species within the Tennessee River-Pickwick Lake watershed (HUC0603000508) and/or within Colbert County, Alabama

Common Name	Scientific Name	Element Rank[2]	Federal Status[3]	State Status[3] (Rank)[4]
Aquatic Insects				
Beetle	*Batrisodes jonesi*	E		TRKD (S2)
Crayfish				
Troglobitic Crayfish	*Procambarus pecki*	E		TRKD (S2?)
Fishes				
Alabama Blind Cave Shrimp	*Palaemonias alabamae*	E	LE	SP (S1S2)
Alabama Cavefish	*Speoplatyrhinus poulsoni*	E	LE	PROT (S1)
Snail Darter	*Pericina tanasi*	E	LT	THR (S2S3)
Southern Cavefish	*Typhlichthys subterraneus*	E		PROT (S3)
Spotfin Chub	*Erimonax monachus*	X	LT	PROT (SX)
Tuscumbia Darter	*Etheostoma tuscumbia*	E		PROT (S2)
Clubshell	*Pleurobema clava*	X	LE	PROT (SX)
Cracking Pearlymussel	*Hemistena lata*	H	LE	PROT (SX)
Cumberland Bean	*Villosa trabalis*	E	LE	END (S1)
Cumberland Leafshell	*Epioblasma stewardsonii*	X		EXTI (SX)
Cumberland Moccasinshell	*Medionidus conradicus*	H		PROT (S1)
Cumberland Monkeyface	*Quadrula intermedia*	X	LE	PROT (S1)
Cumberlandian Combshell	*Epioblasma brevidens*	E	LE	PROT (S1)
Deertoe	*Truncilla truncata*	E		TRKD (S1)
Dromedary Pearlymussel	*Dromus dromas*	E	LE	PROT (S1)
Fanshell	*Cyprogenia stegaria*	E	LE	PROT (S1)

Common Name	Scientific Name	Element Rank[2]	Federal Status[3]	State Status[3] (Rank)[4]
Fine-rayed Pigtoe	*Fusconaia cuneolus*	H	LE	PROT (S1)
Fluted Kidneyshell	*Ptychobranchus subtentum*	H	LE	PROT (SX)
Hickorynut	*Obovaria olivaria*	H		EXTI (SX)
Kidneyshell	*Ptychobranchus fasciolaris*	E		TRKD (S1)
Knob Mudalia	*Leptoxis minor*	H		EXTI (S?)
Leafshell	*Epioblasma flexuosa*	H		
Long-solid	*Fusconaia subrotunda*	H		TRKD (S1)
Monkeyface	*Quadrula metanevra*	E		TRKD (S3)
Mountain Creekshell	*Villosa vanuxemensis*	E		
Mucket	*Actinonaias ligamentina*	H		TRKD (S2)
Ohio Pigtoe	*Pleurobema cordatum*	E		TRKD (S2)
Orangefoot Pimpleback	*Plethobasus cooperianus*	E	LE	END (S1)
Oyster Mussel	*Epioblasma capsaeformis*	E	LE	PROT (SX)
Painted Creekshell	*Villosa taeniata*	H		TRKD (S3)
Pale Lilliput	*Toxolasma cylindrellus*	H	LE	PROT (S1)
Pheasantshell	*Actinonaias pectorosa*	H		TRKD (S1)
Pink Heelsplitter	*Potamilus alatus*	E		
Pink Mucket	*Lampsilis abrupta*	E	LE	PROT (S1)
Pink Papershell	*Potamilus ohiensis*	E		TRKD (S3)
Pistolgrip	*Tritogonia verrucosa*	E		
Pocketbook	*Lampsilis ovata*	E		
Purple Catspaw	*Epioblasma obliquata obliquata*	H	LE	PROT (SX)
Purple Lilliput	*Toxolasma lividus*	E		TRKD (S2)
Purple Wartyback	*Cyclonaias tuberculata*	E		
Pyramid Pigtoe	*Pleurobema rubrum*	E		PROT (S2)
Rabbitsfoot	*Quadrula cylindrica cylindrica*	E	LT	
Rayed Bean	*Villosa fabalis*	H	LE	PROT (SX)
Ring Pink	*Obovaria retusa*	H	LE	PROT (S1)
Rock Pocketbook	*Arcidens confragosus*	E		TRKD (S3)
Rough Pigtoe	*Pleurobema plenum*	E	LE	PROT (S1)
Round Combshell	*Epioblasma personata*	X		EXTI (SX)
Round Pigtoe	*Pleurobema sintoxia*	E		TRKD (S1)
Scaleshell	*Leptodea leptodon*	H	LE	PROT (SX)
Sheepnose	*Plethobasus cyphyus*	E	LE	PROT (S1)
Shiny Pigtoe Pearlymussel	*Fusconaia cor*	X	LE	PROT (S1)

Common Name	Scientific Name	Element Rank[2]	Federal Status[3]	State Status[3] (Rank)[4]
Slabside Pearlymussel	*Pleuronaia dolabelloides*	E	LE	PROT (S1)
Snuffbox	*Epioblasma triquetra*	H	LE	TRKD (S1)
Spectaclecase	*Cumberlandia monodonta*	E	LE	PROT (S1)
Spike	*Elliptio dilatata*	E		TRKD (S1)
Sugarspoon	*Epioblasma arcaeformis*	H		EXTI (SX)
Tennessee Clubshell	*Pleurobema oviforme*	H		TRKD (S1)
Tennessee Pigtoe	*Fusconaia barnesiana*	H		TRKD (S1)
Tennessee Riffleshell	*Epioblasma propinqua*	H		EXTI (SX)
Tuberculed Blossom Pearlymussel	*Epioblasma torulosa torulosa*	X	LE	PROT (SX)
Turgid Blossom Pearlymussel	*Epioblasma turgidula*	X	LE	EXTI (SX)
Wavy-rayed Lampmussel	*Lampsilis fasciola*	E		TRKD (S1S2)
White Heelsplitter	*Lasmigona complanata*	E		TRKD (S2S3)
Winged Mapleleaf	*Quadrula fragosa*	E	LE	PROT (SX)
White Wartyback	*Plethobasus cicatricosus*	E	LE	PROT (S1)
Yellow-blossom Pearlymussel	*Epioblasma florentina florentina*	X	LE	PROT (SX)
Snails				
Anthony's River Snail	*Athearnia anthonyi*	E	LE	PROT (S1)
Armored Rocksnail	*Lithasia armigera*	E		TRKD (S1)
Atlas Pebblesnail	*Somatogyrus humerosus*	H		HIST (SH)
Corpulent Hornsnail	*Pleurocera corpulenta*	H		TRKD (S1)
Muddy Rocksnail	*Lithasia salebrosa*	E		TRKD (S1)
Ornate Rocksnail	*Lithasia geniculata*	E		TRKD (S1)
Round-rib Elimia	*Elimia nassula*	E		TRKD (S1)
Rugged Hornsnail	*Pleurocera alveare*	H		TRKD (S2)
Shortspire Hornsnail	*Pleurocera curta*	H		TRKD (S1S2)
Slowwater Elimia	*Elimia interveniens*	E		TRKD (S2)
Spiral Hornsnail	*Pleurocera brumbyi*	E		TRKD (S2)
Telescope Hornsnail	*Pleurocera walkeri*	H		TRKD (S3)
Varicose Rocksnail	*Lithasia verrucosa*	E		TRKD (S3)
Warty Rocksnail	*Lithasia lima*	H		HIST (SH)

[1] Source: TVA Natural Heritage Database, queried on 1/28/2014.

[2] Heritage Element Occurrence Rank; AC = Excellent, good, or fair estimated viability; E = extant record ≤25 years old; H = Historical; X = considered extirpated.

Common Name	Scientific Name	Element Rank[2]	Federal Status[3]	State Status[3] (Rank)[4]

[3] Status Codes: LE or END = Listed Endangered; LT or THR = Listed Threatened; EXTI = Extirpated from state or region; HIST = Historical; NMGT = In Need of Management; PROT = Protected; RARE = Rare; SPCO = Species of Special Concern; TRKD = Tracked by state natural heritage program (no legal status).

[4] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; SH = Considered Historical; SX = Considered Extirpated.

3.10.1.2 Environmental Consequences

Alternative A – Assess, Close, and Secure Units 1-5, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

Adverse water quality impacts could potentially result from the implementation of the proposed action, which could have indirect impacts to aquatic life within water bodies in the project area over time. Federally designated critical habitat exists for the Alabama cave fish within the Tennessee River-Pickwick Lake watershed. The Alabama cavefish is a highly specialized stygobitic (living exclusively in a subterranean environment) fish restricted to Key Cave. Key Cave is an area protected by a national wildlife refuge, just north of the Tennessee River, and upstream of COF. Due to the isolation of Key Cave and because the proposed project is outside of the Key Cave footprint, no impacts to the Alabama cave fish or Key Cave are anticipated to occur. Impacts to water quality downstream of COF resulting from the proposed action could impair habitat over the long term, but would be minimal and insignificant. Thus, there would be no measureable direct or indirect effects to state or federally listed aquatic species or critical habitats.

Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

Adverse water quality impacts could potentially result from the implementation of the proposed project, which could have direct and indirect impacts to aquatic biota within waterbodies in the project area. However, watercourses that could be affected by the proposed project would be protected by standard permit conditions. Specifically, the shoreline of the Tennessee River would receive a 50 foot minimum SMZ buffer width and/or protection of the existing riparian buffer zone. Therefore, with appropriate stream protection measures, outlined in permit conditions, would be implemented during site preparation activities, no impacts to state or federally listed aquatic species are anticipated to occur as a result of TVA actions.

Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

This alternative is identical to Alternative A, with the exception that TVA would further reduce maintenance costs and risk by removing outlying buildings. Refer to Subsection 3.9.1.2 for potential impacts to aquatic threatened and endangered species. Impacts would be similar to those described for Alternatives A and B.

Alternative D – No Action

Under the No Action Alternative, TVA would not perform any deconstruction or other disposition activities and would continue to maintain the structures at COF in their current state. Changes to the area would nonetheless occur over time, as factors such as human population trends, land use and development, quality of air/water/soil, recreational patterns, and cultural, ecological, and educational interests change within the area. The status and conservation of any potentially

affected species would continue to be determined by the actions of others. Leakage of hazardous chemicals or heavy metals over time from existing structures could have localized impacts on water quality in the Tennessee River adjacent to and downstream of COF. However, these impacts would accrue over the long term and be minimal. Thus, there would be no measureable direct or indirect effects to state or federally listed aquatic species or critical habitats.

3.10.2 Terrestrial Ecology – Threatened and Endangered Species

3.10.2.1 Affected Environment

A review of the TVA Regional Natural Heritage Database in February of 2016 resulted in one federally listed species (gray bat), one state-listed species (long-tailed weasel), and four species tracked by the Alabama Natural Heritage Program (coal skink, a springtail, a ground beetle, and a beetle) within 3 miles of the project footprint. Two federally listed species (red-cockaded woodpecker and northern long-eared bat) and one federally protected species (bald eagle) have been documented in Colbert County, Alabama. Additionally, the US Fish and Wildlife Service (USFWS) has determined that the federally endangered Indiana bat has the potential to occur in the northern portion of the state of Alabama. Thus, it has the potential to occur in the project footprint and impacts to this species also will be evaluated for this project (Table 3-7).

Folsomia candida (a springtail), *Batrisodes jonesi* (a beetle), and *Rhadine caudata* (a ground beetle) are all cave obligate invertebrates tracked by the state of Alabama (NatureServe 2016a, 2016 and 2016c). The nearest caves known to support these species are located approximately 2.1 miles from the project footprint. Twenty-six caves are known to exist within 3 miles of the project footprint, with six located within the project footprint. The six caves occur 50 feet away or more from any building and pavement proposed for demolition. No records of these species occur within the caves within the project footprint.

Coal skinks are known to inhabit leaf litter in humid, wooded areas, including hardwood and oak-pine forest, swamps, bogs, springs and wetlands. They are also known from clear cuts, rights-of-way, and dry bluffs (Camp 2008; Tilley and Huheey 2001). One record of this species exists 1.2 miles from the project footprint. Suitable habitat for coal skinks does not exist in the project footprint.

Table 3-7. Federally listed terrestrial animal species reported from Colbert County, Alabama and other species of conservation concern documented within three miles of COF[1]

Common Name	Scientific Name	Federal Status[2]	State Status[2] (Rank[3])
Birds			
Bald eagle[4]	*Haliaeetus leucocephalus*	DM	PROT(S3)
Red-cockaded woodpecker[4]	*Picoides borealis*	LE	PROT(S2)
Insects/Invertebrates			
A beetle	*Batrisodes jonesi*	--	TRKD(S2)
A springtail	*Folsomia candida*	--	TRKD(S1)
A ground beetle	*Rhadine caudata*	--	TRKD(S2)
Mammals			
Long-tailed weasel	*Mustela frenata*	--	PROT(S3)

Common Name	Scientific Name	Federal Status[2]	State Status[2] (Rank[3])
Gray bat	*Myotis grisescens*	LE	PROT(S2)
Northern long-eared bat[4]	*Myotis septentrionalis*	LT	PROT(S2)
Indiana bat[5]	*Myotis sodalis*	LE	PROT(S2)
Reptiles			
Coal skink	*Plestiodon anthracinus*	--	TRKD(S3)

[1] Source: TVA Regional Natural Heritage Database, extracted 02/08/2016 and USFWS Ecological Conservation Online System (http://ecos.fws.gov/ecos/home.action), accessed 02/08/2016.

[2] Status Codes: DM = Delisted, recovered, and still being monitored; LE = Listed Endangered; LT = Listed Threatened; PROT = Protected; TRKD = Tracked.

[3] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable.

[4] Federally listed species that have been recorded in Colbert County, Alabama, but not within 3 miles of the project area.

[5] Federally listed species with the potential to occur in the northern portion of Alabama, but has not yet been reported from Colbert County, Alabama.

Bald eagles are protected under the Bald and Golden Eagle Protection Act (USFWS 2013). This species is associated with large, mature trees capable of supporting its massive nests. These are usually found near larger waterways where eagles forage (Turcotte and Watts 1999). Records document the occurrence of three bald eagle nests within 3 miles of the project area. Suitable nesting habitat does not exist for bald eagles in the project footprint. No bald eagle nests or resident bald eagle pairs were observed within the project footprint during field reviews on February 9, 2016.

Red-cockaded woodpeckers typically inhabit open, mature, pine forests with dense groundcover consisting of a variety of grass, forb and shrub species (Turcotte and Watts 1999 and USFWS 2003). These woodpeckers are thought to be extirpated from most of their habitat and the one record that exists from Colbert County, Alabama is historic and over 15 miles away (USFWS 2016). No known managed populations of this species occur within the project area and no preferred habitat was observed within the proposed project area during field reviews on February 9, 2016.

Gray bats roost in caves year-round and migrate between summer and winter roosts during spring and fall (Tuttle 1976). Although they prefer caves, gray bats have been documented roosting in large numbers in buildings (Gunier and Elder 1971). They forage over bodies of water. Records document the occurrence of two gray bat cave hibernacula in Colbert County, Alabama. The closest of these is 2.1 miles away from COF. Twenty-six caves are known to exist within 3 miles of the project footprint, with six located within the project footprint. These caves could provide habitat for Gray bats. Gray bats may also attempt to roost in the plant buildings slated for demolition within the proposed actions. During a building survey on February 9, 2016, no evidence of use by bats was observed (i.e. staining, guano). However, several buildings including the powerhouse, service bay, office wing, water treatment building, utility building, and the conveyor control building may offer potentially suitable roosting habitat for bats after buildings are vacated. The powerhouse in particular offers a multitude of potential roosting sites throughout the many floors, dark crevices, boilers, and insulated rooms. Due to the many openings in this building including windows and bay doors, it is possible that bats may enter this building to roost between now and slated deconstruction. Caves and buildings affected by the proposed actions and with the potential to support roosting Gray bats would be surveyed for presence a minimum of one month prior to demolition activities. Wetlands, ponds, and Cane

Creek that provide foraging habitat for gray bat occur within the COF footprint, but not in the action area associated with this demolition and deconstruction EA.

Indiana bats hibernate in caves in winter and use areas around them in fall and spring (for swarming and staging), prior to migration back to summer habitat. During the summer, Indiana bats roost under the exfoliating bark of dead and living trees in mature forests with an open understory often near sources of water. Indiana bats are known to change roost trees frequently throughout the season, yet still maintain site fidelity, returning to the same summer roosting areas in subsequent years. This species forages over forest canopies, along forest edges, and tree lines, and occasionally over bodies of water (Pruitt and TeWinkel 2007, Kurta et al. 2002, USFWS 2015). Although less common, Indiana bats have also been documented roosting in buildings (Butchkoski and Hassinger 2002). Historic records for Indiana bat exist for Tishomingo County, Mississippi (recorded location approximately 16.8 miles from COF) and for Lauderdale County, Alabama (recorded location approximately 31.4 miles from COF). No records of Indiana bat exist for Colbert County, Alabama. However, the USFWS has determined that this species has the potential to occur throughout the northern portion of the state of Alabama, thus this species has the potential to occur in the project footprint. Twenty-six caves are known to exist within 3 miles of the project footprint, with six located within the project footprint. Similar to gray bats (see above), Indiana bats may roost in the caves found within the project footprint. Indiana bats may also attempt to roost in the vacant buildings in the winter. Caves and buildings affected by the proposed actions and with the potential to support roosting Indiana bats will be surveyed for presence a minimum of one month prior to demolition activities. Wetlands, ponds, Cane Creek, and forested areas that provide foraging habitat for Indiana bat occur within COF, but not in the action area associated with this demolition and deconstruction EA.

The northern long-eared bat predominantly overwinters in large hibernacula such as caves, abandoned mines, and cave-like structures. During the fall and spring they utilize entrances of caves and the surrounding forested areas for swarming and staging. In the summer, northern long-eared bats roost individually or in colonies beneath exfoliating bark or in crevices of both live and dead trees. Roost selection by northern long-eared bat is similar to Indiana bat; however, it is thought that northern long-eared bats are more opportunistic in roost site selection. This species has also been documented roosting in abandoned buildings and under bridges. Northern long-eared bats emerge at dusk to forage below the canopy of mature forests on hillsides and roads, and occasionally over forest clearings and along riparian areas (USFWS 2014). The closest record of a northern long-eared bat is from 2004 at Cane Creek Nature Preserve approximately 7.1 miles from the project footprint in Colbert County. Twenty-six caves are known to exist within 3 miles of the project footprint, with six located within the project footprint. Similar to gray bats and Indiana bats (see above), northern long-eared bats may roost in the caves found within the project footprint. Northern long-eared bats may also attempt to roost in the vacant plant buildings in winter 2016. Caves and buildings affected by the proposed actions and with the potential to support roosting Indiana bats will be surveyed for presence a minimum of one month prior to demolition activities. Wetlands, ponds, Cane Creek, and forested areas that provide foraging habitat for Indiana bat occur within the COF footprint, but not in the action area associated with this demolition and deconstruction EA.

3.10.2.2 Environmental Consequences

Alternative A – Assess, Close, and Secure Units 1-5, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

Under Alternative A the structures within the project site would remain in place and occasional inspections of buildings would occur as part of the operations and maintenance program. Under

this alternative, there would be no impacts to listed terrestrial animal species or their habitats as there would be no disturbance to terrestrial areas.

Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

Under Alternative B, numerous existing structures would be decontaminated and/or deconstructed to 3 feet below grade. Under this alternative there would be no effect on long-tailed weasel, coal skink, red-cockaded woodpecker, and bald eagle. Although unlikely, this alternative has the potential to affect habitat for a springtail (*Folsomia candida*), a ground beetle (*Rhadine caudate*), and a beetle (*Batrisodes jonesi*). This alternative also has the potential to impact federally listed gray, Indiana and northern long-eared bats should they roost in the building proposed for demolition or caves onsite.

TVA will implement measures to ensure caves within the project area would not be damaged by the proposed actions. The use of explosives and other ground disturbing demolition activities would be minimized near caves in order to ensure the caves themselves would not be damaged by the proposed actions. Although no records of a springtail (*Folsomia candida*), a ground beetle (*Rhadine caudate*), and a beetle (*Batrisodes jonesi*) are known in caves within the project site, these caves have the potential to support these species. Any cave obligate species that are not able to disperse could be directly and indirectly impacted by the demolition, but are not expected to be killed by the actions as actions are not expected to damage the caves themselves with the above restriction.

As previously discussed, buildings proposed for demolition under this alternative were surveyed for potential use by bats. Although no evidence of bats was found during surveys, these survey results were potentially due to the high activity level still occurring within and around these buildings during the time of survey. During these surveys it was determined that once human activity is reduced due to decommissioning of the buildings, federally listed bats do have the potential to roost in the control tower, office, powerhouse, service bay, units 1-5, utility building, and water treatment buildings. However, it is not expected that any of these buildings would provide anything but temporary, transitional roosting habitat for these bat species. It is highly unlikely that these buildings would be used as maternity roosting habitat. To minimize roosting prior to demolition, openings would be closed to the extent possible and deterrents may also be put in place. If this alternative is selected, an extensive survey of the buildings listed above would be performed a minimum of one month prior to deconstruction of the control tower, office, powerhouse, service bay, units 1-5, utility building, water treatment building or any other structures connected to these buildings to determine if listed bat species are utilizing these buildings. If listed bats are found, these buildings must not be demolished until one of two actions occurs: 1) bats transition out of the buildings; or 2) consultation with USFWS is completed.

Demolition, particularly the use of explosives and other machinery used to break up concrete and pavement may disturb or displace and federally listed bats using the six caves remaining within the project footprint. Any bats that are currently utilizing these caves have coexisted with the operations and maintenance of COF and are thus tolerant of frequent, loud, disturbances. However, the use of explosives and other extremely loud/strong ground disturbing/vibrating demolition activities may increase the level of disturbance in caves to that which is not tolerable by federally listed bats. Demolition actions could cause listed bats to disperse from these caves temporarily or fall from roost sites should they be non-volant at the time of the actions. Surveys of these caves for evidence of bat usage would be performed to the extent feasible prior to demolition actions involving explosives. Should listed bats be observed utilizing these caves, no

demolition actions may occur without consultation with the USFWS. If surveys of the caves are unable to be completed (e.g. safety issues), presence of federally listed species would be assumed and consultation with the USFWS must occur prior to demolition.

Although unlikely, this alternative has the potential to affect habitat for a springtail (*Folsomia candida*), a ground beetle (*Rhadine caudate*), and a beetle (*Batrisodes jonesi*). This alternative also has the potential to impact federally listed gray, Indiana and northern long-eared bats should they roost in the building proposed for demolition or caves on sites. With proper implementation of BMPs and consultation with the USFWS, direct and indirect impacts would be minor and temporary.

Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

Under the Alternative C, TVA would de-energize all operational systems, minimize environmental and life safety risks and remove outlying buildings, except the power house. Under this alternative there would be no effect on long-tailed weasel, coal skink, red-cockaded woodpecker, and bald eagle. Although unlikely, this alternative has the potential to affect habitat for a springtail (*Folsomia candida*), a ground beetle (*Rhadine caudate*), and a beetle (*Batrisodes jonesi*). This alternative also has the potential to impact federally listed gray, Indiana and northern long-eared bats should they roost in the building proposed for demolition or caves on sites. Impacts to *Folsomia candida*, *Rhadine caudate*, *Batrisodes jonesi*, gray bat, Indiana, bat, and northern long-eared bat would be the same as listed under Alternative B.

If this alternative is selected, an extensive survey of the control tower, office, service bay, units 1-5, utility building, and water treatment buildings would be performed a minimum of one month prior to deconstruction of these buildings or any other structures connected to these buildings to determine if listed bat species are utilizing these buildings. If listed bats are found in these buildings, these buildings must not be demolished until one of two actions occurs: 1) bats transition out of the buildings; or 2) consultation with USFWS is performed. If caves surveys cannot rule out presence of federally listed bats, presence will be assumed and demolition cannot take place prior to consultation with the USFWS.

Alternative D – No Action

Under the No Action Alternative TVA would not perform any deconstruction or other disposition activities at COF. Facilities would continue to maintain the structures in their current state. Under this alternative, there would be no direct or indirect impacts to listed terrestrial animal species or their habitats.

3.10.3 Plants – Threatened and Endangered Species

3.10.3.1 Affected Environment

A February 2016 query of the TVA Heritage database indicates that no federally listed and five state-listed plant species are known to occur within 5 miles of the proposed project area. Two federally listed plants, as well as one species proposed for federal listing, have been previously reported from Colbert County, Alabama, where the project would be located (Table 3-8). A desktop review of COF indicates that no habitat for federal or state-listed plant species occurs in the areas where work would occur. The habitat onsite has been severely degraded and is populated primarily with non-native species. No designated critical habitat for plants occurs in the proposed project area.

Table 3-8. Federally listed plants and plants proposed for federal listing previously reported from Colbert County, Alabama, and all plant species of conservation concern known from within five miles of COF

Common Name	Scientific Name	Federal Status[2]	State Status[2]	State Rank[3]
Plants				
Wall-rue Spleenwort	*Asplenium ruta-muraria*	-	SLNS	S1
Leafy Prairie-clover[4]	*Dalea foliosa*	END	SLNS	S1
Dutchman's Breeches	*Dicentra cucullaria*	-	SLNS	S2
False Rue-anemone	*Enemion biternatum*	-	SLNS	S2
Alabama Glade-cress	*Leavenworthia alabamica*	-	SLNS	S2
Lyre-leaf Bladderpod[4]	*Lesquerella lyrata*	THR	SLNS	S1
White Fringeless Orchid[4]	*Platanthera integrilabia*	PT	SLNS	S2

[1] Source: TVA Natural Heritage Database.
[2] Status Codes: END = Listed Endangered; PT = Proposed Threatened; SLNS = State Listed, No Status; THR = Listed Threatened.
[3] State Ranks: S1 = Critically Imperiled; S2 = Imperiled.
[4] Federally listed species occurring within the county where work would occur, but not necessarily within 5 miles of the project area.

3.10.3.2 Environmental Consequences

Construction and operations and maintenance at COF has resulted in significant disturbance that makes the parcel incapable of supporting threatened or endangered plant species. Adoption of this alternative would result in some additional disturbance on the project site, but the action would not affect federal or state-listed plants because those species are not present onsite. Impacts would be similar for all proposed alternatives A, B, C, and D.

3.11 Air Quality and Climate Change

3.11.1 Affected Environment

COF has five coal-powered generating units. The five units are all currently idle, with the last unit taken off-line as of March 23, 2016.

The primary mechanisms for causing potential effects to local air quality considered in this assessment are the demolition of buildings and structures and transportation-related activities. Both generate fugitive dust, which is commonly measured by the size of particulate matter. A common standard of measure for dust is particulate matter less than 10 microns in diameter (PM_{10}). Likewise, exhaust from internal combustion engines used to power trucks and demolition equipment can affect local air quality, particularly if the engines are not properly maintained.

Fugitive greenhouse emissions result from intentional or unintentional releases to the atmosphere. The main greenhouse gases of concern are hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6). HFCs can be emitted during the use of refrigeration, air conditioning, and fire suppression equipment. PFCs can be produced as a byproduct of various industrial processes. SF_6 can escape from gas-insulated substations and switchgear through seals, especially from older equipment. These gases can be released during equipment manufacturing, installation, servicing, and disposal (EPA 2015).

The largest use of SF_6, both in the United States and internationally, is as an electrical insulator and interrupter in equipment that transmits and distributes electricity. It is used in gas-insulated substations, circuit breakers, and other switchgear. SF_6 has replaced flammable insulating oils in many applications and allows for more compact substations in dense urban areas (EPA 2015).

HFCs and PFCs are used as alternatives to several classes of ozone-depleting substances that are being phased out under the terms of the Montreal Protocol and the Clean Air Act Amendments of 1990. Although HFCs and PFCs are not harmful to the stratospheric ozone layer, they are potent greenhouse gases. Sources of these gases may be found in refrigeration units, heating and air conditioning units, etc. (EPA 2015).

The 2015 US Greenhouse Gas Inventory uses emission estimates that have been revised to reflect the global warming potentials (GWPs) provided in the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment (AR4). AR4 values differ slightly from those presented in the IPCC Second Assessment (used in the previous inventories), which results in time-series recalculations for most inventory sources. Under the most recent reporting guidelines, countries are required to report using the AR4 GWPs, which reflect an updated understanding of the atmospheric properties of each greenhouse gas. The GWPs of methane (CH_4) and most fluorinated greenhouse gases have increased, leading to an overall increase in carbon dioxide equivalent (CO_2e) emissions from CH_4, HFC, and PFCs. The GWPs of nitrous oxide and SF_6 have decreased, leading to a decrease in CO_2e emissions from these greenhouse gases (EPA 2015).

Total 2013 U.S. emissions from SF_6 from equipment manufacturing and from electrical transmission and distribution systems were estimated to be 5.1 million metric tons CO_2e. This quantity represents an 80 percent decrease from the EPA's estimate for 1990. This decrease is believed to be the result of two occurrences: a sharp increase in the price of SF_6 during the 1990s and a growing awareness of the environmental impact of SF_6 emissions through programs such as EPA's SF_6 Emission Reduction Partnership for Electric Power Systems (EPA 2015).

Overall, HFCs, PFCs, SF_6 and nitrogen trifluoride accounted for 2.5 percent of 2013 greenhouse gas emissions in the United States. Emissions of PFCs and SF_6 have actually decreased during this time due to emission reduction efforts in the aluminum production industry (PFCs) and electricity transmission and distribution industry (SF_6) (EPA 2015).

3.11.2 Environmental Consequences

3.11.2.1 Alternative A – Assess, Close, and Secure Units 1-5, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

Under Alternative A, there would be near-term direct effects to local air quality because the current operations at the site would cease. Consequently, this action would result in a minor decrease in local air pollution. Likewise, there would be no addition of pollutants or particulate matter as no demolition would take place.

Indirect negative impacts to air quality under Alternative A could occur as fungus, mold, or other biological organisms grow within unused structures. Such growth would potentially accelerate due to the limited maintenance schedule. Biological growth could create an unhealthy environment within the abandoned structures; however, no significant impacts are anticipated for local air quality. In addition, the deterioration of hazardous materials not removed from the facility such as asbestos, lead paint and dust could result in potential contaminants in the air.

Individuals that would potentially contact this environment (trespassers or temporary maintenance workers) would be exposed only in the short term.

Efforts would be made to avoid releases from any equipment containing SF_6 or HFCs during the hazardous material decontamination process at the facility. If a release occurs, it can be expected to be insignificantly small and limited to the amount of gas in a specific container. There is no equipment containing PFCs onsite. No direct or indirect impacts to climate change are anticipated for Alternative A.

3.11.2.2 Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

Demolishing the buildings and structures would likely generate fugitive dust. Likewise, removal of demolition debris and other materials offsite, backfilling structures, and grading would generate some amounts of fugitive dust and would cause effects to air quality in the form of exhaust emissions.

Fugitive emissions from demolition activities typically produce particles that are deposited on the property where the structures being demolished are located. The potential drift distance of particles is governed by the initial injection height of the particle, the terminal settling velocity of the particle, and the degree of atmospheric turbulence. Theoretical drift distance, as a function of particle diameter and mean wind speed, has been computed for fugitive dust emissions. Results indicate that, for a typical mean wind speed of 16 kilometers per hour (10 miles per hour) particles larger than about 100 micrometers (µm) are likely to settle out within 6 to 9 meters (20 to 30 feet) from the point of emission. Particles that are 30 to 100 µm in diameter are likely to undergo impeded settling. These particles, depending upon the extent of atmospheric turbulence, are likely to settle within a few hundred feet from the point of emission. Smaller particles, particularly PM_{10}, and $PM_{2.5}$ have much slower gravitational settling velocities and are much more likely to have their settling rate retarded by atmospheric turbulence (EPA 2006). Dropping the stacks will likely produce the most particulate matter of any site activity. Particulate matter generated from stack demolition will have the potential to travel off the job site. The distance off the job site that is affected is dependent on the height that the dust column generated from demolition reaches, and the wind and weather conditions during demolition.

Site preparation and vehicular traffic over paved and unpaved roads at the site would result in the emission of fugitive dust PM_{10} during active de-construction or demolition debris removal. The largest fraction (greater than 95 percent by weight) of fugitive dust emissions would be deposited within the demolition 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 could be mitigated by spraying water on the roadways to reduce fugitive dust emissions.

The demolition contractor would be required to remove ash from the facility proposed for deconstruction prior to demolition of that facility and implement dust control measures during demolition to prevent the spread of dust, dirt, and debris. These methods include wetting equipment and demolition areas, covering waste or debris piles, using covered containers to haul waste and debris, and wetting unpaved vehicle access routes during hauling. Wet suppression can reduce fugitive dust emissions from roadways and unpaved areas. TVA routinely requires onsite contractors to maintain engines and equipment in good working order.

As with Alternative A, efforts would be made to avoid releases from any equipment containing SF_6 or HFCs. If a release occurs, it would likely be insignificant and limited to the amount of gas in a specific container. There is no equipment containing PFCs onsite.

Due to the need to remove a higher quantity of materials and equipment in Alternative B as compared to Alternative A, there would be a slightly higher potential for impacts to air quality under Alternative B compared to Alternative A. Overall, Alternative B is expected to have a minor and temporary impact on air quality and no direct or indirect impact on climate change.

3.11.2.3 Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

This alternative would have the same conditions as alternative A with regard to air quality impacts for buildings left in place, with the exception that there will be significantly less potential for hazards. With fewer buildings the area would become less attractive to trespassers and there would be few places for mold and fungus to grow and hazardous air contaminants to potentially impact trespassers and maintenance personnel. However, the remaining powerhouse would remain and continue to attract mold, fungus, and trespassers. These factors could contribute to local air quality degradation. Similar air quality impacts would also be anticipated as with Alternative B, with demolition of outlying buildings, removal of hazardous and solid waste and removal of demolition debris. While these impacts would be similar to those of Alternative B, they would be substantially less, since the power house represents a large part of the structures on the site. Overall the potential impacts to air quality are expected to be minor and temporary and less than those from Alternative B.

As with the previous alternatives, efforts would be made to avoid releases from any equipment containing SF_6 or HFCs. If a release occurs, it would likely be insignificant and limited to the amount of gas in a specific container.

Impacts under Alternative C would be slightly higher than Alternative A due to the removal of some structures, but lower than Alternative B due to the Powerhouse remaining intact. No impacts to climate change are anticipated for Alternative C.

No cumulative impacts are expected from this demolition as it would be a one-time event.

3.11.2.4 Alternative D – No Action

Under the No Action Alternative, there would be diminished near-term direct or indirect impacts to local air quality because all plant operations would cease and there would be no direct air emissions to the local atmosphere. Additionally, under the No Action Alternative no fugitive dust would be generated from demolition activities. A limited amount of dust would be generated by the removal of hazardous and solid waste until these materials were removed from the facility. However, the inevitable degradation of the buildings would contribute to air quality hazards, such as mold, fungus and hazardous air contaminants (i.e. dust containing lead from paint or other materials), creating potential exposure hazards for trespassers and maintenance personnel.

Releases from equipment containing SF_6 or HFCs (if left in place) may occur over time. If a release occurs, it would likely be insignificant and limited to the amount of gas in a specific container. There is no equipment containing PFCs onsite.

Alternative D is anticipated to have no direct, indirect, or cumulative impact on air quality or climate change.

3.12 Hazardous Materials and Solid and Hazardous Waste

3.12.1 Affected Environment

The following materials are known to be present at COF:

- Asbestos containing materials (ACM)
- Mercury in equipment switches and flow meters
- Lead-containing materials
- PCBs in transformers and other oil-filled equipment
- Materials such as glaze, caulk, building siding, roofing materials, electrical cable, cable trays, etc.
- Other construction waste (e.g., concrete, scrap metal, etc.)
- Universal waste (fluorescent light bulbs, batteries, etc.)
- Aboveground storage tanks and underground storage tanks
- Containerized petroleum products or chemicals
- Chlorinated fluorocarbons (Freon) from equipment
- Radioactive sources from equipment
- Out of date surplus materials
- Various oils and fuels
- Antifreeze
- Batteries in bulk and associated fixtures including deep cycle series uninterruptible power supply batteries and lead batteries from emergency lighting
- Loose combustible debris (tenant debris)
- Street lighting
- Heavy metals
- Batteries
- Creosote (in railroad ties)

During the spring of 2016, TVA began a hazardous materials survey of the project area to quantify and locate hazardous materials in order for demolition contractors to prepare bids for the removal of hazardous wastes and materials. The survey is being conducted by Amec Foster Wheeler and is anticipated to be completed in July 2016. The locations of the buildings and materials identified will be described in a Hazardous Materials report. The report will identify the quantities and locations of ACM, lead-containing materials, PCB-containing materials, mercury containing materials, and other hazardous materials that are contained at COF. Additional sampling of inaccessible materials, such as liquids or residual solids in sumps, tanks, or storage containers, may be required prior to demolition activities.

TVA would remove hazardous materials prior to implementation of any action taken to demolish structures under Alternative B, and as a part of Alternatives A and C as needed to secure the facility. Hazardous materials that would be addressed prior to demolition would include ACMs, lead-containing materials, and other hazardous materials identified throughout the survey area. Specific oil stains or areas that may contain materials of concern would be addressed prior to demolition as well. Hazardous materials will require special removal, handling, and disposal by appropriately trained and licensed personnel and contractors prior to demolition activities.

3.12.2 Environmental Consequences

3.12.2.1 Alternative A – Assess, Close, and Secure Units 1-5, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

Under Alternative A, hazardous materials and waste not associated with the structural materials would promptly be removed from the facility. Potential contaminant sources that are incorporated into the facility structure would remain in the decommissioned facility. There would be a potential risk for hazardous waste to be discharged/released into the environment under this alternative, as potential contaminants would remain in place. However, periodic inspections would minimize this risk by identifying potential issues, and damaged materials would be removed. Periodically, quantities of hazardous materials and waste would be generated for disposal. Removed materials would be transported either by truck or by rail to a landfill or other approved disposal facility operated by a company under TVA contract. Hazardous waste, PCB, ACM, and universal waste require specific handling, labeling, and disposal protocols. Disposal of any hazardous material removed would be done at facilities specifically permitted to receive such waste. Asbestos and ACM would be removed by a certified contractor and disposed of at a facility designed to receive asbestos and ACM. While bulk hazardous materials would be removed from COF as they deteriorate, material that is incorporated into the remaining structures, such as lead-based paint on metal structures, wiring, and plumbing (copper and lead), may not be removed. Over time, any environmental and safety issues resulting from the degradation of these remaining materials would be addressed when such issues are identified.

Overall, the indirect and direct impacts would be minor due to the limited potential for hazardous waste to be discharged/released into the environment under this alternative.

3.12.2.2 Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

Alternative B would involve removal of potential contaminant sources from the various structures, deconstruction of the identified structures described in Chapter 2, and demolition of chimneys for Units 1-5. The TVA Specification for Demolition and Disposal of Structures provides specific measures to be taken with respect to the handling and disposal of solid and hazardous wastes. With these precautionary measures in place, the potential for releasing hazardous materials into the environment during handling and disposal would be minimized.

Brick, block, and concrete demolition debris not contaminated by ACM or other hazardous materials would be used as clean fill in the basements and lower levels of the facility. Contaminated demolition debris and hazardous wastes would be hauled either by truck or by rail to a landfill designed to receive such waste and operated by a company under TVA contract. Alternative B would include a significant investment recovery opportunity in the form of recycling scrap metal and re-using demolished concrete and masonry for clean fill.

This alternative is likely to have short-term impacts to the local environment through the release of fugitive dust during demolition and removing material to the landfill. However, implementation of the mitigation measures of dust suppression and environmental controls outlined in the guidance would minimize potential impacts. Due to the temporary nature of the operations, use of permitted disposal facilities, and trained and experienced contractors and personnel, environmental impacts from waste handling and disposal are not anticipated.

3.12.2.3 Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

The objective of Alternative C is to de-energize all operational systems, minimize environmental and life safety risks and remove outlying buildings. Specific buildings within the Deconstruction

Study area would remain in place. This alternative is the same as Alternative A plus further reducing future maintenance costs and risk by removing outlying buildings. Removal of just the outlying buildings has minimal impact on the future maintenance cost and risk. These buildings are unlikely to contain large amounts of hazardous waste (such as ACM) that would require special landfill and transportation permitting. Hazardous waste inspections would continue but would have a more limited scope. However, the bulk of the hazardous material would remain on site with this alternative by the retention of the powerhouse.

This alternative is likely to have short-term impacts to the local environment through the release of fugitive dust during demolition and removing material to the landfill. Implementation of the mitigation measures of dust suppression and environmental controls outlined in the guidance would minimize potential impacts. Due to the temporary nature of the operations, use of permitted disposal facilities, and trained and experienced contractors and personnel, environmental impacts from waste handling and disposal are not anticipated.

While bulk hazardous materials would be removed from COF as they deteriorate, material that is incorporated into the remaining structures (powerhouse), such as lead-based paint on metal structures, wiring, and plumbing (copper and lead), may not be removed. Over time, any environmental and safety issues resulting from the degradation of these remaining materials would be addressed when such issues are identified.

Overall, long-term impacts from hazardous and solid waste are anticipated to be minor.

3.12.2.4 Alternative D – No Action

Under this alternative, the power plant and associated structures would not be demolished. If the facility is left as-is, it likely would present a higher risk than Alternatives A, B, or C for the potential to contaminate soil and groundwater as systems and structures degrade. Peeling lead-based paint, failing concrete, buckling floor tiles, and deteriorating asbestos and ACM are examples of the onsite hazard risk. There would also be issues with the long-term functionality of sump pumps, which are maintained to remove water from floor drains. If these sump pumps are allowed to become inoperative, water would build up in the sumps, become stagnant, and leach potentially contaminated water into the groundwater.

Concerns related to hazardous wastes under this alternative would be likely to result in impacts to the environment as there is the potential for environmental contamination. Further, concerns regarding trespassing and vandalism would be higher than with the other alternatives. The presumed presence of materials that could be salvageable might attract thieves. Unauthorized persons at the site could presumably be exposed to potential contaminants or physical injury.

While much of the bulk hazardous materials would be removed from COF as part of closing the facility, material such as lead-based paint on metal structures, wiring, and plumbing (copper and lead) may not be removed. Over time, degradation of these materials may result in release to the environment (e.g., through leaching to soils, surface water, or groundwater), and are likely to have minor long-term impacts. Overall, impacts from hazardous and solid waste are anticipated to be minor.

3.13 Transportation (Rail and Roadway)

3.13.1 Affected Environment

The COF plant is located about 10 miles southwest of Florence, Alabama. The existing transportation infrastructure near COF includes federal, state, and county roads as well as

railway for land access, river access via barge through the system of locks along the Tennessee River, and access by air with one regional and two private airports in the vicinity.

The assessment of traffic effects for the project is based on the transportation planning and engineering concept of level of service (LOS). LOS is a qualitative measure that describes operational conditions within a traffic stream and their perception by drivers and/or passengers. Six levels of service, A through F, define the full range of driving conditions from best to worst, in that order. These levels of service qualitatively measure the effect of such factors as travel time, speed, cost, comfort, safety, and maneuvering freedom. The LOS and capacity are the measurements of the ability of an intersection or a roadway to accommodate design traffic volumes. LOS-E is considered the lowest acceptable LOS.

3.13.1.1 Local Roadway Access

The nearest major highway is US Highway 72 ([US 72] Lee Highway) that connects Decatur, Alabama, and Memphis, Tennessee and passes approximately 0.8 miles south of the site. A four-lane median divided highway, US 72 has 12-foot lanes, 10-foot shoulders and unlimited access for trucks and automobiles. The posted speed limit is 65 mph.

State Route AL-247 is a two-lane highway with a 55-mph posted speed limit. This north/south highway connects Red Bay, Alabama with US 72.

County Road 20 (Old Lee Highway) is a two-lane highway with a 45-mph posted speed limit and provides access to local facilities along the river. The road runs parallel with US 72 for approximately 8 miles and connects back with US 72 under stop control at the end points.

COF can be accessed from County Road 20 via US 72. These routes intersect with Colbert Steam Plant Road, which provides direct access to the facility. The two-lane Colbert Steam Plant Road has an at grade railroad crossing near County Road 20 that is un-signalized but has cross buck warning signs. County Road 20 has stop signs on each approach at the intersection of Colbert Steam Plant Road. An exclusive eastbound left-turn lane on US 72 is provided at the intersection with Colbert Steam Plant Road.

The 2014 average annual daily traffic (AADT) count was obtained from the Alabama Department of Transportation (ALDOT), Alabama Transportation Planning Bureau's web site (Alabama Department of Transportation 2014). Traffic along US 72 ranges from 9,730 vehicles per day west of the facility and 13,070 vehicles per day east of the facility. Traffic counts along State Route AL-247 are 1,800 vehicles per day. No traffic count location along County Road 20 was listed. Traffic count locations are shown on Figure 3-5.

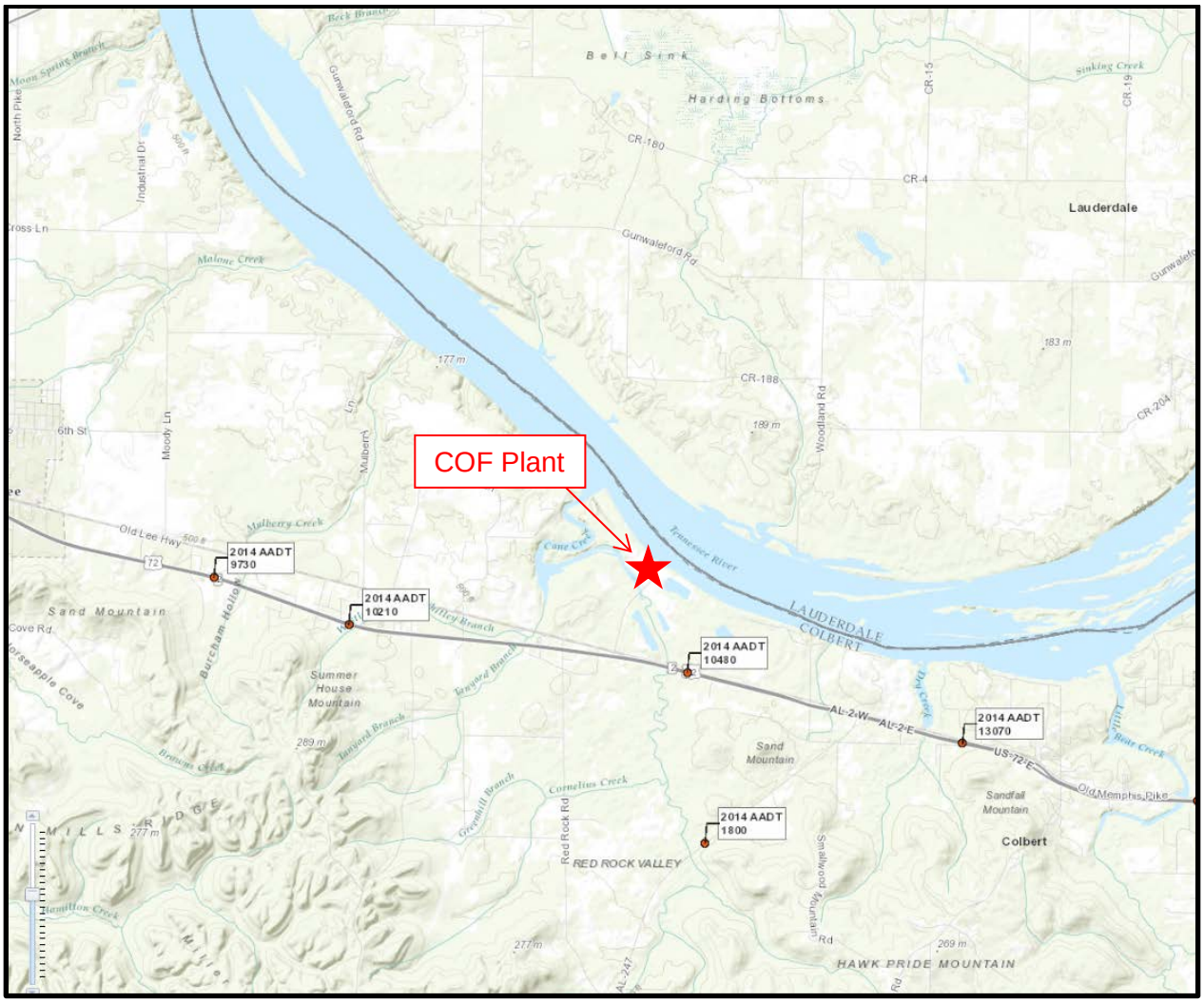

Figure 3-5. 2014 AADT at Locations near COF

3.13.1.2 Railroads

The Norfolk Southern Railroad operates a main line between Memphis, Tennessee and Huntsville, Alabama, that runs parallel to US 72 near COF. This is a priority freight line that carries large amounts of coal to various locations. Train headways average approximately one train passing COF every hour to hour and a half. There is no direct rail line spur into COF as the TVA Colbert spur is already locked out and unused.

3.13.1.3 River Transport

Wilson Dam (TRM 259), located 14 miles upstream of COF in Muscle Shoals, is the largest conventional hydroelectric power-generating facility with the TVA Region. A new lock was completed in 1959, which at the time was the largest in the world. Today, an average 3,700 vessels pass through Wilson's locks each year. A barge slip and unloading crane are located at COF (Ezzell 2012).

3.13.2 Environmental Consequences

3.13.2.1 Alternative A – Assess, Close, and Secure Units 1-5, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

Under Alternative A, structures would remain in place but potential contaminants would be removed and transported either by truck or by rail to an offsite hazardous waste landfill or alternate approved disposal facility. Truck traffic volumes to and from the facility could increase temporarily for a short duration, resulting in a minor impact to the LOS for roads in that area.

No long-term impacts to transportation would be anticipated.

3.13.2.2 Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

Alternative B includes the hazardous materials decontamination of all buildings, structures, conveyers, and silos, and demolition of all structures within the project site to 3 feet below final grade. One option for removing the COF Units 1-5 stacks is explosive demolition. The use of explosives would necessitate increased security measures that would affect transportation in the immediate vicinity of the project site.

During the blasting event, select public roadways would be closed for public safety and to facilitate site security. River traffic would be restricted as well due to the potential for demolition debris to fall into the river. Traffic closures would vary from approximately 3 hours before and up to 3 hours after the blast. The closure would not likely affect a large number of local residents due to the sparse population in the area. The demolition contractor would create a detailed plan for road closures that would be distributed to affected parties, including emergency personnel.

Demolition debris would be used for clean fill material of the basements at the facility with any excess hauled to an offsite landfill either by truck or by rail. In addition to demolition material being hauled to an offsite hazardous waste landfill, Alternative B could result in up to several hundred tons of scrap metal that would also be hauled from the facility either by truck or by rail. Truck traffic volumes in the vicinity could increase for a short period, having a minor and temporary impact on the LOS for roads in that area.

Heavy construction traffic associated with the COF deconstruction activities could also create congestion along Colbert Steam Plant Road and other roadways due to delays associated with the train crossing. As noted, existing train traffic in the area consists of large coal trains passing COF approximately every hour to hour and a half. Additionally, large trailers carrying heavy equipment into and out of COF could potentially drag across the raised rail crossing, potentially resulting in damage to the trailers or to the crossing. Such damage could again result in delays to both construction and train traffic depending on the nature of the impacts. Impacts associated with conflicts between construction and train traffic would be mitigated through consultation with Norfolk Southern Railroad. Working in conjunction with the railroad TVA's construction contractors may be able to schedule construction traffic flow in such a way to minimize congestion. Additionally, TVA's construction contractors would be required to evaluate the raised rail crossing and truck weight loads to minimize the potential for trailers to scrape the crossing. TVA would work in conjunction with Norfolk Southern to evaluate and mitigate any repair requirements to the rail crossing associated with the construction traffic. Therefore, impacts to transportation associated with Alternative A would be anticipated to be temporary and minor.

The Norfolk Southern Railroad would be contacted to discuss the potential stoppage of train movement in the area during the blasting event. No barge or boat traffic would be allowed in

the area during the event. Due to the temporary nature of demolition operations, no impacts to rail and navigational traffic are expected.

3.13.2.3 Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

Impacts associated with Alternative C would be similar to those described for Alternatives A and B. Truck traffic volumes in the vicinity could increase temporarily for a short period, having a minor and temporary impact on the LOS for roads in that area. Due to the temporary nature of demolition operations, no impacts to rail and navigational traffic are expected. Alternative C would experience greater truck traffic than Alternative A and less than Alternative B.

3.13.2.4 Alternative D – No Action

Under the No Action Alternative, TVA would not perform any deconstruction or other disposition activities. Consequently, COF Units 1-5 would be left in place in their current condition; therefore; there would be no effect on the transportation infrastructure and no impact in the current uses of the facility.

3.14 Visual Resources

3.14.1 Affected Environment

Visual resources were evaluated based on physical characteristics of the area, including topography, aerial photography, site inspection, vegetation, existing land uses, and distance from the project location.

COF is located near the town of Tuscumbia in Colbert County, Alabama, along an impounded section of the Tennessee River (downstream of Wilson Lake and upstream of Pickwick Dam). The regional landscape is characterized by ridges, running in a general east to west direction. The terrain immediately surrounding the COF is flat, with rising hills approximately 2 miles in the distance. The area along the river is gently rolling with an average elevation of 440 feet in the vicinity of the plant. To the south of the plant, hills and plateaus rise from the valley to elevations of 600 to 900 feet. On the south side of the river, approximately 3 miles southeast of the site, Hawk Pride Mountain rises to an elevation of approximately 700 feet. On the north side of the river, the land is flat for a larger distance, for at least 10 miles, then hills rise to elevations of approximately 500 to 600 feet. The higher terrain areas are more heavily forested than the lower elevations along the river valley, which appear to be largely used for agriculture.

Land use in the vicinity is predominantly rural with single family residences interspersed with open fields of pasture or crops and forested areas. Commercial and industrial uses are primarily located along US 72/SR 2 located south of the plant. The Barton Riverfront Industrial Park is located two miles to the west and includes a number of large industrial operations. A large rock quarry is located two miles east of the plant. To the north of the river the dominant land use is agricultural.

Figure 3-6 shows the location of visual resources within the project area for the foreground (less than 1 mile) and middle ground distances (1 to 4 miles). Residences, schools, and churches have been identified to show potential vantage points.

Figure 3-7 depicts the viewshed of the project. This identifies the areas from which all or portions of the six stacks may be seen. A description of the process used to prepare the viewshed map is included in Appendix B. Additionally, photographs depicting views of the facility from multiple locations are provided in Appendix B.

Potentially impacted receptors include residences, churches, schools, and other features from which the plant might be observed. Additionally, regional pilots could be potentially impacted as they utilize the obstruction lights on the COF chimneys as navigational landmarks. Within 1 mile of the site, the majority of the residences are located south of the site along U.S. 72, with a smaller number located along the south side of the river to the east of the site. Between 1 and 2 miles from COF is a similar distribution of residences to the south and west of the plant. Two developed recreation areas are located within approximately 1 mile of the deconstruction boundaries. Cane Creek Recreation Area is situated on plant reservation property and is located about 0.75 mile downstream of the deconstruction boundary. This recreation area includes a boat launching ramp, a paved parking lot, and lighting. In addition to boat launching and bank fishing, some dispersed recreational activity such as informal camping occurs on the adjacent reservation property. The second recreation facility is Pride Landing Boat Ramp located approximately 1.5 miles upstream from the deconstruction boundary. This area includes a paved ramp and is managed by the State of Alabama. Barton's First Baptist Church is located on US 72 approximately 2.5 miles east-southeast of COF.

The existing COF stacks, buildings, and associated high voltage transmission lines are the dominant feature of the landscape within the foreground. The majority of the foreground area is contained within the site limits with no private residences or public roads. To the north of the site, across the river, existing vegetation along the Tennessee River limits views of the site from many locations. To the south of the river, along US 72/SR 2 the views are similarly obscured due to the numerous wooded areas and rows of trees along the road. Recreational users of the river have clear views of the plant within the foreground and middle ground distance (1 to 4 miles) though these are somewhat limited by the forested islands east of the plant.

Within the middle ground distances, views are more limited due to intervening vegetation and topography. At these distances, only the upper portions of the stacks are visible when not obscured by vegetation. On the north side of the river, the stacks are visible from various points along the local roads where open fields are adjacent to the roads. On the south site of the river, the middle ground distance views are limited to open areas. From these locations, the plant is not significantly visible due to the intervening vegetation.

Appendix B contains a map and representative photographs generated using Google Street View of COF from the surrounding area. At all 7 photo locations, the existing plant stacks are barely visible in the distance. In most views, only the tallest stack is visible, just slightly raised above the tree line. Due to the plant's location along the river and the distance between it and most observers along public roads, the plant does not visually intrude upon the rural aspects of the scenery. Additional screening is provided by the intervening vegetation. The plant is most visible from locations that are along a transmission line right of way, where views are unobstructed by the forested areas. As there are very few structures and vantage points in the foreground are that are not screened by vegetation, the only observers that would generally have a direct view of the plant would be recreational users of the Tennessee River.

3.14.2 Environmental Consequences

3.14.2.1 Alternative A – Assess, Close, and Secure Units 1-5, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

The adoption of Alternative A would mean that the COF structures and powerhouse would remain in place with no impact to the existing visual environment. Minor impacts could occur over time if the buildings begin to deteriorate. These impacts would be mitigated by the general maintenance measures to address safety-related issues and would be minor. Minor indirect

impacts may occur during the removal of hazardous substances process due to potential increased heavy equipment traffic in the surrounding area. These impacts would be temporary and insignificant.

3.14.2.2 Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

Under Alternatives B, the COF and additional structures and facilities shown in Figures 1-3 through 1-6 would be deconstructed to a depth of 3 feet below grade. Removing these elements, especially the visually dominant stacks, would greatly enhance the visual environment of both the near and middle ground distances. This would represent a substantial change for the viewers in a relatively small area, so the overall impacts of this demolition alternative would be beneficial, but minor due to the number of observers. Temporary negative impacts to visual resources would occur during the demolition process. Large heavy equipment and numerous dump trucks and cranes would potentially be visible throughout the plant area. However, due to the small number of potential observers in the foreground area and the existing vegetative screening in the middle ground area, this impact would be insignificant. This equipment and the potential use of explosives may also mobilize dust in the vicinity creating some additional minor visual impacts. The negative visual impacts associated with construction would be temporary and minor with respect to the overall beneficial impacts. Additional indirect impacts would occur during demolition in the surrounding area due to increased truck traffic on local roads.

Removal of the chimneys and the associated removal of the obstruction lighting on the chimneys would result in the loss of this navigational landmark for regional pilots. TVA would notify the FAA and follow all local, state, and federal guidelines regarding removal of the obstruction lighting. Impacts associated with the removal of the obstruction lighting on the chimneys would, therefore, be minor.

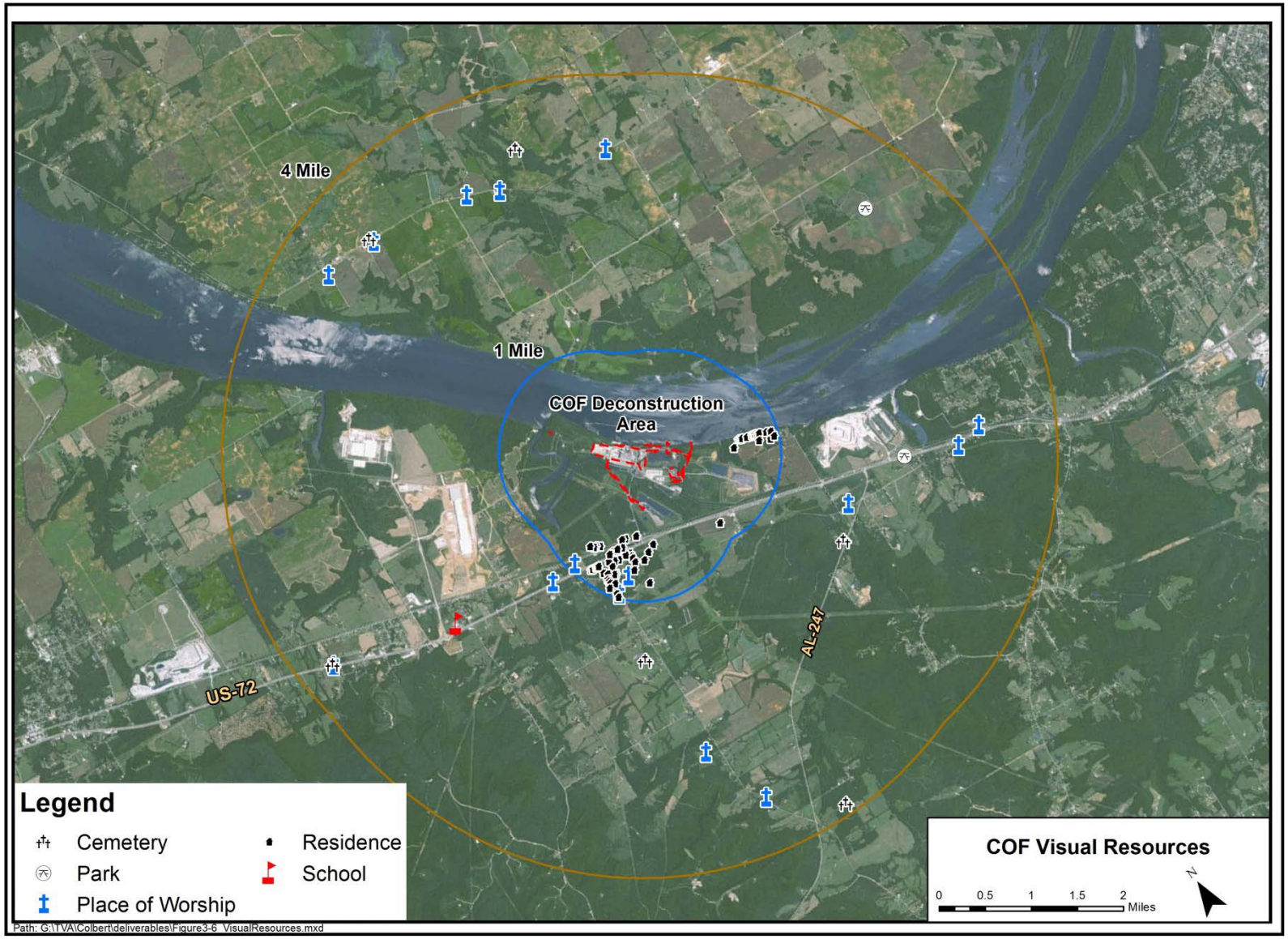

Figure 3-6. One Mile and Four Mile Visual Buffer Zone at the COF

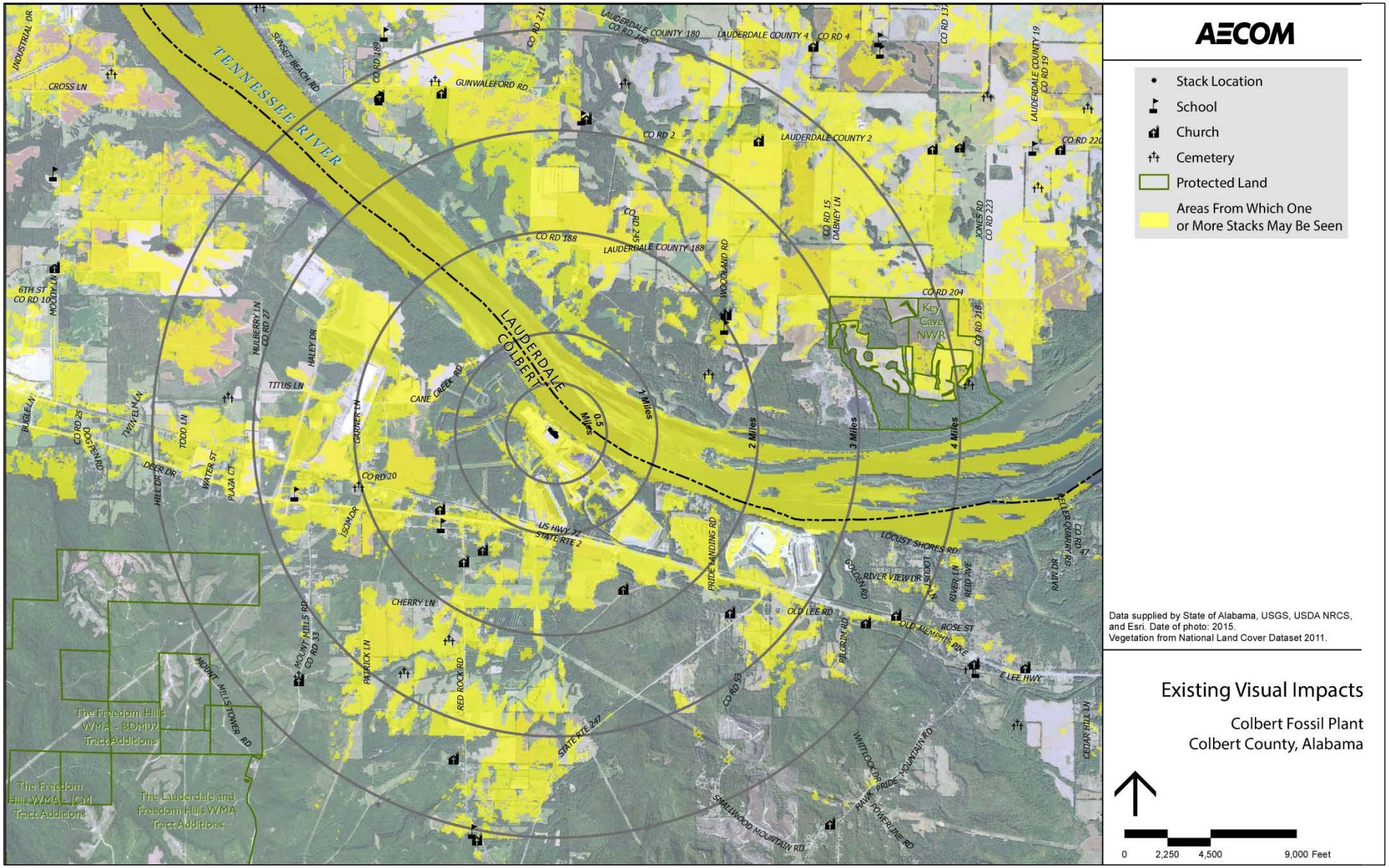

Figure 3-7. COF Plant Viewshed Map

3.14.2.3 Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

Under Alternative C, the powerhouse and the stacks would remain in place. These structures are the most visible from the surrounding area. Therefore, impacts would similar to Alternative A, with minor and insignificant indirect impacts due to increased traffic during demolition of the outlying buildings and no significant impacts to visual resources overall.

3.14.2.4 Alternative D – No Action

Selection of Alternative D would not significantly alter the current visual environment because all existing structures would remain in place. The visually dominant stacks would remain visible. Minor impacts could occur over time if the buildings begin to deteriorate. These impacts would be mitigated by the general maintenance measures to address safety-related issues and would be minor. Views on and adjacent to the river would remain the same, with the COF stacks and powerhouse being the major visual features in the foreground along the riverside, resulting in no impact to visual resources.

3.15 Natural Areas, Parks and Recreation

3.15.1 Affected Environment

Numerous areas across the TVA region are recognized and, in many cases, managed for their recreational, biological, historic, and scenic resources. These areas are owned by federal and state agencies, local governments, non-governmental organizations such as the Nature Conservancy and regional land trusts, and private corporations and individuals.

Parks, managed areas, and ecologically significant sites are typically managed for one or more of the following objectives:

- *Recreation:* areas managed for outdoor recreation or open space. Examples include national, state and local parks and recreation areas; reservoirs (TVA and other); picnic and camping areas; trails and greenways; and TVA small wild areas.
- *Species/Habitat Protection*: places with endangered or threatened plants or animals, unique natural habitats, or habitats for valued fish or wildlife populations. Examples include national and state wildlife refuges, mussel sanctuaries, TVA habitat protection areas, and nature preserves.
- *Resource Production/Harvest*: lands managed for production of forest products, hunting, and fishing. Examples include national and state forests, state game lands and wildlife management areas, and national and state fish hatcheries.
- *Scientific/Educational Resources*: lands protected for scientific research and education. Examples include biosphere reserves, research natural areas, environmental education areas, TVA ecological study areas, and federal research parks.
- *Historic Resources*: lands with significant historic resources. Examples include national battlefields and military parks, state historic sites, and state archeological areas.
- *Scenic Resources*: areas with exceptional scenic qualities or views. Examples include national and state scenic trails, scenic areas, wild and scenic rivers, and wilderness areas.
- *Agricultural Resources*: lands with significant local agricultural production and open space value, often in areas where suburban development is increasing. Examples include working family farms protected by conservation easements.

Numerous parks, managed areas and ecologically significant sites occur throughout the TVA region in all physiographic areas. Individual ecologically significant areas vary in size from a few acres to thousands of acres. Many areas cross state boundaries are managed cooperatively by several agencies.

A review of data from the TVA Natural Heritage Project database indicates there are no natural areas within the footprint of the proposed project. There are two natural areas immediately adjacent to COF, Seven Mile Island Wildlife Management Area and the Tennessee River/Wilson Dam Non-Essential Experimental Population Area. The Seven Mile Island Wildlife Management Area is located directly across the Tennessee River. Comprised of 4,685 acres, the Seven Mile Island Wildlife Management Area is managed by Alabama Department of Conservation and Natural Resources for waterfowl and small game hunting. The Tennessee River/Wilson Dam Non-Essential Experimental Population Area was designated by the USFWS in 2001 for the Tennessee River between Wilson Dam and the backwaters of Pickwick Reservoir, as well as extending 5 miles upstream of all tributaries that enter Wilson Dam tailwaters. For a further discussion, see Section 3.9.1, Aquatic Threatened and Endangered Species.

Table 3-9 shows the five natural areas that are located within 5 miles of COF.

Table 3-9. Natural Areas Located Within Five-Mile Radius of COF

Natural Area	Size (acres)	Managing Entity	Uses	Distance from COF
Alabama Cavefish Critical Habitat	25	USFWS[1]	Endangered species habitat	2.79 miles
Coffee Bluff TVA Habitat Protection Area	269	TVA	Habitat protection	2.4 miles
Freedom Hills Wildlife Management Area	8,540	ADCNR[2]	Wildlife habitat, small & large game hunting	2.7 miles
Key Cave Aquifer Hazard Area	2,300	N/A	Aquifer protection/recharge	2.29 miles
Key Cave National Wildlife Refuge	1,060	USFWS[1]	Endangered species habitat	2.39 miles

[1]U.S. Fish and Wildlife Service; [2]Alabama Department of Conservation and Natural Resources

Local residents fish from the bank in the outfall area south of the COF switchyard. This is an area accessible to the general public, though not advertised as a public recreation area. It is anticipated approximately 6-12 people may fish from this bank on average per day. It is anticipated that several of these are repeat visitors. This fishing area is located outside of the deconstruction boundary.

Two developed recreation areas are located within approximately 1 mile of the deconstruction boundaries. Cane Creek Recreation Area is situated on plant reservation property and is located about 0.75 mile downstream of the deconstruction boundary. This recreation area, developed by TVA and currently managed by Colbert County, includes a boat launching ramp, paved parking lot, and lighting. In addition to boat launching and bank fishing, some dispersed recreational activity such as informal camping occurs on adjacent reservation property. Cane Creek Road provides access to this area.

The second recreation facility is Pride Landing Boat Ramp located approximately 1.5 miles upstream from the deconstruction boundary. This area includes a paved ramp and is managed by the State of Alabama.

Water based recreation activities in the waters adjacent to the site include general pleasure boating, water sports activity such as water skiing and boat fishing.

3.15.2 Environmental Consequences

3.15.2.1 Alternative A – Assess, Close, and Secure Units 1-5, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

The COF facility would remain in place and be subject to some hazardous material removal and periodic maintenance and inspection. The site would be secured. There would be no direct impacts to the two natural areas immediately adjacent to COF, as all activities would be confined to the boundaries of COF. There could be indirect impacts associated with construction-related stormwater runoff; this impact would be mitigated to an insignificant level via the use of standard BMPs onsite. There would be no impacts to the five natural areas located within a 5 mile radius of COF, as these areas are located a sufficient distance from the proposed project. Overall there would be no overall direct or indirect impacts to natural areas associated with adoption of Alternative A.

3.15.2.2 Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

Under Alternative B, direct and indirect impacts to the natural areas would be similar to those described under Alternative A.

Under this alternative, demolition would be implemented. Noise and other demolition related impacts could have some temporary negative impact on water based recreation activity in the immediate vicinity of the plant. However, because these impacts would be small and of limited duration, overall impacts on recreation would be insignificant.

3.15.2.3 Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

Under Alternative C, direct and indirect impacts to the natural areas would be similar to those described under Alternative A.

Recreation related impacts under this alternative would be similar to those outlined under Alternative B.

3.15.2.4 Alternative D – No Action

Under the No Action Alternative, the proposed project would not be implemented and no direct or indirect to natural areas would be anticipated and existing recreation use patterns would continue in the area adjacent to COF.

3.16 Cultural and Historic Resources

3.16.1 Affected Environment

North Alabama has been an area of human occupation for the last 12,000 years. This includes five broad cultural periods: Paleo-Indian (11,000-8,000 BC), Archaic (8000-1600 BC), Woodland (1600 BC-AD 1000), Mississippian (AD 1000-1700), and Historic (AD 1700- to present). Prehistoric land use and settlement patterns vary during each period, but short- and long-term habitation sites are generally located on floodplains and alluvial terraces along rivers and

tributaries. Specialized campsites tend to be located on older alluvial terraces and in the uplands. In the early historic period, this area was largely populated by members of the Cherokee and Chickasaw tribes. The influx of European settlers into the region forced cession of Cherokee and Chickasaw lands in the Treaty of 1816. The Tennessee River served as a primary travel route in the region and Tuscumbia, the seat of Colbert County, became one of the agricultural and commercial centers of northern Alabama. The creation of the Tuscumbia Railway Company solidified Tuscumbia's role as a major commercial center. The First World War brought another role to the area, that of the country's leading ammunitions manufacture with the construction of two nitrate plants (U.S. Nitrate Plant No. 1 and 2) and a massive hydroelectric dam (Wilson Dam) to provide power to the facilities. Wilson was operated and managed by the United States Corps of Engineers until 1933 when ownership was transferred to the TVA. TVA authorized funds for the construction of Colbert Steam Plant in 1951 as part of TVA's steam plant program as means to meet increased power demands in the region.

Historic and cultural resources, including archaeological resources, are protected under various federal laws, including: the Archaeological Resources Protection Act, the Native American Graves Protection and Repatriation Act, and the National Historic Preservation Act (NHPA). Section 106 of the NHPA requires federal agencies to consult with the respective State Historic Preservation Officer (SHPO) when proposed federal actions could affect these resources.

With regards to cultural resources the area of potential effects (APE) is taken as the affected environment for purposes of this EA. APE is defined at 36 CFR §800.16(d) (a section of the federal regulations implementing Section 106 of the NHPA) as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." TVA has defined the APE for both archaeological and architectural resources for the proposed actions as the area in which the undertaking would result in ground-disturbing activities. This APE includes the Deconstruction Boundary and the area within an approximately 0.5 mile radius around the Deconstruction Boundary. As the project would not result in the addition of new above-ground features, the architectural APE does not extend beyond the Facility Boundary.

Archaeological Resources

Existing knowledge of the cultural resources present within the APE and other parts of the COF Reservation comes from several archaeological surveys associated with several previous COF and TVA land planning actions (D'Angelo and Cleveland 2003; D'Angelo 2004; de Gregory and Rosenwinkel 2015; Manning et al, 2015; Meyer 1995; Shaw 1992; Shaw and Ford 1993; Wild 2002 and 2003; Tucker-Laird and Holland 2010). Previous survey work within and adjacent to the plant property boundary resulted in the recording of 28 archaeological sites including 16 located within the current APE (Table 3-10). Three of the 16 sites were previously determined to be no longer extant (Wild 2002; D'Angelo 2004). An additional three of the 16 sites were previously determined, in consultation with the SHPO and federally recognized tribes, to be ineligible for the National Register of Historic Places (NRHP) (D'Angelo 2004b; Manning et al., 2015).

TVA contracted with Tennessee Valley Archaeological Research (TVAR) to conduct an archaeological Phase I survey of the additional 440 acres within the COF property that had not been previously surveyed and to revisit the sites previously identified within the APE (Rosenwinkel et al, 2016). A total of 138 acres were not testable due to contaminated soils and deep disturbance from previous construction activities.

Table 3.10 provides the TVAR findings and TVA eligibility recommendations for the 16 sites within the current APE. TVAR did not revisit the three sites determined previously to be no longer extant. Additionally, due to safety and accessibility issues, TVAR was unable to revisit six sites; as result TVA will consider these six sites undetermined for eligibility in the NRHP. TVAR revisited the remaining seven of the 16 sites and identified expanded site boundaries for four of the seven. TVAR identified that one of the sites was no longer present. TVAR additionally identified three new sites and two isolated finds. Thus, a total of 19 sites and two isolated finds were identified within the current APE. Based on the survey results, TVA finds that within the current APE a total of four sites are no longer present, five sites (and two isolated finds) are considered not eligible for the NRHP, and ten sites are considered undetermined for eligibility for the NRHP.

One of the sites TVAR revisited was the previously recorded site 1CT116. A records search at the University of Alabama and TVA recovered little information regarding 1CT116; the site was recorded as an earthen mound as part of the Pickwick Basin survey that was conducted prior to inundation of the Pickwick Reservoir. There is no indication that an archaeological excavation took place at the site either during the Pickwick Basin survey or prior to construction of the COF. Historic photographs of COF and TVA's engineering report document significant ground disturbance in this area, including cut and fill activities. The northern third of the site's extent fell within an ash disposal area and TVAR was unable to revisit this area due to safety concerns. One shovel test conducted within 1CT116's boundaries produced further evidence of the site's disturbance related to the ash disposal area through a profile that consisted entirely of black sandy clay between 0 and 40 centimeters below surface . Based on the construction photos and the shovel test, it is unlikely that remnants of the mound remain. However, there may be deeply buried deposit associated with the site, therefore the site should be considered undetermined for NRHP eligibility.

Historic Structures

One historic structure (Colbert Fossil Plant) was located within the APE. In 2015, TVAR conducted a NRHP assessment of the circa 1955 COF and associated outbuildings proposed for demolition. TVA finds that COF is not eligible for the NRHP due to its lack of architectural merits and previous alterations to the facility. In a letter dated March 11, 2016 the Alabama SHPO concurred with TVA's finding.

3.16.2 Environmental Consequences

As the result of multiple archaeological surveys (D'Angelo and Cleveland 2003; D'Angelo 2004; de Gregory and Rosenwinkel 2015; Manning et al, 2015; Meyer 1995; Shaw 1992; Shaw and Ford 1993; Wild 2002 and 2003; Tucker-Laird and Holland 2010; Rosenwinkel et al., 2016), nineteen archaeological sites have been recorded within the APE (Table 3.10). Four sites are no longer extant. Five sites were determined not eligible for the NRHP. Ten sites are considered undetermined (i.e., potentially eligible) for the NRHP.

Table 3.10. Sites located within the APE

Site	Site Type	TVAR Survey / Survey findings	Eligibility	Reference
1CT16	Unknown Aboriginal	Not revisited.	Site no longer present	Wild 2002
1CT77	Unknown Aboriginal	Not revisited.	Site no longer present	Wild 2002
1CT78	Unknown Aboriginal	Not revisited.	Site no longer present	D'Angelo 2004a
1CT20	Unknown Aboriginal	Not revisited due to safety and accessibility issues.	Undetermined	D'Angelo 2004a
1CT21	Unknown Aboriginal	Not revisited due to safety and accessibility issues.	Undetermined	D'Angelo 2004a
1CT22	Unknown Aboriginal	Not revisited due to safety and accessibility issues.	Undetermined	D'Angelo 2004a
1CT23	Unknown Aboriginal	Not revisited due to safety and accessibility issues.	Undetermined	D'Angel 2004a
1CT75	Unknown Aboriginal	Not revisited due to safety and accessibility issues.	Undetermined	Rosenwinkel et al., 2016
1CT113	Unknown Aboriginal	Not revisited due to safety and accessibility issues.	Undetermined	D'Angelo 2004a
1CT17	Shell Midden	Revisited.	Site no longer present	D'Angelo 2004a
1CT74	Unknown Aboriginal	Revisited and expanded site boundaries.	Not Eligible	D'Angelo 2004a
1CT356	Unknown Aboriginal	Revisited and expanded site boundaries.	Not Eligible	Goldman 1995; Rosenwinkel et al., 2016
1CT523	Unknown Aboriginal	Revisited, expanded site boundaries, and confirmed previous eligibility determination.	Not Eligible	D'Angelo 2004b
1CT625	Unknown Aboriginal/Historic	Revisited, expanded site boundaries, and recommend new eligibility determination for expanded boundary.	Undetermined (previous site was determined as Not Eligible)	Manning et al., 2015; Rosenwinkel et al., 2016
1CT626	Unknown Aboriginal/Historic	Revisited, expanded site boundaries, and confirmed previous eligibility determination (based on previous disturbance and unlikelihood of intact deposits).	Not Eligible	Manning et al., 2015; Rosenwinkel et al., 2016
1CT116	Earthen Mound	Revisited, site has been disturbed and could not be completely reevaluated due to safety and accessibility issues. Potential for presence of deeply buried deposits.	Undetermined	Meyer 1995; Rosenwinkel et al., 20016
1CT630	Unknown Aboriginal	Identified Site.	Undetermined	Rosenwinkel et al., 2016
1CT631	Unknown Aboriginal	Identified Site.	Undetermined	Rosenwinkel et al., 2016
1CT632	Unknown Aboriginal	Identified Site; lack of potential to contribute to research.	Not Eligible	Rosenwinkel et al., 2016
Isolated Find 1	Unknown Aboriginal	Identified Site; lack of potential to contribute to research.	Not Eligible	Rosenwinkel et al., 2016
Isolated Find 2	Unknown Aboriginal	Identified Site; lack of potential to contribute to research.	Not Eligible	Rosenwinkel et al., 2016

3.16.2.1 Alternative A – Assess, Close, and Secure Units 1-5, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

Under Alternative A, the COF facility would remain in place and be subject to some hazardous material removal and periodic maintenance and inspection. The site would be secured. Activities associated with hazardous materials removal would be restricted to the area within the deconstruction boundary. Additionally, hazardous materials removal would not involve ground disturbing activities or explosive demolition.

Sites 1CT630, 1CT631, and 1CT625considered undetermined or potentially eligible for the NRHP fall outside the main project area. A 20 meter buffer would be placed around the sites, prior to any work the areas will be flagged, and during any onsite activities these sites would be avoided.

Therefore, TVA finds that the proposed undertaking would have no effect to archaeological sites eligible or potentially eligible to the NRHP. TVA is currently seeking concurrence with the AL SHPO on this no effect finding.

3.16.2.2 Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

Under Alternative B, the structures within the deconstruction boundary would be demolished and reduced to three feet below final grade. Six of the nine sites of undetermined eligibility for the NRHP (sites 1CT20, 1CT21, 1CT22, 1CT23, 1CT75, and 1CT113) are located along the bluff line and would not be directly affected by any ground disturbance activities associated with deconstruction of COF. The Fuel Oil Barge Unloading Cell catwalk fronting sites these would be removed by barge and therefore have no potential to cause effects to these sites.

The use of explosives is being considered as part of the demolition. This blasting could cause vibrations in the vicinity of six of the sites of undetermined eligibility. The area where blasting would occur is no less than 1,000 feet from the nearest site. Previous vibration monitoring reports for three tall chimney demolitions at other facilities in the U.S have been conducted to measure the effects from demolition-related vibrations on standing structures in the vicinity of the chimney demolitions (Protect 2008, 2009, 2013). In each case, vibrations were below the recommended limits set by the U.S. Bureau of Mines Report, RI 8507. The report authors in each case concluded the demolitions would not cause damage to structures within the radius of influence. Vibrations resulting from the demolition of the COF should be of similar magnitude. Thus, seismologic analyses carried out at recent demolitions of other tall industrial chimneys strongly suggest that the vibrations would not result in measurable effects to archaeological deposits. In order to add further protection to these sites, TVA would require the demolition contractor develop and implement a blast plan in order to minimize vibration effects to Sites 1CT20, 1CT21, 1CT22, 1CT23, 1CT75, and 1CT113.

The three remaining sites considered undetermined or potentially eligible for the NRHP (1CT630, 1CT631, and 1CT625 fall outside the main area of deconstruction. All deconstruction activities will be confined to the north side of Cane Creek and these three sites will avoided. As described previously, records searches recovered little information regarding 1CT116 (recorded as an earthen mound). There is no indication that an archaeological excavation took place at the site and historic photographs document significant ground disturbance in this area, including cut and fill activities. Based on the construction photos and the single shovel test able to be performed during the TVAR survey, it is unlikely that remnants of the mound remain. However, because no deep testing occurred at the site, there may be a possibility for deeply buried

deposits. For the proposed undertaking no grading greater than 40 centimeters below surface is being proposed. TVA would put a condition in place that if project plans change and if any deep excavations are required below the area of disturbance, additional testing and evaluation would be required.

With the aforementioned conditions in place, TVA finds that the proposed undertaking would have no effect to archaeological sites eligible or potentially eligible to the NRHP. TVA is currently seeking concurrence with the AL SHPO on this no effect finding.

3.16.2.3 Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

Under Alternative C, direct and indirect impacts to cultural resources would be similar to those described under Alternative A.

3.16.2.4 Alternative D – No Action

Under the No Action Alternative, the proposed project would not be implemented and no direct, indirect or cumulative impacts to cultural resources would be anticipated.

3.17 Utilities and Service Systems

3.17.1 Affected Environment

This section includes an assessment of the existing utility and service systems and an evaluation of project-related impacts under each of the alternatives.

Current utilities and service systems at COF include drinking water, cooling water, process wastewater and cooling water, sanitary wastewater, electrical, fiber optics, and compressed air, and natural gas. Table 3-11 lists the disposition of the service systems under each alternative.

Table 3-11. Impact to Service Systems by Alternative

Service System	Alternative A	Alternative B	Alternative C	Alternative D
Powerhouse Units 1 through 5	Stay	Demo	Stay	Stay
Service Bay	Stay	Demo	Stay	Stay
Office Wing	Stay	Demo	Stay	Stay
Precipitators, SCR, and Ammonia Tank Farm	Stay	Demo	Stay	Stay
Ash Disposal Piping	Stay	Demo	Stay	Stay
Condensate Tanks	Stay	Demo	Stay	Stay
Water Treatment Building	Stay	Demo	Stay	Stay
Removal of the Intake Pump Station Equipment (Concrete Structure Remains)	Stay	Selective Demo	Stay	Stay
Transformer Yard	Stay	Demo	Stay	Stay
SCR Transformer Yard	Stay	Demo	Stay	Stay
Vacant Warehouses and Miscellaneous Storage Buildings West of Powerhouse	Stay	Demo	Demo	Stay
Carport West of Powerhouse	Stay	Demo	Demo	Stay
Hydrogen Trailer Ports A and B	Stay	Demo	Stay	Stay
Utility Building	Stay	Demo	Stay	Stay

Service System	Alternative A	Alternative B	Alternative C	Alternative D
Aboveground diesel and gasoline storage tanks near Utility Building	Stay	Demo	Stay	Stay
Lighting Off Oil Tank, associated piping and concrete containment	Stay	Demo	Stay	Stay
Coal Conveyors and Hoppers	Stay	Demo	Stay	Stay
Conveyor Control Building	Stay	Demo	Stay	Stay
Coal Barge Unloaders No. 1 and 2	Stay	Demo	Stay	Stay
Dry Fly Ash Storage Silos	Stay	Demo	Stay	Stay
Select Plant Roads and Parking Lots	Stay	Demo	Stay	Stay
Six Stacks	Stay	Demo	Stay	Stay
Emergency Notification System (poles, sirens, windsocks and hardware)	Stay	Demo	Stay	Stay

3.17.2 Environmental Consequences

3.17.2.1 Alternative A – Assess, Close, and Secure Units 1-5, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

Retirement activities for Alternative A include the following:

- Maintenance of fire protection, fire detection and fire alarm systems and all HVAC systems, if present, in all buildings;
- Maintenance of all HVAC systems required for cooling electrical equipment or for life safety;
- Addition of heat tracing for critical fire protection supply lines for an unheated environment;
- Roof and structural inspections;
- Regular Hazardous Materials condition surveys;
- Hazardous Materials removal over time;
- Monitoring of all PCB-containing and PCB-contaminated electrical equipment as well as any known PCB contaminated areas; (TVA's PCB Management Procedure [TVA-SPP-05.060 Section 3.2.7] stipulates that a PCB transformer can be stored on site for a maximum of only 9 months after removal from service and retirement. PCBs will need to be dealt with during decommissioning, regardless which alternative TVA chooses);
- Maintain stack lighting according to FAA regulations;
- Maintain building lighting, necessary elevator(s), emergency lighting, and exit signs required for walk downs and maintenance or egress;
- Maintain the operation of select sump pumps to prevent below-grade flooding or unpermitted discharges to the environment; and
- Continue investigation of retired equipment that could be used at other TVA facilities.

In addition, stormwater systems would remain in place and would require monitoring, including sumps. Potable water and sanitary sewer systems would remain, as there would be maintenance personnel on the property. It is estimated that ten employees would be required for the 24/7 operations and maintenance schedule.

Certain services systems would also remain, including elevators and ventilation fans. Inspections of structures and other associated support systems would continue to be required. The existing railroad tracks on site would remain in place for this alternative.

Under Alternative A, underground utilities to be abandoned in place would not be maintained. Therefore, over time the pipelines may collapse or experience root intrusion. As the underground utilities age, the pipes may degrade and potentially affect groundwater quality. Additionally, service systems would remain onsite as part of this alternative. These service systems could include lead batteries, mercury switches, electrical wiring containing PCBs, and transformers. Without complete removal of these systems, or replacement with nonhazardous materials, there is a risk for environmental impacts as described previously, including leeching to soils or groundwater.

Overall, the impacts of Alternative A on utilities and service systems are expected to be minor.

3.17.2.2 Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

Under this alternative, all aboveground utilities and service systems would be removed. All buried utilities would be cut and capped at the retirement/deconstruction boundary and abandoned in place. Utilities constructed of hollow pipe would be decommissioned through placement of a mechanical cap or plug, and/or placement of concrete on an open end. This alternative also includes three options for disposing of the cooling water intake and discharge tunnels: sealing with bulkheads, sealing with bulkheads and flow-fill, or removal. Sealing would consist of erecting bulkheads within the intake and discharge tunnels. It could also include filling all tunnels with flow-fill.

Overall, the impacts of Alternative B on utilities and service systems are expected to be minor. No impacts would be anticipated outside of the project site.

3.17.2.3 Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

The impacts associated with Alternative C would be similar to those described for Alternatives A and B. Overall, the impacts of Alternative C on utilities and service systems are expected to be minor.

3.17.2.4 Alternative D – No Action

Under the No action alternative, TVA would not perform any deconstruction or other disposition activities. There would be no removal of the utilities and service systems. If the facility remains in the “as-is” condition, it likely would present a higher risk than Alternatives A, B, and C as utilities would not be maintained and would degrade over time, resulting in the potential to contaminate soil and groundwater as described previously. Impacts related to Alternative D would occur over the long-term and are expected to be minor.

3.18 Safety

3.18.1 Affected Environment

The area surrounding COF consists of open rural property and the Tennessee River. The closest residences are located approximately 1.25 miles from the COF site.

The site is accessible via Colbert Steam Plant Road, the only vehicular route in or out of the facility. Colbert Steam Plant Road connects to State Route (SR) 20 (two-lane highway) and US

72 (four-lane divided highway) approximately 0.8 mile southwest of the facility. COF is surrounded by chain link security fence, with the entrance gates guarded. Population in the immediate area (within approximately 1.25 miles of the plant) is very sparse, with only a few dwellings in the vicinity. The nearest population center is Tuscumbia, located approximately 10.5 miles southwest of the facility.

3.18.2 Environmental Consequences

3.18.2.1 Alternative A – Assess, Close, and Secure Power Production Facilities, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

The objective of Alternative A is to de-energize non-essential systems at the COF Units 1-5 and associated facilities, minimize environmental and safety risks, and close the powerhouse and associated facilities to an “idle and vacant” status. Hazardous materials would be removed from the site. Any remaining hazardous materials would be susceptible to increased deterioration and damage when it remains in unconditioned buildings and structures. As the material deteriorates, it presents a material threat to human health and the environment.

Without removal of the structures, materials could degrade; become subject to surface water erosion, wind erosion, or biological disturbance; or become leachable into the groundwater. Over time, lead from paint, metals in wiring and pipe, and oil from retired equipment could find its way to soil and groundwater and potentially contaminate drinking water sources. Maintenance activities associated with environmental items could continue for decades.

Ongoing maintenance activities could present opportunity for injury to maintenance and security staff. Trespassing (by foot or by boat) and vandalism are often a concern at a closed facility that might contain salvageable materials. Unauthorized persons at the site could presumably be exposed to potential contaminants or to physical injury. Some level of security would need to remain in place to protect workers and TVA property, as well as to dissuade trespassers. Effects on safety to the general public are expected to be minor.

3.18.2.2 Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

Under Alternative B, the COF and additional structures and facilities shown in Figures 1-3 through 1-6 would be deconstructed to a depth of 3 feet below grade. The demolition activities would last approximately 15 to 18 months. Most of the work would occur during the day on weekdays. However, demolition activities could occur at night or on weekends, if necessary. All hazardous materials associated with buildings and structures would be removed and disposed of, and the structures demolished. This action would result in the lowest risk to soil and groundwater as contaminants would be removed from the site. Demolition of all structures to grade, or at least 3 feet below grade, would result in the current property becoming a “brownfield.” Brownfields are sites that are no longer suitable for agriculture but that can be used for commercial or industrial purposes. Contamination of soil and groundwater would be unlikely.

Potential contaminants removed prior to structure demolition would be hauled to an offsite landfill either by truck or by rail. Alternative B could result considerable amounts of scrap metal that would also be hauled from the facility either by truck or by rail. These combined hauling activities could cause an increase in truck traffic to and from the facility for some period of time.

As part of the structure removal, the stacks could be demolished via explosives. Prior to the demolition, the area would be prepared, and a circular fall exclusion zone equal to 1.5 times the

height of the chimney would be established. During the blast event, no personnel would be allowed in the fall exclusion zone. A targeted fall zone for the Units 1-5 chimneys would be established. A fall exclusion zone area would also be established based on guidelines provided by the National Demolition Association's Demolition Safety Manual (National Demolition Association 2012) and would provide a sufficient safety buffer for debris and dust control around the area as well as a control zone for any unlikely change in the intended fall direction. All worker activity would comply with federal and state safety regulations, including donning appropriate personal protective equipment, maintaining equipment in good working order, and adequate training for work performed, which minimizes safety risks.

Explosives would be managed under the direction of a licensed blaster. Security would be a very important component of this event to eliminate any threats to public health or safety as much as possible. Once explosives arrive onsite, 24-hour security would be provided to monitor the explosives. Detailed security plans would be developed and provided to area emergency response agencies. Security details, including any information about the transport and storage of explosives, would be limited to authorized personnel only. Site security on the day of the event would be strictly enforced, and trespassing would not be tolerated. Notifications to the public would be issued prior to the use of explosives for demolition.

Public health and safety concerns related to hazardous materials would be low under this alternative. The potential for contaminants from the facility to reach soil and groundwater would be almost nonexistent. Brick, block, and concrete demolition debris not contaminated by asbestos or other hazardous materials would be used as clean fill onsite. Other demolition debris would be hauled to an offsite landfill either by truck or by rail.

Trespassing and vandalism would be much less of an issue for the facility since there would be little to attract unauthorized persons. It is TVA policy that all contractors have in place a site-specific health and safety plan prior to conducting construction activities at TVA properties. A health and safety plan will also be required for workers responsible for operating the systems after construction is complete. With the high level of safety awareness and preparation during demolition and removal of facilities, safety and security plans and safety awareness would reduce potentially large safety risk (felling of stacks and demolition of buildings) down to a minor and temporary impact.

3.18.2.3 Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

This alternative is the same as Alternative A with further reductions in both future maintenance costs and risk as a result of removing outlying buildings. Due to the temporary and intermittent nature of demolition and the site's rural location, and the distance to nearest receptors (greater than 1 mile), the potential direct and indirect impacts on safety for the general public would be similar to but less than those described under Alternative B.

3.18.2.4 Alternative D – No Action

Under the No Action Alternative, TVA would not perform any deconstruction or other disposition activities. If the facility remains in the "as-is" condition, it likely would present a higher safety risk than Alternatives A, B, and C for the potential to contaminate soil and groundwater as systems and structures degrade. In addition, the risk of trespassing and injury to trespassers would likely increase due to a perception that salvageable materials are present on the site as well as the increased level of environmental contaminants. However, due to the site location and the sparse population, effects on safety to the general public are expected to be minor.

3.19 Socioeconomics and Environmental Justice

This section describes the socioeconomic resources in the vicinity of COF, including the minority and poverty characteristics related to environmental justice, and evaluates the impacts on social and economic resources and environmental justice from the Action and No Action alternatives. Components of socioeconomic resources that are analyzed include population, employment, and income; minority populations and poverty levels are analyzed in regard to environmental justice.

3.19.1 Affected Environment

COF is located in Colbert County in northeast Alabama. The nearest cities are Tuscumbia, the county seat, and Muscle Shoals, approximately 10 miles and 13 miles to the northeast, respectively. The nearest town to the west is Cherokee, approximately 6 miles from COF. These cities and town are part of the Florence - Muscle Shoals Metropolitan Statistical Area, known as "The Shoals."

3.19.1.1 Socioeconomics

The 2014 estimated population of Colbert County is 54,491. As projected by the State of Alabama, the population of Colbert County would decrease to about 54,137 by 2030. Population trends and projections are presented in Table 3-12.

Colbert County has a total employment of about 31,098 jobs (Table 3-13). Manufacturing provides the greatest number of jobs (19.2 percent), above both the state level of 10.3 percent and the national level of 7.0 percent. Approximately 16.9 percent of county workers are employed by the government, more than the state share of 15.6 percent and the national share of 12.9 percent. Retail trade (11.0 percent) is slightly higher than the state and national shares. Employment in construction (7.6 percent) is similar to state (5.4 percent) and national (5.2 percent) employment levels.

In 2014, approximately 1,971 people were unemployed in Colbert County, yielding an annual average unemployment rate of 8.2 percent. This represents a slight increase from the 2013 unemployment rate of 8.1 percent. Colbert County's 2014 unemployment rate is higher than Alabama's rate of 6.8 percent and the national rate of 6.2 percent (U.S. Bureau of Labor Statistics 2016a and 2016b).

Per capita personal income in Colbert County in 2014 was $34,616, which is a 3.6 percent increase from 2013. It is 75 percent of the national average of $46,049 and less than the state average of $37,512 (U.S. Bureau of Economic Analysis 2015b).

Table 3-12. 1990–2030 Population Data

Area	1990	2000	2010	2014 Estimated[1]	Projection 2030	Percent Increase 1990-2010	Percent Increase 2010-2030
Colbert County	51,666	54,984	54,428	54,491	54,137	5.3	-.5
Alabama	4,040,587	4,447,100	4,779,736	4,817,678	5,373,294	18.3	12.4
United States	248,709,873	281,421,906	308,745,538	314,107,084	359,402,000	24.1	16.4

Sources: U.S. Census Bureau 1990, 2000, 2010, 2014, 2016a, U.S. Census Bureau and Center for Business and Economic Research, The University of Alabama 2015.

[1] 2010-2014 five-year estimate.

Table 3-13. 2014 Employment Data

	Colbert County	Alabama	United States
Total Employment	31,098	2,559,746	185,798,800
Industry	**Percentage of Employment**		
Farm	2.2	1.7	1.4
Construction	7.6	5.4	5.2
Manufacturing	19.2	10.3	7.0
Retail Trade	11.0	10.9	10.1
Health Care and Social Assistance	7.1	9.2	11.2
Accommodation and Food Services	5.9	7.0	7.3
Services (other)	6.3	6.8	5.9
Government	16.9	15.6	12.9

Source: U.S. Bureau of Economic Analysis 2015a.

3.19.1.2 Environmental Justice

EO 12898 directs federal agencies to identify and address, as appropriate, potential disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. While TVA is not subject to this EO, TVA typically assesses environmental justice impacts in its NEPA reviews. This section provides demographic information that characterizes the distribution of minority populations and low-income populations in the project area.

In identifying minority and low-income populations, the following Council on Environmental Quality definitions of minority individuals and populations and low-income populations were used:

- *Minority individuals.* 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.
- *Minority populations.* Minority populations are identified where: (1) the minority population of an affected area exceeds 50 percent, or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.
- *Low-income populations.* Low-income populations in an affected area are identified with the annual statistical poverty thresholds from the Census Bureau's Current Population Reports, Series P-60, on Income and Poverty (Council on Environmental Quality, 1997).

According to Council on Environmental Quality guidance, U.S. Census data are typically used to determine minority and low-income population percentages in the affected area of a project. The COF site is located in the northwestern part of Colbert County in Census Tract 209.02. Census Tract 209.02, Block Group 3, which contains the COF site, and Census Tract 209.02, Block Group 1 located adjacent to COF to the south, are identified as the potentially affected area for environmental justice.

Minorities constitute 20.9 percent of the total population in Colbert County as of 2014 (Table 3-14). Census Tract 209.02, Block Group 1 has a minority population of 18.3 percent, and 209.02, Block Group 3 has a minority population of 4.0 percent. These two block groups have a

lesser proportion of minorities than the county as a whole. The block group minority levels are below the state average of 33.4 percent and less than the national average of 37.2 percent. Therefore, residents of the block groups in the potentially affected area for the COF site are not considered minority populations.

Table 3-14. 2014 Minority Population Data

Area	Total Population	Minority Population	Percent Minority Population
Block Group 1, Census Tract 209.02	672	123	18.3
Block Group 3, Census Tract 209.02	1299	52	4.0
Colbert County	54,491	11,392	20.9
Alabama	4,817,678	1,611,090	33.4
United States	314,107,084	116,947,592	37.2

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

The portion of the population in Colbert County that has income below the poverty level as of 2014 is 18.3 percent (Table 3-15). In Census Tract 209.02 Block Group 1, which lies directly south of the COF site, 7.1 percent of the population has income below the poverty level. This is well below county, state, and national levels. Census Tract 209.02, Block Group 3, which contains the COF site, has 23.8 percent of the population living below the poverty level. This is approximately 5 percent greater than the county and state levels of 18.3 and 18.9 percent, respectively. Therefore, residents of Block Groups 1 and 3, in the potentially affected area for the COF site, are not considered low-income populations.

Table 3-15. 2014 Poverty Level Data

Area	Total Population[1]	Persons Below Poverty Level	Percent of Persons Below Poverty Level
Block Group 1, Census Tract 209.02	672	48	7.1
Block Group 3, Census Tract 209.02	1,299	310	23.8
Colbert County	53,978	9,860	18.3
Alabama	4,699,510	889,710	18.9
United States	306,226,394	47,755,606	15.6

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

[1] Population for whom poverty status is determined.

3.19.2 Environmental Consequences

Social and economic issues considered for evaluation within the impact area include effects on employment and income, change in expenditures for goods and services, and change to current and projected population levels.

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 COF site. Therefore, no disproportionate impacts to environmental justice populations are expected to occur as a result of implementation of any of the four alternatives.

3.19.2.1 Alternative A – Assess, Close, and Secure Units 1-5, and Implement Operations and Maintenance Program to Maintain Structures and Equipment

Maintenance activities for the facilities at the COF site would be greatly reduced under this alternative. COF plant personnel estimated that Alternative A would require the employment of a ten person crew to maintain the facility with 24/7 coverage. Personnel from other TVA sources would be used, as necessary, to assist with performing operations and maintenance activities (Project Planning Document, Plant Deconstruction Colbert Fossil Plant, May 21, 2015).

The cost of salary and benefits for the permanent team is approximately 44.3% of operations and maintenance projected for Year 1. Substantial operations and maintenance costs would accrue over the next 20 years (Project Planning Document, Plant Deconstruction Colbert Fossil Plant, May 21, 2015).

Overall, employment of the maintenance workforce and routine capital expenditures needed to support Alternative A would have a minor beneficial impact on the local economy. Changes to population levels in the area as a result of implementing Alternative A are not expected.

3.19.2.2 Alternative B – Demolition of Units 1-5 and Other Structures to Three Feet Below Final Grade (Brownfield) including the Six Stacks

Demolition of the COF facilities could have minor beneficial indirect impacts to short-term employment and income levels in Colbert County as well as the surrounding region.

Alternative B has an initial capital cost of over $28,000,000 due to costs associated with deactivation and demolition activities. Thus, there would be short-term beneficial economic impacts including a temporary increase in employment. This increase would be local or regional, depending on where the workers, goods, and services were obtained. It is likely some of the demolition workforce would be from local or regional sources. A portion could potentially come from out of state, temporarily increasing the local population (Project Planning Document, Plant Deconstruction Colbert Fossil Plant, May 21. 2015).

The direct impact to the economy associated with demolition activities would be short-term and beneficial to the local economy. Materials, equipment, and services may be purchased locally in the Colbert County area, as well as in adjacent counties.

Removal of operating equipment and structures as a result of Alternative B eliminates the need to have permanent operations and maintenance staff stationed onsite for these assets. Operations and maintenance costs for Alternative B include routine grounds maintenance (mowing and trimming) and infrequent site security visits to protect against trespassing and vandalism.

The majority of the indirect employment and income impacts would be from expenditure of the wages earned by the workforce involved in demolition activities, as well as the local workforce used to provide materials and services.

Overall, socioeconomic impacts from Alternative B are anticipated to be positive and short-term, although minor relative to the total economy of the county.

3.19.2.3 Alternative C – Assess, Close, and Secure Units 1-5, Demolish Outlying Buildings, Structures, Retain Powerhouse

This alternative is the same as Alternative A plus further reducing future maintenance costs and risk by removing outlying buildings. The socioeconomic impacts associated with Alternative C

would be similar to those described for Alternative A, with the addition of beneficial economic impacts associated with limited demolition activities. Overall, socioeconomic impacts from Alternative C are anticipated to be positive, although minor relative to the total economy of the county.

3.19.2.4 Alternative D – No Action

Under the No Action Alternative, the COF would be left in the "as is" condition. Therefore, no socioeconomic impacts from a change in employment or expenditures at the site would occur.

3.20 Cumulative Impacts

Cumulative impacts are defined in the Regulations for Implementing the Procedural Provisions of the NEPA (Council on Environmental Quality, 1987) 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."

Past actions that have already occurred and present actions are integrated into the existing baseline conditions discussed above. Table 3-16 summarizes and the following section analyses the reasonably foreseeable future actions on COF and in the immediate vicinity of the plant. Projects planned elsewhere in the community are not likely to have a cumulative impact on the demolition project as they would be a considerable distance from the project area.

Table 3-16. Summary of Present or Reasonably Foreseeable Future Actions in the Vicinity of the Proposed Project

Actions Description	Description	Timing
Ash Impoundment Closure (TVA 2015c)	The 52-acre Ash Impoundment #4, which holds 3.2 million cubic yards of Coal Combustion Residuals in the form of Fly Ash and Bottom Ash is planned for closure by April 2018.	Present/Future
Coal Yard Improvements (TVA 2015c)	Soil remediation and re-purposing of the coal yard.	Future
NPDES Outfalls Closure (TVA 2015c)	Outfalls closure in conjunction with closure of discharge and stormwater permits.	Future
Potential Development of Commercial Port (Times Daily 2016)	The COF's existing port is the subject of a feasibility study to determine its use as a commercial port facility.	Future
Potential Development of Solar Farm (Times Free Press 2015)	Development of a new solar farm located near COF is underway. It will take advantage of the COF's existing transmission system, and supply power to TVA.	Present/Future
Expansion of Service Area for Proposed Landfill at Barton Riverfront Industrial Park (Waste Dive 2016)	Expansion of service area for proposed landfill serving Alabama counties to accept non-hazardous industrial waste, and construction and demolition materials from Georgia, Mississippi and Tennessee.	Present/Future

Ash Impoundment Closure
COF's Ash Impoundment #4 is considered an "active impoundment" under U.S. Environmental Protection Agency (EPA)'s new coal combustion residuals rule. The impoundment will continue to receive boiler slag for several months after decommissioning. TVA proposes to close the active Ash Impoundment #4 at COF onsite using an approved closure methodology.

Coal Yard Improvements
The coal yard will be graded to drain using soils from the onsite borrow area, and re-vegetated to allow the area to return to a natural state.

NPDES Outfalls Closure
The closure of the NPDES impoundment system and outfalls is addressed in TVA's Draft Impoundment Closure EIS (2015). The EIS addresses impacts associated with the closure of the impoundment portion of the facility.

Potential Development of Commercial Port
Preliminary results of a feasibility study conducted by Auburn University confirm that the COF's port facility could be repurposed for use as a commercial port serving Colbert County farmers and timber producers. This would provide an economic benefit to the area. Colbert County does not currently have a commercial port.

Expansion of Service Area for Proposed Landfill at Barton Riverfront Industrial Park
Expansion of the service area for a proposed landfill to accept non-hazardous industrial waste, and construction and demolition materials from Georgia, Mississippi and Tennessee was approved by Colbert County commissioners. The proposed facility is currently permitted to accept waste from Colbert County. An amendment to the permit issued by ADEM is required for the service area increase to other states. The landfill is proposed to be located approximately 3 miles northwest of COF at Barton Riverfront Industrial Park. The proposed facility has not been constructed but has signage, an excavated area with marked boundaries and stormwater pond.

Potential Development of Solar Farm
NextEra Energy Resources is building the River Bend Solar facility in Lauderdale County across the Tennessee River from the COF. The facility eventually would tie into the COF's transmission line. NextEra signed a 20-year power purchase agreement with TVA.

The following sections address the potential cumulative impacts associated with the cumulative impacts of the proposed project.

3.20.1 Land Use and Prime Farmland
Cumulative impacts caused by Alternative B and other site related closure activities could include the eventual redevelopment of the site, resulting in land use changes. Without knowing what development would occur, it is inappropriate to speculate on the extent or manner of land use changes at this time; however, such changes would be anticipated to be minor and beneficial as they would result in converting the brownfield site to an active land use.

3.20.2 Geology and Groundwater
There are no cumulative impacts with Alternative B, as potential sources of soil or groundwater contamination due to stored chemicals, oils, etc., would be removed from the site. Alternative C would remove some contamination from the site, but would carry a risk of impacting the environment as materials that cannot be practically removed from structures, sumps, and shafts

(lead based paint, metals, etc.) may have the potential to contaminate soil and groundwater through years of deterioration, and thus potentially contribute to geology and groundwater cumulative impacts as a result of the multiple construction projects and associated vehicles in the area. In addition, disturbance of soils and potential spills may cause cumulative geology and groundwater effects. Projects would reduce the probability of contamination through employment of BMPs including spill prevention and control along with countermeasure plans to control and clean spills of hazardous materials. Construction projects would also utilize engineering controls and BMPs to manage runoff of soils and stormwater; further minimizing potential impacts. Although Alternatives A and D would not remove sources from the site, maintenance and monitoring under Alternative A would reduce the amount of degradation and decay expected under abandon in place Alternative D; thus potentially contributing to more cumulative effects than Alternatives B and C, but to lesser cumulative effects than Alternative D, Overall, potential cumulative impacts associated with geology and groundwater are anticipated to be minor.

3.20.3 Surface Water

Surface water could be potentially impacted due to increased silt load resulting from runoff during soil disturbing activities. Similar impacts could be anticipated from the nearby projects. All projects would implement BMPs and engineering controls. Therefore, only minor and temporary cumulative impacts to surface waters would be anticipated with respect to runoff. Any discharges into surface waters would comply with all NPDES permit limits and local, state, and federal regulations. These impacts would not be expected to be significant.

There is a potential for cumulative impacts to surface water quality if the facility is not properly maintained and if hazardous waste and other potential pollutants to surface water are not removed from the site or properly stored and maintained. The intake and discharge tunnels and the onsite chimneys, if left in place, are located in close proximity to surface waters and have the potential to impact surface water quality if not properly maintained or removed. Mitigation measures would be implemented as needed to ensure the discharges from the site would have no significant impacts on the receiving stream water quality.

The closure of the NPDES impoundment system and outfalls is addressed in TVA's Draft Impoundment Closure EIS (2015). The EIS addresses impacts associated with the closure of the impoundment portion of the facility. With proper BMPs, maintenance practices, draw down practices, and treatment of any continuing discharge waste streams, no negative cumulative impacts would be expected from these activities.

3.20.4 Aquatic Ecology

With Alternatives B and C surface water could be potentially impacted due to increased silt load resulting from soil disturbing activities as described previously. Proper implementation of BMPs and engineering controls would be expected to result in no impacts to surface waters and thus no cumulative impacts to aquatic ecology.

With Alternatives A and D, there is a potential for cumulative impacts to aquatic ecology if the facility is not properly maintained and if hazardous waste and other potential pollutants leach to surface water are not removed from the site or properly stored and maintained.

3.20.5 Air Quality

Under all alternatives for the COF demolition, potential emissions of greenhouse gasses and fugitive dust could occur as a result of the deconstruction activities. Similar emissions could be anticipated from the other projects in the area as a result of construction activities. The

combined projects could cause cumulative minor, temporary impacts to air quality in the area. Such impacts would be mitigated through the use of best management practices such as water suppression for dust control and regular inspections and maintenance of construction vehicles.

3.20.6 Hazardous Materials and Solid and Hazardous Waste

There would be a potential risk for hazardous waste to be discharged/released into the environment under Alternative A, C and D, as potential contaminants would remain in place. These contaminants could build up in the environment potentially affecting soil, surface water and ground water. The release of materials would be expected to be slow and minor in concentration over time.

Under Alternative B there would be a significant reduction in the potential for future contamination of the environment as compared to Alternatives A, C and D. The fugitive dust produced during demolition will not add to cumulative impacts as it is temporary and short-term, and will be mitigated to the extent possible during demolition.

3.20.7 Transportation

Under all alternatives for COF demolition, the increased traffic associated with transport of fill into the site and steel and other deconstructed materials off of the site could result in cumulative transportation impacts in association with other projects in the area. Such impacts would be expected to be concentrated on the COF site and along County Road 20 (Old Lee Highway). Impacts would include multiple construction vehicles moving into and out of the site most of the day throughout the construction period and could result in congestion along US 72 (Lee Highway). Such impacts would be anticipated to be temporary, lasting only for the duration of the projects, and minor.

The Alabama Department of Transportation has 18 projects proposed for the year 2016 through 2021 in Colbert County. The majority of these are resurfacing and widening projects. There are two bridge replacement projects; one on CR-65, over Little Bear Creek, the other is on US 72 over Ashe Street (ADOT 2016). Cumulative indirect impacts are possible due to additional traffic and re-routing of existing traffic around transportation upgrade projects.

3.20.8 Visual Resources

Cumulative impacts caused by Alternative B and other site closure activities could include the eventual redevelopment of the site, providing a different visual experience for recreational river users, motorists, and area residents. Without knowing what development would occur, it is inappropriate to speculate on the extent or manner of visual impacts at this time; however, it would likely present a better, more appealing visual setting than the deteriorating facility that would be visible in Alternatives A, C, and D. These impacts to visual resources in the general area are expected to be temporary and insignificant due to the distances between the projects and the COF and the timing of the concurrent projects.

3.20.9 Safety

Under the Alternatives A and C, ongoing maintenance activities could present opportunity for injury to maintenance and security staff. Trespassing (by foot or by boat) and vandalism are often a concern at a closed facility that might contain salvageable materials. Unauthorized persons at the site could presumably be exposed to potential contaminants or to physical injury. Under Alternatives B and C, safety issues are short-term and the responsibility of the demolition and hazardous materials removal contractors. Demolition and materials removal would result in additional vehicles to the truck traffic produced by other on-going projects on the COF property. This could result in cumulative safety and traffic impacts if the foreseeable projects were to be

implemented at the same time. Impacts would be anticipated to be temporary and minor and would affect primarily the truck drivers and construction personnel. Controls would be needed to ensure truck traffic is coordinated safely.

3.20.10 Socioeconomics and Environmental Justice

Under Alternative A the cumulative impact would include the limited redevelopment potential due to the presence of the existing non-utilized structures. The presence of these structures prevents significant redevelopment of the property for energy production or recreation opportunities and jobs. The cumulative impact under Alternative C is similar to Alternative A due to the retention of the Powerhouse. While TVA's plans for the site in the future are currently undefined, the remaining buildings in these alternatives present a barrier for future use of the site. Beneficial cumulative impacts caused by Alternative B could include redevelopment of the brownfield site, which could add jobs to the local economy or the site could potentially offer additional recreation opportunities to the local community. Cumulative socioeconomic and environmental justice impacts would be anticipated to be minor.

3.21 Unavoidable Adverse Environmental Impacts

The selected alternative would not cause any unavoidable adverse environmental impacts.

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

COF would be retired and deconstructed to a brownfield site. In the long term, the site could become very productive if various industries were to be established, thereby producing employment opportunities and tax revenue.

3.23 Irreversible and Irretrievable Commitments of Resources

As used here, irreversible commitments of resources include the use or consumption of non-renewable resources because of a decision or implementing a proposed action. For example, extracting 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 forestland and timber productivity.

Retiring and deconstructing COF would not result in any irreversible or irretrievable commitments of resources.

CHAPTER 4 - LIST OF PREPARERS

4.1 NEPA Project Management

Ashley Farless, PE, AICP (TVA)
Position: NEPA Specialist
Education: BS, Civil Engineering
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Involvement: Project Management

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Involvement: Project Management, Independent Technical Review

4.2 Other Contributors

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Position: Botanist
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Education:	MS and BS, Wildlife and Fisheries Science
Experience:	6 years sampling and hydrologic determination for streams and wet-weather conveyances; 5 years in environmental reviews
Involvement:	Threatened and Endangered Species, Aquatic Ecology

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Position:	Senior Wetlands Biologist
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Anneliesa Barta (AECOM)

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Education:	MBA, Finance, BS Psychology
Experience:	10 years
Involvement:	Socioeconomics and Environmental Justice

Zoe Knsel (AECOM)

Position:	Scientist
Education:	MS, Marine Science; BA Integrative Biology/Ecology; BA Studio Art
Experience:	20 years
Involvement:	Visual Resources

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Experience:	2 years
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Chad H. Worthington (JSG)

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Involvement:	Aquatic Ecology

CHAPTER 5 - ENVIRONMENTAL ASSESSMENT RECIPIENTS

5.1 Federal Agencies

Natural Resources Conservation Service, Alabama State Conservationist
U.S. Army Corps of Engineers, Nashville District
U.S. Fish and Wildlife Service, Daphne Field Office

5.2 Federally Recognized Tribes

Eastern Band of Cherokee Indians
United Keetowah Band of Cherokee Indians in Oklahoma
Cherokee Nation
Chickasaw Nation
Muscogee (Creek) Nation of Oklahoma
Thlopthlocco Tribal Town
Kialegee Tribal Town
Alabama-Quassarte Tribal Town
Alabama-Coushatta Tribe of Texas
Eastern Shawnee Tribe of Oklahoma
Shawnee Tribe
Absentee Shawnee Tribe of Oklahoma
Seminole Tribe of Florida
Seminole Nation of Oklahoma
Poarch Band of Creek Indians

5.3 State Agencies

Alabama Department of Agriculture and Industries
Alabama Department of Conservation and Natural Resources
Alabama Department of Environmental Management
Alabama Department of Economic and Community Affairs
Alabama Department of Public Health
Alabama Department of Transportation
Alabama Forestry Commission
Alabama Historical Commission
Top of Alabama Regional Council of Governments

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Appendix A – Summary of Environmental Permits and Applicable Regulations

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Alabama is an "authorized" state, meaning that it is authorized by EPA to administer state environmental law in lieu of most federal environmental laws.

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 ADEM Division of Air Pollution Control (APC) in accordance with the requirements of ADEM Admin. Code r. 353-3-14. Modification of the existing Title V Permit must be done in accordance with the requirements of ADEM Admin. Code r. 335-3-16.

Modification of the existing NPDES Permit for COF must be done through the ADEM Division of Water Pollution Control (WPC) in accordance with the requirements of ADEM Admin. Code r. 335-6-6 and the Clean Water Act.

Stormwater runoff from construction sites (or demolition site in this case) is regulated under the NPDES program. Currently, construction projects where 1 acre of land or more would be disturbed require a NPDES Permit. The permit establishes the conditions under which discharge may occur, and establishes monitoring and reporting requirements. Application for coverage under the Alabama General NPDES Permit for Discharge of Stormwater Associated with Construction Activities must be done through the ADEM Division of WPC in accordance with the requirements of ADEM Admin. Code r. 335-6-12 and would require preparation and submittal of a Construction Best Management Practices Plan.

The addition of a stormwater pond would require selection and implementation of standard Erosion Prevention and Sediment Control measures in accordance with the *Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas* (ADEM 2014a).

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.

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Appendix B – Visual Resources

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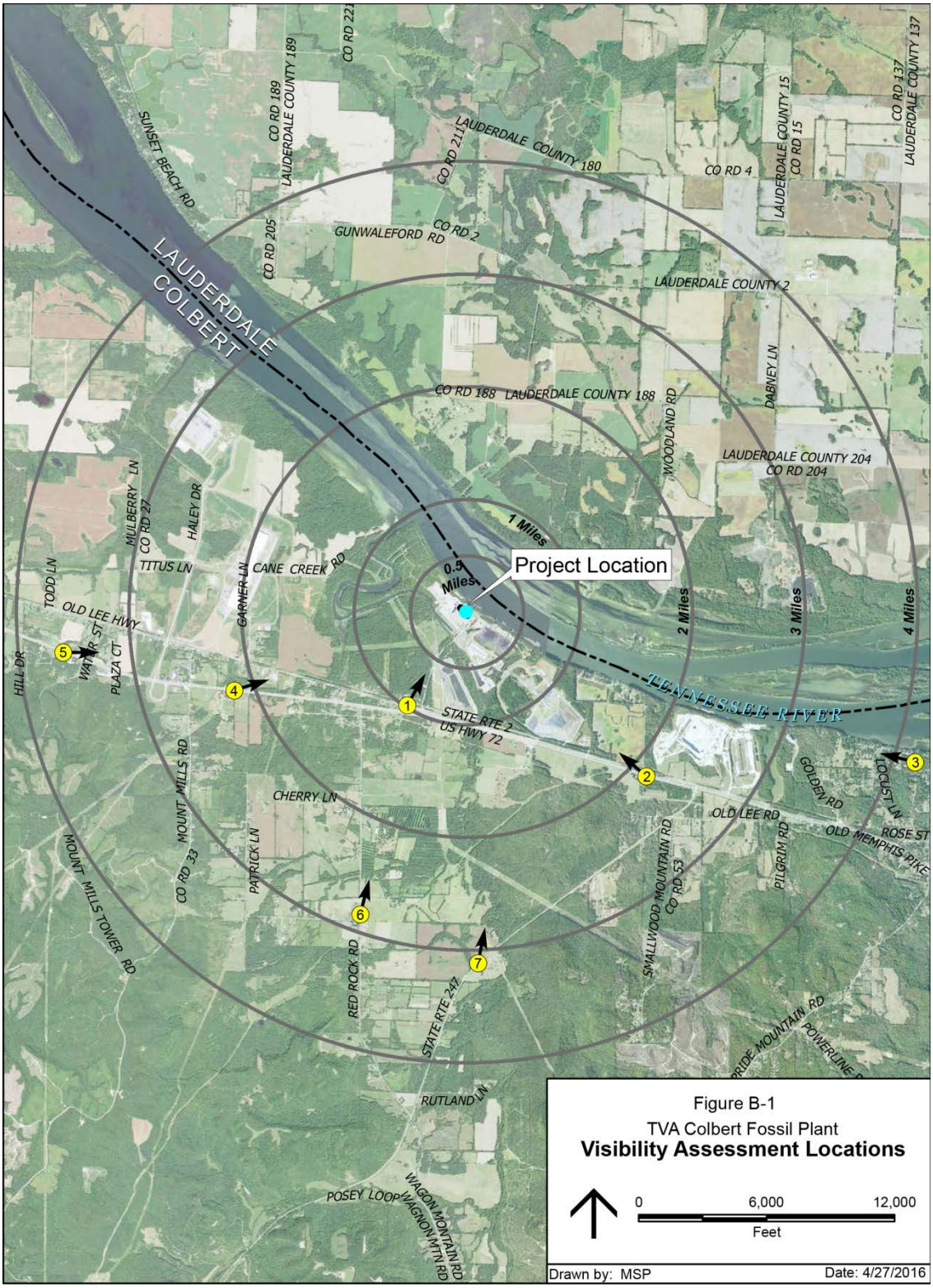
Viewshed Map Methodology

The viewshed map was prepared using 10 foot resolution USGS digital elevation model data. To account for screening from vegetation, a base vegetation layer was created from the USGS 2011 National Land Cover Database. This dataset characterizes land-cover into 16 classes. Those areas classified as deciduous forest, evergreen forest, and mixed forest were assigned an assumed tree height of 45 feet. Areas of woody wetlands were assigned a vegetation height of 15 feet. High intensity developed areas were assigned a height of 25 feet.

The vegetation heights were added to the ground surface elevations in the digital elevation model to produce a digital surface model. Using Esri ArcGIS® software with the Spatial Analyst extension, a visibility analysis was run assuming a viewer height of six feet and heights of 300, 500, and 600 feet for the plant's stacks. The visibility analysis program calculates the visibility by reading every cell in the digital surface model and assigns a value based on whether a stack is visible or not. A value of zero is assigned to those cells which have obstructed views. Once the viewshed analysis was completed, the areas covered by forest vegetation as previously defined were assigned a visibility code of zero. The viewshed map shows the results of this analysis. It is important to note that screening provided by buildings or small forested areas such as yard trees or wind breaks are not included and may provide additional screening.

Representative Area Photo Locations

Using Google Street View ®, GIS aerial photography and elevation data, representative views of the site were identified. Figure B-1 shows the location of these photo locations.



Location 1 is just southwest of Colbert Steam Plant Road on Old Lee Highway and is approximately 1 mile south of the site, looking north-northeast towards the plant. Only the upper portion of the 600 foot stack is visible.

Location 2 is from US 72, 2.2 miles southeast of the site. Here only the upper portion of the 500 and 600 foot stacks are visible.

Location 3 is just over 4 miles east-northeast of the plant on Locust Shores Road. Only the upper portion of the 600 foot stack is visible.

Location 4 is 2.2 miles southwest of the site on US 72/SR 2 where the high voltage transmission line crosses the highway. Here, five of the stacks are visible.

Location 5 is 3.6 miles southwest of the site on US 72/SR 2, east of Plantview Drive. Only the tallest stack is visible.

Location 6 is located 2.8 miles south of the site on Red Rock Road, just north of Patrick Lane. From this location only the upper portion of the 600 foot stack is visible to the right of the utility pole in the photo.

Location 7 is 3.1 miles south of the project on SR 247. Here only the upper portions of the two tallest stacks are visible behind the greenhouses in the photo. The taller structure near the center of the photo is a cell tower.

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Appendix C – Cultural Resources Coordination

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STATE OF ALABAMA
ALABAMA HISTORICAL COMMISSION
468 SOUTH PERRY STREET
MONTGOMERY, ALABAMA 36130-0900

March 11, 2016

LISA D. JONES
ACTING EXECUTIVE DIRECTOR
STATE HISTORIC PRESERVATION OFFICER

TEL: 334-242-3184
FAX: 334-240-3477

Clinton E. Jones
Manager, Biological and Cultural Compliance
Safety, River Management and Environment
WT11C-K
TVA
400 West Summit Hill Drive
Knoxville, Tennessee 37902

Re: AHC 2016-0450
Architectural Assessment of Colbert Fossil Plant
Colbert County

Dear Ms. Tubbs:

Upon review of the architectural assessment conducted for the above referenced project, we have determined that we agree with the author's findings. Colbert Fossil Plant is not eligible for listing on the National Register of Historic Places. Therefore, we concur with the proposed project activities.

We appreciate your commitment to helping us preserve Alabama's historic archaeological and architectural resources. Should you have any questions, please contact Lee Anne Wofford at 334.230.2659 or LeeAnne.Wofford@preserveala.org. Have the AHC tracking number referenced above available and include it with any future correspondence.

Sincerely,

Lee Anne Wofford

Lee Anne Wofford
Deputy State Historic Preservation Officer

LAW/LAW/amh