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**PARADISE AND COLBERT
COMBUSTION TURBINE PLANTS
FINAL ENVIRONMENTAL ASSESSMENT**
Colbert, Lauderdale, and Morgan Counties, Alabama; Hardin, Lawrence,
Montgomery, Sumner, Wayne, and Wilson Counties, Tennessee; and
Muhlenberg and Todd Counties, Kentucky

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Symbols, Acronyms, and Abbreviations

AADT	Annual Average Daily Traffic
ACE	Affordable Clean Energy
ADCNR	Alabama Department of Conservation and Natural Resources
ADEM	Alabama Department of Environmental Management
APE	Area of Potential Effect
ARAP	Aquatic Resources Alteration Permit
BACT	Best Achievable Control Technology
BMP	Best Management Practice
CAA	Clean Air Act
CBMPP	Construction Best Management Practices Plan
CC	Combined Cycle
CCR	Coal Combustion Residuals
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO₂	Carbon Dioxide
CPP	Clean Power Plan
CR	County Road
CT	Combustion Turbine
CWA	Clean Water Act
dB	Decibel(s)
dBA	A-weighted decibel
DLN	Dry Low-NO _x
EA	Environmental Assessment
EGU	Electrical Generating Units
EIS	Environmental Impact Statement
EMF	Electric and Magnetic Fields
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
ESA	Endangered Species Act
gpm	Gallons per Minute
GSA	Geologic Survey of Alabama
HAP	Hazardous Air Pollutant
HDD	Horizontal Directional Drilling
HUC	Hydrologic Unit Code
HUD	U.S. Department of Housing and Urban Development
IMP	Integrity Management Program
IPaC	Information for Planning and Consultation
IRP	Integrated Resource Plan
KAR	Kentucky Administrative Regulations
KDAQ	Kentucky Division of Air Quality
KDEP	Kentucky Department for Environmental Protection
KDFWR	Kentucky Department of Fish and Wildlife Resources
KHC	Kentucky Heritage Council
KPDES	Kentucky Pollutant Discharge Elimination System
KSNPC	Kentucky State Nature Preserves Commission
kV	Kilovolt
Ldn	Day-Night Sound Level
MMBTU	Million British Thermal Units
msl	Mean Sea Level
MW	Megawatt
NAAQS	National Ambient Air Quality Standards

NAVD	North American Vertical Datum
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NMSZ	New Madrid Seismic Zone
NO_x	Nitrogen Oxides
NO₂	Nitrogen Dioxide
NPDES	National Pollution Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
NSPS	New Source Performance Standards
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyls
Pb	Lead
PM	Particulate Matter
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
RM	River Mile
ROW	Right-of-Way
SCC	Social Cost of Carbon
SHPO	State Historic Preservation Officer
SO_x	Sulfur Oxides
SO₂	Sulfur Dioxide
SR	State Road
SWPPP	Stormwater Pollution Prevention Plan
TCA	Tennessee Code Annotated
TDEC	Tennessee Department of Environment and Conservation
TL	Transmission Line
TPY	Tons per Year
TSS	Total Suspended Solids
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGCRP	U.S. Global Change Research Program
USGS	U.S. Geological Survey
WKP	Western Kentucky Parkway
WMA	Wildlife Management Area
WOUS	Waters of the United States
WWC	Wet Weather Conveyance

CHAPTER 1 – PURPOSE AND NEED FOR ACTION

1.1 Introduction

The Tennessee Valley Authority (TVA)'s generating assets include 21 natural gas-fueled combined cycle (CC) units at eight sites and 87 natural gas-fueled simple-cycle combustion turbine (CT) units at nine sites (TVA 2019b). Eighty of the CT units are capable of using fuel oil and 60 are capable of quick start-up.

CT units are designed to meet peaks in power demand very quickly. CTs operate much like a jet engine. The compressor draws air into the unit, compressing it, mixing it with fuel, and igniting it. As combustion occurs, gas expands through turbine blades connected to a generator to produce electricity. CC technology systems initially operate the same as traditional CT units, but they also capture exhaust heat from the gas turbines and convert it to steam that is used to drive steam turbines to produce additional power (TVA 2020a).

Natural Gas-Fired Frame Combustion Turbines:

Natural-gas frame CT units are known as peaking units. They are expected to operate infrequently during short-duration, high demand periods.

Peaking units are essential for maintaining system reliability requirements, as they can start up quickly to meet sudden changes in either demand or supply.

Future CT needs are driven by demand for electricity, renewable energy development, and evolution of other peaking technologies.

Source: TVA 2019a

TVA completed its most recent Integrated Resource Plan (IRP) in 2019. The purpose of the IRP was to provide TVA with direction on how to best meet future electricity demand. The IRP process evaluated TVA's current energy resource portfolio and alternative future portfolios of energy resource options to meet future electrical energy needs of the TVA region while taking into account TVA's mission of serving the Tennessee Valley through energy, environmental stewardship, and economic development. As part of the IRP, TVA identified the gas fleet, including CTs, as playing a critical role in providing the flexibility needed to integrate renewable energy generation and promote distributed energy resources (TVA 2019a). TVA expects to add about 10,000 MW of solar by 2035, with 2,300 MW already committed. Peaking units such as CTs are valuable in meeting electricity demand for shorter periods of high demand on summer and winter peak days, and their flexibility also plays a key role in successfully integrating renewable resources, which have variable and unpredictable generation patterns.

1.2 Purpose and Need

In Fiscal Year 2019, TVA completed a CT Modernization Study to evaluate the condition of TVA's current CT units and form recommendations for investments to ensure a reliable peaking fleet into the future. The study characterized TVA's existing frame CT fleet as one of three categories based on age and material condition:

- Reliable CT units, which have received some recent investment, are around 20 years old and expected to remain reliable at current funding levels.
- Challenged CT units, which have received some recent investment, are 40 or more years old and require refurbishment or replacement to ensure reliability.

- Most Challenged CT units, which have received little recent investment, are 40 or more years old and require refurbishment or replacement to ensure reliability.

Economic analysis of the Challenged group indicates that refurbishment is the prudent course of action. Based on age and material condition, units in the Most Challenged group would require significantly more investment in order to ensure an adequate level of reliability. Engineering and economic analysis indicates that the cost required to ensure performance of units within this category is greater than 50 percent of the cost of replacing with new peaking capacity. As such, it is prudent to replace these units with more efficient frame CT technology available today.

CT Units 1-20 located on TVA's Allen Reservation in Memphis, Tennessee, and CT Units 1-16 located on TVA's Johnsonville Reservation in New Johnsonville, Tennessee (total of 1,400 megawatt [MW] capacity) were determined to be in the Most Challenged group and recommended for retirement and replacement. However, TVA is considering retaining a few CT units at Allen for the foreseeable future for the purpose of supporting emergency regional start needs. To maintain adequate reserves, the replacement peaking units would need to be in commercial operation prior to the retirement of the older CTs at Allen and Johnsonville. To provide the required capacity resulting from replacement of these CT units, TVA is proposing the addition of 1,500 MW of replacement frame CTs to be split between TVA's Paradise and Colbert sites for commercial operation no later than December 31, 2023. This replacement aligns with the 2019 IRP near-term actions to evaluate engineering end-of-life dates for aging generation units to inform long-term planning and to enhance system flexibility to integrate renewables and distributed resources. TVA is preparing an Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA) to evaluate the environmental impacts from construction and operation of these replacement frame CTs.

Therefore, the purpose of the proposed action is to replace the existing capacity from the retirement of 1,400 MW of frame CTs at the Allen and Johnsonville sites with the addition of 1,500 MW of CT capacity to be split between TVA's Paradise and Colbert sites for commercial operation no later than December 31, 2023. The impacts associated with the retirement and decommissioning of Allen and Johnsonville CTs were analyzed in the 2019 IRP and are incorporated by reference into the current EA. Based on the 2019 IRP analysis, impacts associated with the retirement and decommissioning of the Allen and Johnsonville CTs were determined to be minor and include the loss of 8 jobs at Allen and 28 jobs at Johnsonville. TVA would help offset this employment loss by placing some interested employees in available positions across the TVA service area. In addition to employment impacts, during the decade following the CT retirements, i.e., 2021–2030, annual average system-wide emissions of CO₂ would decrease by 0.6 percent.

Long-term actions related to the potential demolition of the CT units at Allen and Johnsonville are outside the scope of this EA and will be addressed by TVA at a future date, when TVA has a tangible proposal for the demolition or future disposition of those units.

1.3 Decision to be Made

This EA has been prepared to inform TVA decision makers and the public about the environmental consequences of the proposed action. The decision TVA must make is whether or not to construct and operate CT plants at the Paradise and Colbert reservations to replace the capacity lost as a result of retiring the CTs at Allen and Johnsonville, and to implement needed upgrades to the natural gas pipelines and transmission lines (TL) that

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

1.4 Related Environmental Reviews

TVA's 2019 IRP provides direction for how TVA will meet the long-term energy needs of the Tennessee Valley region while fulfilling its mission of serving the Valley by providing low-cost reliable power, environmental stewardship, and economic development (TVA 2019a). TVA also released an accompanying EIS with the 2019 IRP that assesses the natural, cultural, and socioeconomic impacts associated with the implementation of the IRP (TVA 2019b). The proposed actions evaluated in this EA support TVA's preferred alternative, Target Power Supply Mix, as described in the IRP and accompanying EIS.

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

- *Potential Paradise Fossil Plant Retirement EA (TVA 2019c)*
- *Paradise Coal Combustion Residuals (CCR) Management and Process Water Basins Supplemental EA (TVA 2018)*
- *Paradise CCR Management Operations EA (TVA 2017a).*
- *Colbert Fossil Plant Decontamination and Deconstruction EA (TVA 2016a)*
- *Ash Impoundment Closure EIS, Part II – Site Specific NEPA Review: Colbert Fossil Plant (TVA 2016c)*
- *Paradise Fossil Plant Units 1 and 2 Mercury and Air Toxics Standards Compliance Project, Muhlenberg County, Kentucky (TVA 2013).*

1.5 Scope of the Environmental Assessment and Summary of the Proposed Action

This EA evaluates the potential environmental, cultural, and socioeconomic impacts of the proposed construction and operation of CT plants at the Paradise and Colbert reservations. The impacts associated with the retirement and decommissioning of Allen and Johnsonville CTs were analyzed in the 2019 IRP and are incorporated by reference into the current EA. Long-term actions related to the potential demolition of the units are outside the scope of this EA and will be addressed by TVA in the future, when TVA has a tangible proposal for the demolition or future disposition of those units.

TVA's proposed action would result in the need for upgrades to the existing natural gas supply as well as actions necessary to connect the CT plants to TVA's existing transmission system, including TL network upgrades. Preliminary project scoping identified approximately 10 TLs, two for Paradise and eight for Colbert, which would require network upgrades. TVA separated these TL upgrades into two categories: TL upgrades that must be complete prior to the new CT plants in-service date on TVA's system and other impacting projects (two TLs for Paradise and four TLs for Colbert), and TL upgrades that may be completed, as and if necessary, after the CT plants are in service (four TLs for Colbert). TVA has scopes for the TL upgrades identified in the first category. However, details regarding the four TL network upgrades in the second category are still being reviewed for

feasibility. Additional supplemental environmental analysis will be completed for this second category at a later time, as appropriate and necessary based on the results of the feasibility review. The scope of this EA, therefore, focuses on the impacts related to construction and operation of CT plants at Paradise and Colbert, the natural gas supply upgrades, and the six TL upgrades that must be completed prior to the new CT plants in-service date. A detailed description of the proposed action and alternatives considered are provided in Chapter 2.

TVA has performed a preliminary analysis and determined that the following resources will not be affected by the proposed action and are eliminated from further review in this EA.

- Prime Farmland – There are no prime farmland soils mapped within the proposed temporary and permanent use areas of the Paradise Reservation. Small areas of the Colbert Reservation are designated Prime Farmland. However, the project site is on land currently in industrial development and has been for over 50 years. Proposed offsite natural gas and TL upgrades would occur on previously developed sites or right-of-way (ROW) and would not require the conversion of prime farmland. Therefore, there would be no impacts to prime farmland soils and this resource is not evaluated any further in this EA. Accordingly, completion of Form AD 1006 and consultation on prime farmlands is not required (Farmland Protection Policy Act, 7 United States Code [USC] 4201).
- Land Use – Proposed activities would occur on previously disturbed land located within the plant boundaries or existing natural gas pipeline and transmission ROW. Therefore, no changes in land use are anticipated to occur with this project and this resource is not evaluated in this EA.

This EA was prepared consistent with Council on Environmental Quality (CEQ) regulations for implementing NEPA at 40 CFR 1500-1508 issued in 1978 (43 FR 55990, November 29, 1978), with minor revisions in 1979 and 1986, as well as TVA regulations at 18 CFR 1318 issued in 2020 (85 FR 17434, Mar. 27, 2020). Because TVA began this EA before CEQ's revised NEPA regulations (85 FR 43304-43376, July 16, 2020) became effective on September 14, 2020, TVA applied the previously promulgated 1978 CEQ regulations and TVA's 2020 NEPA regulations in the preparation of this EA (see 40 CFR 1506.13). TVA considered the possible environmental effects of the proposed action and determined that potential effects to the environmental resources listed below were relevant to the decision to be made and assessed the potential impacts on these resources in detail in this EA:

- | | | |
|---------------------------------------|-------------------------------------|--------------------------------------------|
| • Air Quality | • Aquatic Ecology | • Natural Areas, Parks and Recreation |
| • Climate Change and Greenhouse Gases | • Vegetation | • Noise |
| • Geology and Soils | • Wildlife | • Solid and Hazardous Waste |
| • Groundwater | • Threatened and Endangered Species | • Socioeconomics and Environmental Justice |
| • Surface Water | • Visual Resources | • Public Health and Safety |
| • Floodplains | • Cultural and Historic Resources | |
| • Wetlands | • Transportation | |

TVA's action would satisfy the requirements of Executive Order (EO) 11988 (Floodplain Management), EO 11990 (Protection of Wetlands), EO 12898 (Environmental Justice), EO 13751 (Invasive Species); and applicable laws including the National Historic

Preservation Act (NHPA), Endangered Species Act (ESA), Clean Water Act (CWA), and Clean Air Act (CAA).

1.6 Public and Agency Involvement

The Draft EA was released for a 30-day public comment period on February 1, 2021 and was posted on TVA's website (<http://tva.com/nepa>). The public review period was later extended 10 days until March 13, 2021 in response to a request from several organizations. To solicit public input, the availability of the Draft EA was announced in newspapers that served both the Paradise and Colbert CT plant project areas and areas where associated offsite transmission line upgrades would occur. A news release was issued to the media. TVA's inter-agency involvement includes circulation of the Draft EA to local, state, and federal agencies and federally recognized tribes as part of the review. Chapter 5 provides a list of agencies, tribes, and organizations notified of the availability of the Draft EA.

In addition, the commercial natural gas provider at Paradise reached out to state and local officials as a part of their outreach effort, engaged with Kentucky Department for Environmental Protection (KDEP) and U.S. Environmental Protection Agency (EPA) regarding their air permit, and filed an application for Federal Energy Regulatory Commission review. The commercial natural gas provider at Colbert has communicated with affected property owners.

TVA accepted comments submitted through mail and email. TVA received comments from EPA, KDEP, Tennessee Department of Environment and Conservation (TDEC), Sierra Club, and eight members of the public. Comments from Sierra Club included 441 signatures, 177 of which are accompanied by additional personal messages. One comment letter was submitted from Southern Environmental Law Center in conjunction with Appalachian Voices, Energy Alabama, GASP, Shoals Environmental Alliance, Sierra Club, and Southern Alliance for Clean Energy and included twenty-three attachments. The most frequently mentioned topics related to climate impacts, environmental justice, analysis of alternatives and cumulative impacts.

In response to comments received by TVA from the public, agencies and other interested parties, TVA has revised text within the Final EA and has included a response to comments in Appendix A.

1.7 Necessary Permits or Licenses

TVA will obtain all necessary permits, licenses, and approvals required for the alternative selected. TVA anticipates the following permits or approvals would likely be required for implementing the proposed alternative.

- Storm Water Best Management Practices (BMPs) and Kentucky Pollutant Discharge Elimination System (KPDES), TDEC, and Alabama Department of Environmental Management (ADEM) permit application and/or modification for all stormwater discharges associated with construction activity that disturb more than one acre of land.
- Modification of the existing KPDES and ADEM Permits at Paradise and Colbert for discharges from the proposed CT plants.
- Actions involving wetlands and/or stream crossings would be subject to federal CWA Section 404 permit requirements as well as state Section 401 water quality certification from KPDES, TDEC, and ADEM.
- Modification to Paradise's and Colbert's existing CAA Title V Operating Permits performed via Prevention of Significant Deterioration (PSD) review under the Clean Air Act.

CHAPTER 2 – ALTERNATIVES

2.1 Description of Alternatives

During initial project planning, TVA considered a range of alternatives and specific screening criteria to provide for the reliable replacement of peaking generation as a result of retiring the CTs at Allen and Johnsonville. These criteria are described in the following sections.

2.2 Alternative Development

2.2.1 Generation Type

TVA considered various gas asset types for replacement of generation lost as a result of retiring the Allen and Johnsonville CTs. Since the replacement generation must be capable of meeting peak demand at short notice, gas-fired frame CTs were selected as the preferred generation type. The relatively low cost of gas-fired frame CTs per installed MW further reinforced the basis for their selection to replace the lost generation at Allen and Johnsonville.

At this time, renewable energy replacements and storage cannot provide this magnitude of reliable and cost-effective energy year-round. While solar prices are becoming competitive, solar does not contribute to the winter peak, which is typically just before sunrise. Therefore, solar requires peaking gas generation to support the winter peak. Wind resources do contribute to both summer and winter peak capacity (less than one third of nameplate or maximum rated output), but they are typically more expensive due to low regional wind speeds or high transmission costs. TVA recognizes the value that both short- and long-duration storage technologies will play in the future and is working to gain operational experience with battery storage technology.

2.2.2 Generation Location

Candidate sites for the location of new frame CTs were identified based on a desktop review of land parcels located near existing transmission access and near existing natural gas supply. Initial site screening resulted in 12 potential locations for new frame CTs. These 12 sites were then further evaluated using the following criteria summarized in Table 2-1.

Table 2-1. Summary of Criteria Evaluated to Determine the Location of the Frame CTs

<p><u>Transmission</u></p> <ul style="list-style-type: none"> • System upgrades needed • Locational value 	<p><u>Site Considerations</u></p> <ul style="list-style-type: none"> • TVA owned vs Non-TVA owned sites • Site availability (available for purchase) • Land cost • Access to Water 	<p><u>Operational Considerations</u></p> <ul style="list-style-type: none"> • Supply chain considerations • Staffing
<p><u>Fuel Supply</u></p> <ul style="list-style-type: none"> • Cost • Availability • Reliability • Operational considerations 	<p><u>Environmental Considerations</u></p> <ul style="list-style-type: none"> • Environmental Regulations • Sensitive environmental/cultural resources present 	<p><u>Financial and Planning Considerations</u></p> <ul style="list-style-type: none"> • Long Range Financial Plan • Integrated Resource Plan

Based on evaluation of the screening criteria, TVA proposes to construct new frame CTs at the Paradise Reservation and at the Colbert Reservation. These locations offered several advantages to alternative locations:

- The construction footprint for the new units could be located on previously disturbed land within existing TVA property as opposed to purchasing or utilizing greenfield property.
- The Paradise Reservation currently includes a CC plant. As such, the site has existing natural gas pipeline infrastructure that supports the CC plant that could also be utilized for the CT site.
- The Colbert Reservation includes existing natural gas infrastructure to support the existing CT plant that could also be utilized for the additional proposed CT units.
- Both brownfield locations have favorable air permitting prospects for new units and offer access to transmission infrastructure that serves remaining generating capacity as well as having the ability to serve additional capacity following the retirement of the coal plants.
- Throughout the operational history of both sites, extensive environmental reviews have been conducted which provided a level of confidence, for initial screening purposes, that there is a low potential for impacting sensitive environmental resources.

2.3 Location and Description

2.3.1 Paradise Reservation

TVA's Paradise Reservation is situated on 3,400 acres on the west bank of the Green River, east of the city of Drakesboro in Muhlenberg County, Kentucky. The 1,100-MW Paradise CC plant, completed in April 2017, was designed to replace Units 1 and 2 of the

coal-fired Paradise Fossil Plant. TVA has since retired the remaining Unit 3 of the coal-fired Paradise Plant and is currently considering options for the disposition of the retired coal plant.

2.3.2 Colbert Reservation

TVA's Colbert Reservation is situated on 1,354 acres on the south shore of Pickwick Landing Reservoir, west of the city of Tuscumbia in Colbert County, Alabama. There are eight existing frame CT units at the Colbert CT plant. The retired coal-fired plant on the reservation is currently being demolished.

2.4 Description of Alternatives

2.4.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not retire CT Units 1-20 at Allen or CT Units 1-16 at Johnsonville. These units would continue to operate as part of the TVA generation portfolio. In order for the existing units to remain operational, additional repairs and maintenance would be necessary in the future to maintain reliability. Any repairs proposed to the existing CTs would be evaluated under a separate NEPA review as needed.

2.4.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

Under Alternative B, TVA would retire CT Units 1-20 at Allen and CT Units 1-16 at Johnsonville. However, TVA would retain a few Allen CT units (about 80 MW) for emergency regional black start purposes until a suitable alternative is in place. Although the specific units to be retained have not been identified, they would only be used for emergency purposes and would not be considered part of TVA's normal operational system. In order to replace the capacity lost as a result of retiring the Allen and Johnsonville CTs, TVA would construct and operate three new natural gas-fueled frame CT units (750 MW total) at Paradise and three natural gas-fueled frame CT units (750 MW total) at Colbert for a system total of 1,500 MW. Actions associated with implementation of this alternative are described below.

2.4.2.1 Actions Associated with Construction of the Frame CT Units at the Paradise Reservation

2.4.2.1.1 Construction of Frame CT Units and TL Upgrades on the Paradise Reservation

TVA would construct three new natural gas-fueled frame CTs on heavily disturbed lands located within the boundaries of the Paradise Reservation as shown in the conceptual layout in Figure 2-1. The overall Paradise CT plant project area consists of 1,089 acres of land that includes a portion of land outside of the reservation where TL upgrades required for the project would occur. The proposed CT plant would include three gas-fired frame CT generators with inlet evaporative cooling and three natural gas-fired dew-point gas heaters. Subsurface piles would be installed to support foundations for plant components, as required. In addition to these major equipment systems, the proposed CT facilities would include plant equipment and systems, such as natural gas metering and handling systems; instrumentation and control systems; transformers; and administration and warehouse/maintenance buildings. At full buildout, the CT plant would occupy approximately 4.4 acres of the 1,089-acre Paradise CT plant project area.

TVA would also construct and operate a 500-kilovolt (kV) switchyard, which would be situated on approximately 21 acres located southeast of the CT plant within the project

area. The existing 500-kV TL would be re-configured to re-terminate at the proposed switchyard. Re-configuration would require re-routing/extending approximately 2.4 miles of the existing 500-kV TL. The re-route would start at an existing structure in the southeast portion of the CT plant project area, veer to the south around the existing fossil-plant cooling towers before turning northwest extending to the proposed 500-kV switchyard. The route of the new TL is shown on Figure 2-1. In addition to the re-route, three (3) short 500-kV “feeder” TLs, with lengths less than 0.2-mile, would be required to connect the new CT plant to the new switchyard. New 500-kV TL facilities would be supported by lattice steel towers constructed on concrete or laced steel foundations. Foundation backfill would consist of excavation spoil and crushed stone. Heights of the new TL structures would vary, depending on the terrain and existing obstacles on the reservation. All unit substation transformers would be oil-filled; therefore, concrete foundations and an oil containment system would be included. Other actions needed to support the CT plant at Paradise include re-terminating TLs and upgrading communications infrastructure within the plant boundary, which will require the installation of new tubular steel pole structures. New pole structures would typically utilize direct-buried foundations with supporting guy anchors, although some concrete foundations could become necessary.

TVA has identified four areas (totaling approximately 47 acres) within the Paradise project area that would be used for vehicle and equipment parking, materials storage, laydown, and construction administration during construction of the CT plant. In addition, two temporary use areas (9.4 acres) would be designated for light uses such as trailer placement or light vehicle parking during construction. The laydown and temporary use areas are all located on previously disturbed areas and, when construction is complete, they would be allowed to revert to their original use.

Given site specific conditions at Paradise, borrow material would be needed to support construction of the switchyard. Borrow material would be obtained from an approximately 34-acre site located on the reservation (Figure 2-1). TVA has analyzed the material available to determine the presence of materials suitable for borrow in this previously disturbed area. During excavation, visual inspection in the field would be undertaken to confirm the excavated material is suitable for use as fill. After all needed suitable borrow material has been removed, the area will be graded to promote positive drainage and would be reseeded with an appropriate native seed mixture.

The CT plant would be fueled by a reliable supply of natural gas. Preliminary estimates indicate an upper bound of 165 million standard cubic feet per day of natural gas would be needed to fuel three frame CT units, running at maximum capacity. Similarly, the three gas heaters, which are required to raise the supplied natural gas above its dew point, would burn as much as 240,000 standard cubic feet of natural gas per day if running at the same maximum capacity. This demand would require construction and operation of a new natural gas compressor at an existing compressor station (see Section 2.4.2.1.2), piping to connect the CTs to the existing natural gas pipeline and metering station, and the expansion of the existing metering station into the disturbed area to the east of the existing station (Figure 2-1). The new, approximately 1,600-foot-long pipeline would be constructed in a trench of sufficient depth to bury the pipeline at 10 to 12 feet below grade. After the pipeline construction is completed, the trench would be backfilled with the stockpiled material and revegetated. This pipeline would be constructed and operated by TVA.

The CT plant would require up to 100 gallons per minute (gpm) of water for inlet air evaporative cooling in summer ambient temperatures. CT compressor washing requires

demineralized water. The Paradise CC plant already has adequate capacity for demineralized water production that would be used for the CTs. Wash effluent would be collected in tanks and, after analysis, disposed of at an approved wastewater treatment facility offsite. Potable water for domestic use and safety showers would be obtained from the existing public supply.

Operating the CT plant would also require air emissions monitoring. Reduction of nitrogen oxide (NO_x) emissions from the CTs would be achieved through dry low-NO_x (DLN) combustion systems. Exhaust stacks would be equipped with continuous emissions monitoring systems. Emissions from the units would adhere to the requirements of Kentucky Division of Air Quality (KDAQ) and federal regulations.

Project materials and equipment would be primarily delivered to the project site by truck and placed in designated project laydown areas until used (See Figure 2-1). Some major equipment would be transported by rail. Modifications to the existing rail system within the Paradise CT project area may be required. These modifications would be minor and are expected to occur within the limits of the 30.8-acre laydown area shown on Figure 2-1. Roads within the Paradise CT plant project area would be maintained during the construction process.

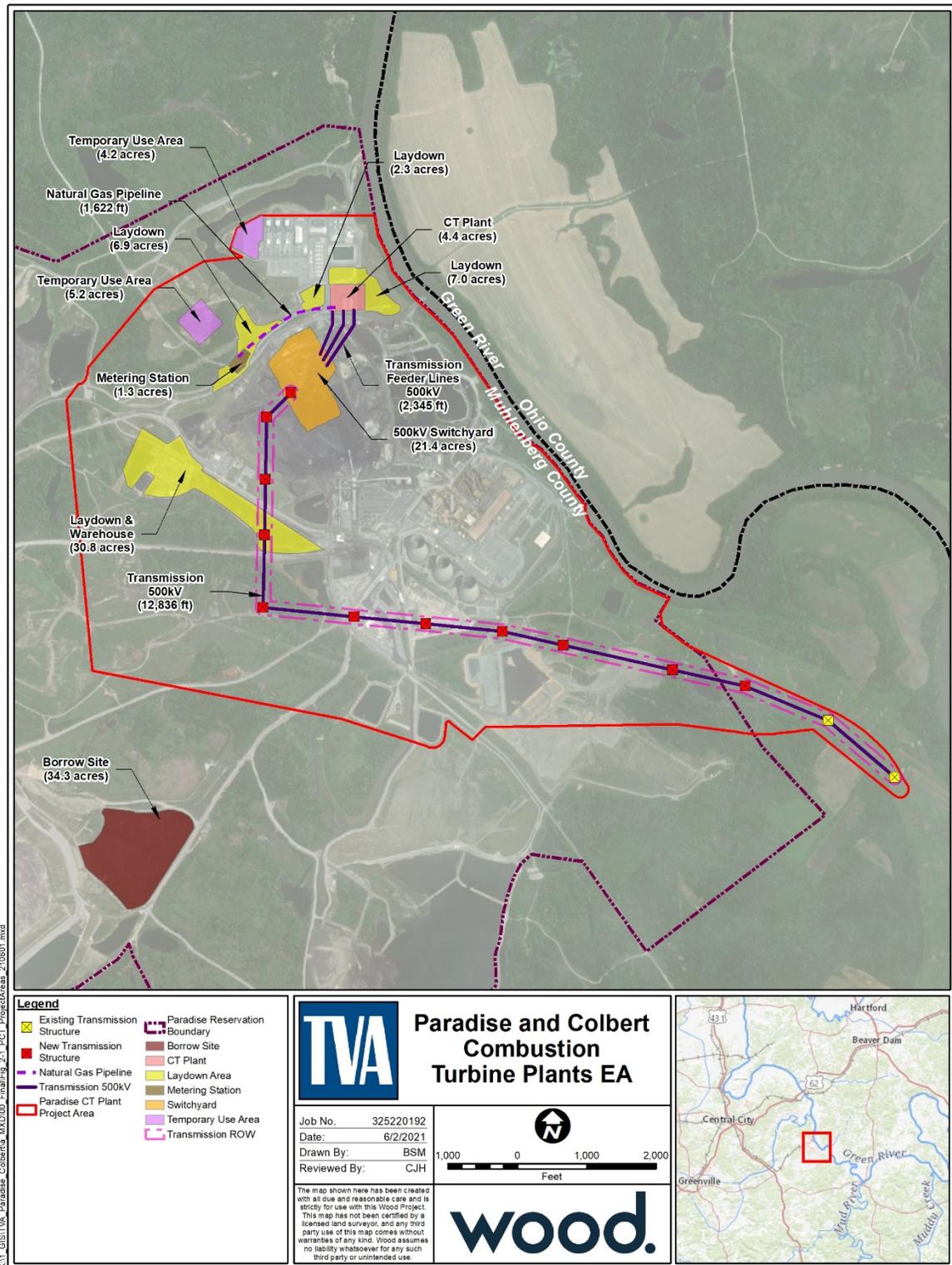


Figure 2-1. Paradise CT Plant Project Area

2.4.2.1.2 Offsite Construction of a Natural Gas Compressor

In order to provide the additional natural gas supply to the CTs at Paradise, a new natural gas-fired reciprocating internal combustion engine driving a reciprocating natural gas compressor, would be constructed at an existing compressor station located approximately 18 miles west of the Paradise CT project area in Muhlenberg County, Kentucky (Figure 2-2). The project would include new piping to tie the compressor into the existing pipeline system to serve the proposed CTs at Paradise. The compressor and pipelines would be constructed and operated by a commercial supplier. All project activities would be located within the existing compressor station property boundary and all project facilities would be located within the entirety of the existing graveled and paved area at the site. The combustion engine unit would be installed within the existing compressor building.

2.4.2.1.3 Offsite Upgrades to Existing TLs

The operation of the proposed CT plant at Paradise would require replacing pull-off jumpers and stingers at an existing substation, various upgrades to approximately 12.6 miles of TL (TL 5823) located in Sumner and Wilson Counties, and fiber optic ground wire installation on an approximately 52-mile TL (TL 6057) that extends south of the reservation (Figure 2-2) as described below.

TL 5823 – Approximately 12.6 miles of the approximately 21.5-mile 161-kV TL would be up-rated. Modifications would include adding a tower extension at a TL structure, sliding a conductor to raise the conductor height, cutting/re-splicing an existing conductor in two spans to raise conductor height, and replacing up to two existing TL structures.

TL 6057 – TVA proposes to replace the existing overhead ground wire with new fiber optic ground wire on the approximately 52.1 miles of the 500-kV TL. A helicopter would be used to assist in installation and modifications to several existing TL structures would be required to support the new fiber optic ground wire.

Upgrades are typically performed to increase the electrical capacity of the existing TL and would include the following:

- *Moving Features that Interfere with Clearance.* As more electricity is transmitted through the TL, the conductor (the cable that carries the current) temperature rises and the TL may sag. Features such as sheds or storage buildings located within the ROW may interfere with the ability to operate the TL safely and would be moved.
- *Replacement or Modification of Existing TL Structures or Installation of Intermediate TL Structure.* Typical TL structure replacement, extensions or installation of intermediate TL structures is performed with standard TL equipment such as bulldozers, bucket trucks, boom trucks, and forklifts. The result of this work is that the existing conductor is raised to provide the proper ground clearance. Disturbance is usually limited to an approximately 100-foot circumference around the work structure.
- *Conductor Modification.* Conductor modifications include conductor slides, cuts, or floating dead-ends to increase ground clearance. A cut involves removing a small amount of conductor and splicing the ends back together. A slide involves relocating the conductor clamp on the adjacent structure a certain distance toward the area of concern (i.e., “sliding” the clamp). No conductor is removed. A floating dead-end

shortens the suspension insulator string of a structure to gain elevation at the attachment point of the conductor, increasing a span's clearance. These improvements require the use of a bucket truck; disturbance is minimal and confined to the immediate area of the clearance issue.

- *Conductor Replacement:* If the existing conductor size cannot support the TL's electrical load, the conductor must be replaced. Bucket trucks or other light-duty equipment are utilized for access and stringing equipment. Reels of conductor would be delivered to various staging areas along the ROW, and temporary clearance poles would be installed at road crossings to reduce interference with traffic. The new conductor would be connected to the old conductor and pulled down the TL through pulleys suspended from the insulators. A bulldozer and specialized tensioning equipment would be used to pull conductors to the proper tension. Crews would then clamp the wires to the insulators and remove the pulleys. Wire pulls vary in length but are limited to a maximum of five-mile pulls. Pull point locations depend on the type of structures supporting the conductor as well as the length of conductor being installed and are typically located along the most accessible path on the ROW (adjacent to road crossings or existing access roads). The area of disturbance at each pull point typically ranges from 200 to 300 feet along the ROW.
- *Adding Surcharge.* Adding rock or dirt (surcharge) to structure footing is sometimes required when height and/or loading modifications are made to a structure. These changes can create uplift on the existing tower footings or grillage, therefore requiring a stone base settlement to be placed around the existing footings. The additional burden prevents the tower from rising under certain conditions (i.e., weather conditions or conductor loading). Typical installation of surcharge is performed with tracked equipment with minimal ground disturbance. The stone is piled around the footings as required and the depth varies depending on the uplift on the affected structures.
- *Modification of Local Power Company Distribution Lines.* Local utilities' distribution lines can intersect TVA TLs. If the local utility crossing does not have adequate clearance, TVA requests that the local utility lower or re-route the crossing.
- *Fiber Optic Ground Wire Installation.* New fiber optic line can be installed with the help of a helicopter. Designated pull points along the TL corridor are used to set up cable reels of optic ground wire for installation. Pull point locations are typically located along the most accessible path on the ROW (adjacent to road crossings or existing access roads). Modifications to the existing TL are typically required along the length of the TL. Existing access roads would be used for the pull point locations.

Development of new permanent access roads to support upgrades to the existing TLs is not anticipated. However, depending on access needs, existing access roads may require modifications such as brush clearing or tree trimming to allow for passage of equipment and bucket trucks. Tree removal is not anticipated and if required would be a negligible amount. Modifications would generally be limited to the existing 20-foot-wide access road area, and, if needed, tree trimming to allow a vertical clearance of up to 12 feet. Minimal ground disturbance is expected in these areas, but, if the ground is disturbed, the access road area would be revegetated using native, low-growing plant species after required TL upgrade work is completed. Areas such as pasture, agricultural fields, or lawns would be returned to their former condition.

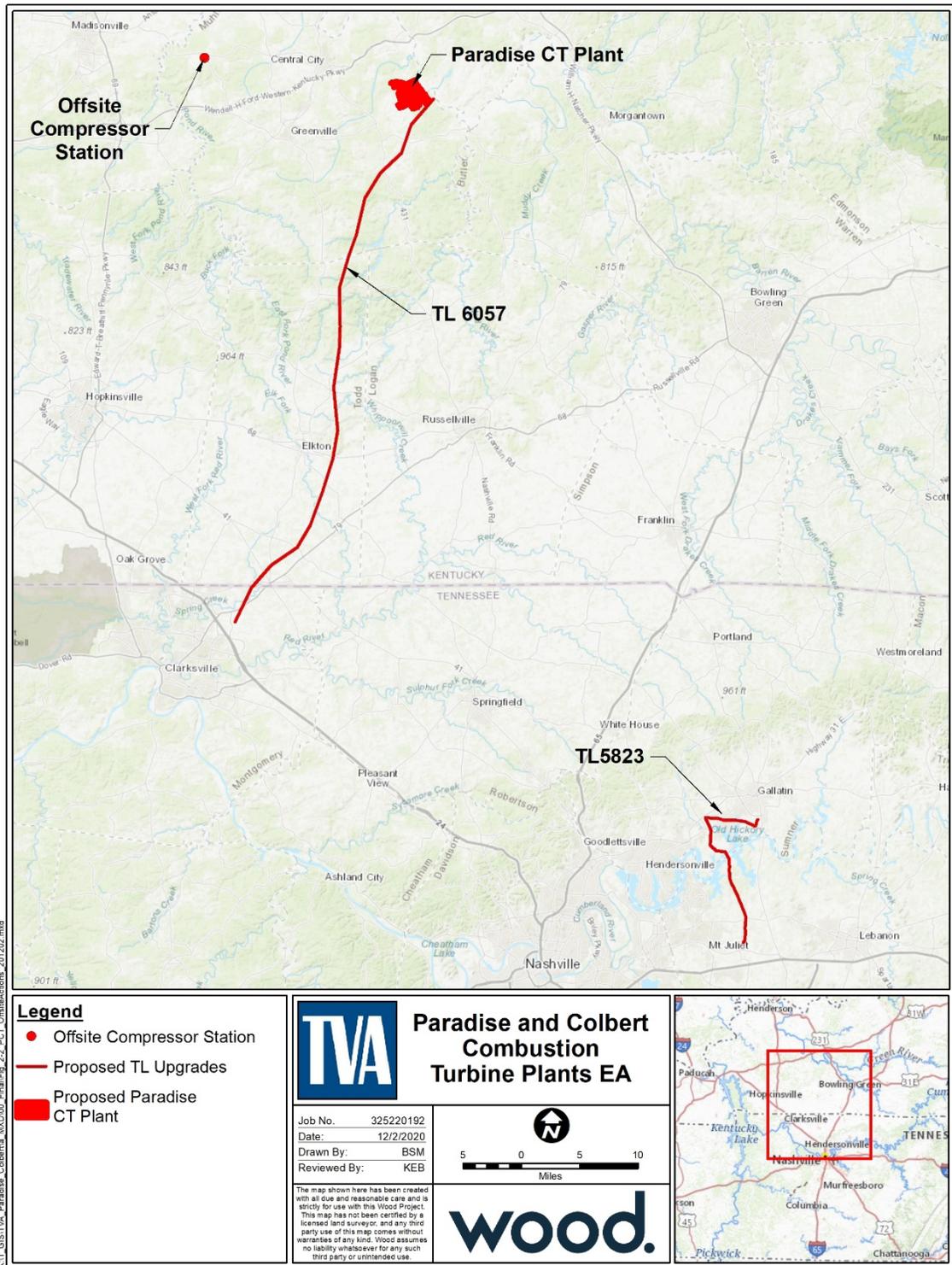


Figure 2-2. Offsite Related Actions Associated with the Proposed Combustion Turbine Plant at Paradise

2.4.2.2 Actions Associated with Construction of the Frame CT Units at the Colbert Reservation

2.4.2.2.1 Construction of Frame CT Units and TL Upgrades on the Colbert Reservation

Under Alternative B, TVA would construct three new natural gas-fueled frame CT units on heavily disturbed lands within the boundaries of the Colbert Reservation as shown on (Figure 2-3). The overall Colbert CT plant project area consists of 390.8 acres of land that includes a portion of land outside of the reservation where a natural gas line extension required for the project would occur. The proposed CT plant at Colbert would include three gas-fired frame CT generators with inlet evaporative cooling and three natural gas-fired dew-point gas heaters and plant equipment and systems similar to those described for CT construction at Paradise. Construction of a switchyard at Colbert, however, would not be necessary.

In order to provide power to the CT plant, TVA would construct three new 161-kV TLs to connect the existing switchyard to the new CT plant. The new TLs would be built to the north of the existing switchyard and would likely be constructed with double and single steel-pole structures of varying heights, depending on the terrain and existing obstacles on the reservation (See Figure 2-3). The new TL structures would either be erected on concrete foundations, or direct buried with spoil or gravel backfill. Some TL structures would likely require steel guy wires secured to buried anchors (e.g., wood logs or reinforced concrete), to support changes in line direction or tension. All unit substation transformers would be oil-filled; therefore, concrete foundations and an oil containment system would be included.

The CT plant would be fueled by a reliable supply of natural gas. Preliminary estimates indicate an upper bound of 165 million standard cubic feet per day of natural gas would be needed to fuel three frame CT units, running at maximum capacity. Similarly, the three gas heaters, which are required to raise the supplied natural gas above its dew point, would burn as much as 240,000 standard cubic feet of natural gas per day if running at the same maximum capacity. To accommodate for the maximum demand, a 20-inch diameter underground natural gas pipeline would be constructed that would run parallel to the existing 10-inch diameter natural gas pipeline lateral. The approximately one-mile pipeline would primarily be installed on the portion of the Colbert CT plant project area that is located on TVA-owned property; however, a portion would be built just south of the reservation (Figure 2-3) to connect the new lateral tie to the main distribution pipeline (see Section 2.4.2.2.2). The pipeline would be constructed in a trench of sufficient depth to bury the pipeline at a minimum of three feet below grade as measured from the top of the pipeline. Segments of the pipeline crossing Cane Creek, Old Lee Highway (County Road 20), U.S. Highway 72 (US 72), and the existing railroad adjacent to the highway would be installed using Horizontal Directional Drilling (HDD). Installation of the pipeline under US 72 and Cane Creek would require drilling from 10 to 60 feet below the surface. The natural gas pipeline would be constructed and operated by a commercial supplier and would require acquisition of a 35-foot permanent easement along the proposed pipeline length. In addition, incorporation of the new 20-inch loop line may require expansion of the existing metering station. The new pipeline would require expansion of the existing metering station to support the proposed upgrades. The station footprint would be expanded into an existing grassy area to the southeast as shown on Figure 2-3.

TVA has identified four areas (totaling approximately 58 acres) within the Colbert CT plant project area that would be used for vehicle and equipment parking, materials storage, laydown, and administration during construction of the CT plant. One approximately 9-acre site within the project area has been designated as a temporary use area that would be designated for light uses such as trailer placement or light vehicle parking during construction. Installation of the natural gas pipeline on TVA property is expected to require a 75-foot workspace along the entire route north of US 72 (i.e., 35 feet of permanent right of way and 40 feet of temporary workspace). In addition, three areas (2.7 acres) would be designated as construction staging and laydown during installation of the pipeline. All areas designated for laydown and temporary use are located on previously disturbed areas and once construction is complete, these areas would revert to their original use. The location of the proposed equipment laydown areas, temporary use areas, pipeline construction staging and laydown areas are shown on Figure 2-3.

Like Paradise, the CT plant at Colbert would require up to about 100 gpm of water for inlet air evaporative cooling in summer ambient temperatures and demineralized water for CT compressor washing. Potable water will be used to support these needs at Colbert, as well as for domestic uses and safety showers, and it will be supplied by the local provider via the existing water service mains to the reservation.

Operating the Colbert CT plant would also require air emissions monitoring. Reduction of nitrogen oxide (NO_x) emissions from the CTs would be achieved through dry low-NO_x (DLN) combustion systems. Exhaust stacks would be equipped with continuous emissions monitoring systems. Emissions from the units would adhere to the requirements of ADEM and federal regulations.

Project materials and equipment would be primarily delivered to the site by truck. Some major equipment would be transported to the Colbert site by rail. Onsite modifications to the rail system may be required. Construction materials would be delivered and placed in designated project laydown areas until used (See Figure 2-3). Roads within the Colbert CT plant project area would be maintained during the construction process.

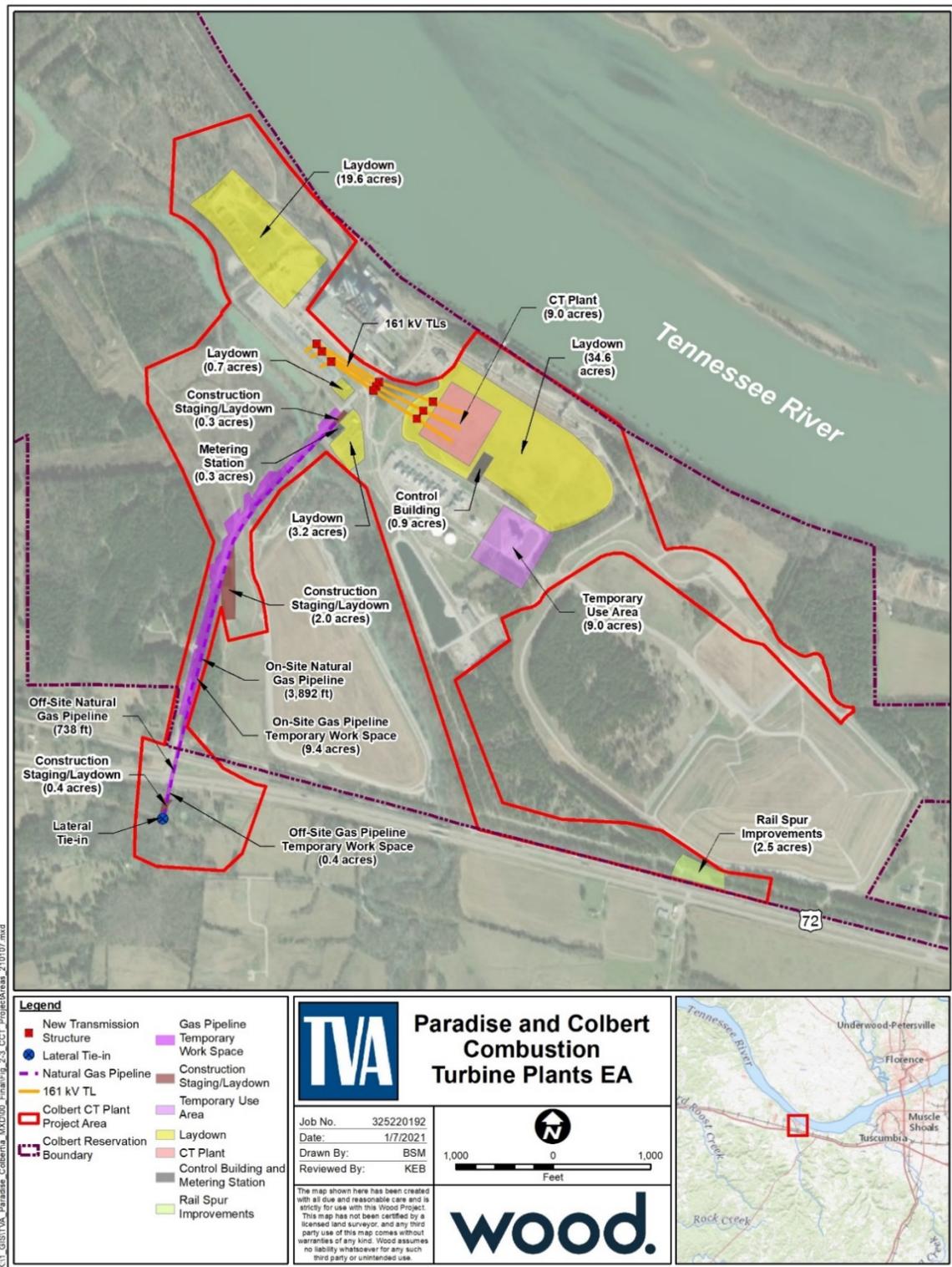


Figure 2-3. Colbert CT Plant Project Area

2.4.2.2.2 Offsite Existing Natural Gas Supply Upgrades

In order to provide the additional natural gas supply to the CTs at Colbert, a new lateral would be constructed and would tie into an existing interstate pipeline system (See Figure 2-3). Construction activities would be limited to the approximately two-acre area shown on Figure 2-3. A temporary bypass road would be constructed within this area to allow continued access to the residence located south of the proposed construction area throughout the construction period. Operation and maintenance of the proposed pipeline may require the commercial supplier to acquire a new or amended easement to the existing 30-foot pipeline easement. In addition, some upgrades to the existing gas receipt point (replacement of meters and regulators, etc.) located approximately 1.15 miles west of the proposed pipeline would be needed (Figure 2-4). The proposed pipeline would be constructed and operated by a commercial supplier.

2.4.2.2.3 Offsite Upgrades to Existing TLs

The operation of the proposed CT plant at Colbert would require various upgrades to four existing TLs located in northern Alabama (TL 5676 and TL 5670) and southern Tennessee (TL 5989 and TL 5617) (Figure 2-4). Upgrades would be performed to increase the electrical capacity of the existing TLs and would likely include the following actions as described below: moving features that interfere with clearance, replacing and/or modifying existing structures, installing intermediate structures, modifying or replacing some of the existing conductor in order to increase ground clearance, adding fill rock or dirt (surcharge) around the base of existing structures, and working with the local power companies to modify their lines.

TL 5676 – A 4.2-mile section of the existing 161-kV TL would be re-conducted, which may require modifications to existing TL structures.

TL 5670 – The 10.2-mile existing 161-kV TL would be re-conducted. Additionally, tower extensions would be required at several TL structures and one TL structure would be replaced to raise the conductor height. Additional modifications would also be performed by local power companies to lower crossings and by property owners to remove sheds inside the ROW.

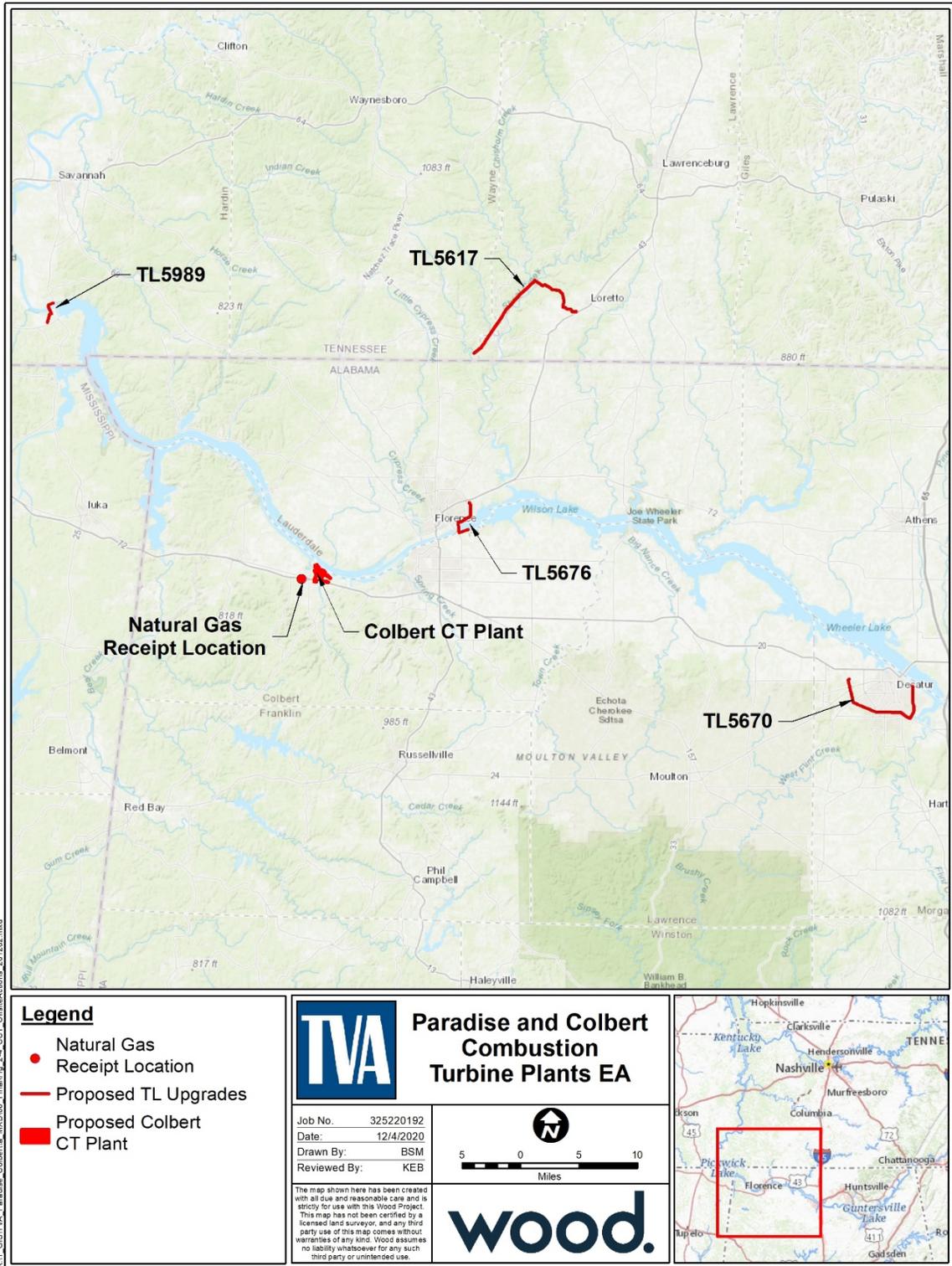
TL 5989 – TVA would up-rate a 0.82-mile section of the existing 161-kV TL.

TL 5617 – TVA would up-rate an approximately 12.8-mile portion of the existing 161-kV TL. Modifications for this portion of TL would include cutting/re-splicing the conductor in the structure spans to raise the conductor height. Additionally, one structure on the tap line to the Loretto substation would be replaced.

Existing access roads to these TLs may require some modifications such as brush clearing or tree trimming to allow for access of equipment and bucket trucks. More details regarding these activities are described above in Section 2.4.2.1.3. As mentioned in Section 1.5, four additional TLs and an additional 24 miles of TL 5617 associated with the Colbert CT plant will need to be upgraded as a result of TVA's proposed action. Additional details regarding these network upgrades, such as the exact locations of pull points or any potential pole replacements, are still being developed. Supplemental environmental analysis would be conducted as details become available.

2.4.2.3 CT Project Construction

Site preparation work, CT plant construction, and offsite TL upgrades would begin in 2021, and the plants would begin commercial operation in 2023. Equipment used during the construction phase would include trucks, truck-mounted augers and drills, excavators, as well as tracked cranes and bulldozers. Low ground-pressure-type equipment would be used in specified locations (such as areas with soft ground) to reduce the potential for environmental impacts per TVA BMPs. TVA estimates a maximum of 180 workers would be employed onsite at the peak of the two-year construction period for each plant site. This does not include the construction workforce needed for pipeline or offsite TL upgrades as this work is not centralized in one location for any significant period of time. Once constructed, four to six employees would be needed to operate the CTs at both Paradise and Colbert in addition to current staff.



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Figure 2-4. Offsite Related Actions Associated With the Proposed Combustion Turbine Plant at Colbert

2.5 Comparison of Alternatives

The environmental impacts of each of the alternatives under consideration are summarized in Table 2-2. These summaries are derived from the information and analyses provided in the Affected Environment and Environmental Consequences sections of each resource in Chapter 3.

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

Resource	Alternative A	Alternative B
Air Quality	No change from existing conditions. Benefits to regional air quality that may be associated with operation of newer, more efficient CT units would not be realized.	Temporary minor construction impacts associated with emissions from onsite vehicles and equipment as well as generation of fugitive dust. Overall, there will be a reduction in emissions at the Paradise Reservation upon netting the emission increase from operation of the new CTs against the reduction in emissions due to the shutdown of Paradise coal-fired Unit 3. Operation of the Colbert CT Plant would result in an incremental increase in local emissions as measured against the current baseline. These emissions would be monitored and would comply with permit limits. No exceedances of National Ambient Air Quality Standards expected. On a regional basis, the operation of the CT units at Paradise and Colbert, together with the retirement of Allen and Johnsonville CTs would result in a decrease in regional air emissions by removing CT units considered most challenged from TVA's generation portfolio and replacing them with high efficiency natural gas-fired combustion powered generating units that are subject to more stringent, new source regulations.
Climate Change and Greenhouse Gases	No impact.	Temporary localized, minor greenhouse gas emissions during construction activities. Operational emissions would be negligible relative to regional and national GHG levels and would not impact climate change. Implementation of Alternative B would result in a net reduction in regional GHG emissions, given the simultaneous retirement of the older CTs at Allen and Johnsonville, since the newer CTs installed at Paradise and Colbert would operate at a higher thermal efficiency than the ones being retired at Allen and Johnsonville.
Geology and Soils	No impact.	Minor temporary increase in soil erosion, minimized with BMPs.
Groundwater	No impact.	Minor impacts to soil resources; however, the use of BMPs would minimize impacts to groundwater. Minor localized, temporary impacts associated with dewatering activities potentially used to control groundwater infiltration into excavation sites.
Surface Water Resources	No impact.	Temporary, minor impacts to surface waters associated with sedimentation from stormwater runoff during construction activities and potential temporary stream crossings at offsite TL upgrades.

Resource	Alternative A	Alternative B
Floodplains	No impact.	<p>Impacts would be minimized through implementation of BMPs during construction and operation.</p> <p>Minor impacts on floodplains and their natural and beneficial values. There is no practicable alternative to locating portions of laydown areas at Colbert in the floodplain. Therefore, construction laydown areas within the floodplain would be consistent with EO 11988. Upon completion of the pipeline upgrades, the laydown and temporary use areas would be returned to existing conditions.</p> <p>New TL construction would adhere to the TVA subclass review criteria for location in floodplains. Fill, gravel, or other access road modifications in the floodway would be removed and construction areas and access roads returned to pre-construction conditions upon completion of the project.</p>
Wetlands	No impact.	<p>Minor impacts. Total estimated impacts to wetlands at all project sites include 0.04 acres at Paradise, 0.03 acres associated with Paradise offsite TLs upgrades, and 0.22 acres associated with Colbert offsite TLs. Potential impacts to wetlands would be minimized through further avoidance and implementation of erosion and sedimentation BMPs and site-specific Stormwater Pollution Prevention Plan to reduce potential sediment-laden runoff into adjacent or downgradient wetlands.</p>
Aquatic Ecology	No impact.	<p>Minor, temporary impacts from stormwater runoff during construction activities that would be minimized through the implementation of BMPs.</p>
Vegetation	No impact.	<p>Minor impacts. Clearance of disturbed herbaceous vegetation and forest (approximately 9.5 acres at Paradise and approximately 5 acres at Colbert). Projects expected to impact locally common vegetation with limited conservation value. Impacted forest communities are common within project vicinities and impacts to forest resources would be negligible compared to the total amount of forest land in the region.</p>
Wildlife	No impact.	<p>Minor impacts due to heavily disturbed habitats proposed for removal at the CT plant project areas, small size and discrete locations of offsite TL project areas, and amount of similar, suitable habitat in project area vicinities.</p>
Threatened and Endangered Species	No impact.	<p>Due to the relatively small amount of habitat being permanently impacted across the landscape, the short duration of actions at TLs, and use of BMPs, listed threatened and endangered species would not be impacted.</p> <p>Project activities are within the bounds of impacts analyzed in TVA's Bat Strategy Programmatic Section 7 ESA consultation. The conservation measures required for this project will be</p>

Resource	Alternative A	Alternative B
Visual Resources	No impact.	implemented. No impacts would occur to federally listed bats. Minor impacts; temporary visual discord during construction activities.
Cultural and Historic Resources	No impact.	No impact.
Transportation	No impact.	Temporary, minor impacts to traffic on area roadways associated with CT plant construction activities.
Natural Areas, Parks and Recreation	No impact.	Minor, temporary impacts during construction activities.
Noise	No impact.	Short-term minor adverse impact related to construction activities at the Paradise and Colbert CT plant sites. Construction activities associated with the installation of the natural gas-fired reciprocating engine at the existing compressor station to support the CT units at Paradise would be negligible as there are no sensitive noise receptors within one mile of the of the existing compressor station. Construction of natural gas upgrades at the Colbert CT plant may result in notable increase in noise levels at four nearby receptors. However, these impacts would be temporary and would be limited to daylight hours. All operational noise impacts would be negligible to minor.
Solid and Hazardous Waste	No impact.	No impact. Solid and hazardous wastes generated during construction and operation of the CT plants at Paradise and Colbert would be managed in accordance with established procedures and applicable regulations.
Socioeconomics and Environmental Justice	No impact.	Beneficial short-term impacts during construction. No long-term disproportionate impacts to low-income or minority communities.
Public Health and Safety	No impact.	The operation of the proposed CT units at both Paradise and Colbert would adhere to TVA guidance and be consistent with standards established by OSHA and applicable state requirements. Therefore, worker and public health and safety during project operation would be maintained and impacts would be minimal.
Cumulative Effects	No impact.	Minor.

2.6 TVA's Preferred Alternative

TVA has identified Alternative B, as its preferred alternative. Under the preferred alternative, TVA would construct three new natural gas-fueled frame CT units (750 MW total) at Paradise and three frame CT units (750 MW total) at Colbert for a system total of 1,500 MW, which would replace the capacity lost as a result of retiring the Allen and Johnsonville CTs. This replacement aligns with the 2019 IRP near-term actions to evaluate engineering end-of-life dates for aging generation units to inform long-term planning and to enhance system flexibility to integrate renewables and distributed resources.

2.7 Summary of BMPs, Mitigation Measures, and Commitments

BMPs, mitigation measures, and commitments identified in Chapters 2 and 3 to avoid, minimize, or reduce adverse impacts to the environment are summarized below. Additional project-specific BMPs may be applied as appropriate on a site-specific basis to enable efficient maintenance of construction projects and further reduce potential impacts on environmental resources including air, surface water, and groundwater.

Best Management Practices include:

- Fugitive dust produced from construction activities would be controlled by BMPs (e.g., wet suppression), as stated in the TVA's fugitive dust control plans required under existing Clean Air Act Title V operating permits.
- Low ground-pressure-type equipment would be used in specified locations (such as areas with soft ground) to reduce the potential for environmental impacts, per TVA BMPs.
- BMPs described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities, Revision 3* (TVA 2017b) and in specific state regulatory sediment and erosion control handbooks would be outlined in the project-specific Stormwater Pollution Prevention Plan (SWPPP), Construction Best Management Practices Plan (CBMPP), or BMP plan, as required, that would be implemented to minimize erosion during site preparation. Appropriate BMPs would be followed, and 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 minimized. Areas where soil disturbance could occur would be stabilized and vegetated with native or non-native, non-invasive grasses and mulched.

Mitigation measures include:

- TVA would establish a 50-foot buffer around the stream located within a laydown and warehouse area at Paradise and avoid any ground disturbing actions within the buffer to avoid direct impacts to the stream.
- New TL construction would adhere to the TVA subclass review criteria for TL location in floodplains.
- Any road improvements proposed in floodplains but not floodways would be constructed in such a manner that upstream flood elevations would not be increased by more than 1.0 foot.

- During construction, the commercial natural gas provider at Colbert would develop an evacuation plan prior to mobilization to relocate flood-damageable, loose, or valuable equipment out of the floodplain during a flood.
- To prevent obstruction in the floodway due to construction or modification of the access roads to TL 6057 Structures 7-10 in the Green River floodway; TL 5823 Structure 94 in the Bulls Creek floodway; and TL 5670 Structures 137 and 140 in the Clark Spring Branch Tributary floodway: (1) any fill, gravel or other modifications in the floodway that extend above the pre-construction road grade would be removed after completion of the project; (2) this excess material would be spoiled outside of the published floodway; and (3) the area would be returned to its pre-construction condition.
- At Colbert, the portions of the natural gas pipeline trench that would be located within the floodplain would be backfilled such that the final settled ground elevation would be no higher than the pre-construction ground elevation.
- A number of activities associated with the proposed project were addressed in TVA's programmatic consultation completed in April 2018 with the USFWS on routine actions with potential to affect federally listed bats in accordance with ESA Section 7(a)(2). For those activities with potential to affect bats, TVA committed to implementing specific conservation measures.
- The conservation measures required for this project are identified on pages 5-7 of the TVA Bat Strategy Project Screening Form (Appendix C), and they will be implemented as part of the proposed project. Project activities are within the bounds of impacts analyzed in TVA's Bat Strategy Programmatic Section 7 ESA consultation.
- If the timing of proposed actions within 660 feet of the two osprey nests at Colbert, two osprey nests at Paradise, and one on TL 5676 cannot be modified to avoid nesting seasons, coordination with the USDA Wildlife Services would be required to ensure compliance under the EO 13186 [Responsibilities of Federal Agencies to Protect Migratory Birds].

TVA is performing analysis to determine the presence of materials suitable for borrow at the identified borrow site on the Paradise Reservation. During excavation, visual inspection in the field would be undertaken to confirm the excavated material is suitable for use as fill. After all needed suitable borrow material has been removed, the area will be graded to promote positive drainage and upon completion reseeded with an appropriate native seed mixture.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Air Quality

3.1.1 Affected Environment

3.1.1.1 Air Quality

The Clean Air Act (CAA) (as amended) is the comprehensive law that protects air quality by regulating emissions of air pollutants from stationary sources (e.g., power plants) and mobile sources (e.g., automobiles). It requires the EPA to establish National Ambient Air Quality Standards (NAAQS) and directs the states to develop State Implementation Plans to achieve these standards. This is primarily accomplished through permitting programs that establish limits for emissions of air pollutants. The CAA also requires EPA to set standards for emissions of hazardous air pollutants.

NAAQS have been established to protect the public health and welfare with respect to six criteria air pollutants: carbon monoxide (CO), nitrogen dioxide (NO₂), ozone, particulate matter (PM), sulfur dioxide (SO₂), and lead (Pb). Primary standards protect public health, while secondary standards protect public welfare (e.g., visibility, crops, forests, soils, and materials) (EPA 2020h).

In accordance with the CAA Amendments of 1990, all counties are designated with respect to compliance, or degree of noncompliance, with NAAQS. These designations include:

- Attainment – any area where air quality achieves the NAAQS;
- Nonattainment – any area with air quality worse than the NAAQS; and
- Unclassified – not enough data to determine attainment status.

The Paradise CT Plant project area and the offsite compressor station are both located in Muhlenberg County, Kentucky. Air quality in Muhlenberg County is protected by air quality regulations found in Title 401, Chapters 50–68 of the Kentucky Administrative Regulations (KAR). Muhlenberg County is currently in attainment with ambient air quality standards referenced in Chapters 51 and 53.

The proposed offsite TL upgrades would occur on various portions of existing TLs located in Sumner County, TN (TL 5823) and Muhlenberg and Todd counties, Kentucky (TL 6057). All of these counties are currently in attainment with all NAAQS (EPA 2020e) and applicable state regulations.

The Colbert CT Plant project area and the adjacent gas line upgrade are located in Colbert County, Alabama. Air quality in Colbert County is protected by air quality regulations found in ADEM Administrative Code. Colbert County is currently in attainment with air quality standards referenced in Section 335-3-1-.03 of the ADEM Administrative Code. As stated above for Paradise, the proposed CT plant at Colbert would be subject to both federal and state regulations that impose permitting requirements and specific standards for expected air emissions.

Proposed offsite upgrades to TL to support the CT plant at Colbert would occur in Morgan County (TL 5670) and Lauderdale and Colbert counties (TL 5676) in Alabama, and Wayne

and Lawrence counties (TL 5617), and Hardin County (TL 5989) in Tennessee. All of these counties are currently in attainment with all NAAQS (EPA 2020e) and applicable state regulations.

3.1.1.2 Other Pollutants and Air Quality Concerns

Nitrogen oxides (NO_x) are a group of highly reactive gases, including NO₂, that contain varying amounts of nitrogen and oxygen. NO_x emissions contribute to ground-level ozone, fine particulate matter, regional haze, acid deposition and nitrogen saturation. Natural sources of NO_x include lightning, forest fires and microbial activity; major sources of human-produced NO_x emissions include motor vehicles, electric utilities, industrial boilers, nitrogen fertilizers and agricultural burning (TVA 2016b).

Sulfur oxides (SO_x) are compounds of sulfur and oxygen molecules. Sulfur dioxide (SO₂) is the predominant form found in the atmosphere. Most SO₂ is produced from the burning of fossil fuels (coal and oil), as well as petroleum refining, cement manufacturing and metals processing. In addition, geothermic activity, such as volcanoes and hot springs, can be a significant natural source of SO₂ emissions (World Bank Group 1998).

Hazardous Air Pollutants (HAPs), commonly referred to as air toxics, are pollutants that are known or suspected to cause cancer or other serious health effects or adverse environmental effects. The CAA identifies 187 pollutants as HAPs (EPA 2020a). Most HAPs are emitted by human activities, including mobile sources (motor vehicles), stationary sources (factories, refineries, and power plants), and indoor sources (building materials and activities such as dry cleaning).

States are required to establish an air operating program under Title V of the CAA. Regulations to implement this operating program, 40 CFR Part 70, require each major source of air pollutant emissions to obtain an operating permit, typically issued by the state environmental agency, that consolidates all of the air pollution control requirements into a single, comprehensive document covering all aspects of air pollution activities at a facility. In attainment areas, Title V major source thresholds, the level of potential emissions that require sources to obtain a Title V permit, are 100 tons per year (tpy) for each criteria pollutant, 10 tpy for each individual HAP and 25 tpy for total HAPs.

Sources that emit less than 10 tpy of a single HAP or less than 25 tpy of a combination of HAPs are referred to as area sources, as opposed to major sources. Emissions from individual area sources are relatively small. However, if located in heavily populated areas that contain a number of area sources, emissions can be of concern.

3.1.1.3 Characterization of Existing Site Operations

The Paradise reservation currently includes a natural gas-fired CC plant which is a major source as defined by 401 KAR 51:001. The Paradise Fossil Plant previously included three coal-fired generating units: Units 1 and 2 were replaced with the Paradise CC plant in spring 2017, and Unit 3 was retired from service on February 1, 2020. The Colbert CT Plant currently operates eight (8) simple-cycle natural gas fired CT units and is a major source as defined by ADEM Administrative Code R. 335-3-16-.01.

3.1.2 Environmental Consequences

3.1.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would continue to operate Units 1-20 of Frame CTs at Allen and Units 1-16 of Frame CTs at Johnsonville. Because no changes to operations are foreseen, air pollutant emissions would be unchanged. Consequently, air quality would not be affected. However, any benefits to regional air quality associated with operation of newer, more efficient units would not be realized under this alternative.

3.1.2.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

Under Alternative B, TVA is proposing to retire a total of 450 MW of Allen Frame CTs (Units 1-20) and a total of 950 MW of Johnsonville Frame CTs (Units 1-16) and construct about 1,500 MW of gas-fired frame CTs consisting of three Frame CTs (250 MW each) at Paradise and three Frame CTs (250 MW each) at Colbert to replace the capacity lost as result of these retirements.

3.1.2.2.1 Paradise CT Plant Project Area, Offsite Natural Gas Upgrade, and Offsite TL Upgrades

Construction Impacts

Onsite and offsite construction activities associated with the CT plant at Paradise would result in emissions from the operation of construction equipment driven on paved and unpaved roads, and fugitive dust suspension from clearing, grading and other activities on unpaved areas. Fugitive dust produced from construction activities would be temporary and controlled by BMPs (e.g., wet suppression) as stated in the TVA's fugitive dust control plans required under existing Clean Air Act Title V operating permits.

Equipment used during the construction phase would include trucks, truck-mounted augers and drills, excavators, as well as tracked cranes and bulldozers. Low ground-pressure-type equipment would be used in specified locations (such as areas with soft ground) to reduce the potential for environmental impacts per TVA BMPs. Combustion of gasoline and diesel fuels by internal combustion engines (vehicles, generators, construction equipment, etc.) would generate local emissions of CO, CO₂, ozone, NO_x, PM, SO₂, and volatile organic compounds (VOCs). However, new emission control technologies and fuel mixtures have significantly reduced vehicle and equipment emissions, and it is expected that all vehicles and equipment would be properly maintained and employ the use of diesel emission controls and cleaner fuel, which also would reduce emissions. Additionally, cleaner construction practices for on-road and off-road equipment used for transportation, soil movement, or other project activities would be used. Borrow material is expected to be obtained onsite, which minimizes emissions from the transport of this material. Air quality impacts from construction activities would depend on both man-made factors (intensity of activity, control measures, etc.) and natural factors such as wind speed and direction, soil moisture and other factors. However, even under unusually adverse conditions, these emissions would have, at most, a minor transient impact on offsite air quality that is well below the applicable ambient air quality standard.

Equipment used during clearing of ROW for the proposed onsite 500-kV TL would include chain saws, skidders, bulldozers, tractors, and/or low ground-pressure feller-bunchers. Marketable timber would be salvaged where feasible; otherwise, woody debris and other

vegetation would be piled and burned, chipped, or taken off site. TVA would adhere to all appropriate state and county regulatory requirements if burning of landscape waste is conducted. Impacts from these actions would be temporary and minimal.

Equipment used to support the proposed offsite TL upgrades may include mowers, chain saws, skidders, and bucket trucks. Equipment operation would produce small increases in emissions from combustion engines and particulates from mowing and localized land disturbance. Such emissions, however, are localized and temporary. No tree clearing is expected as upgrades would occur along established and maintained TL and access road ROWs.

Overall, effects to air quality from construction–associated activities would be temporary and localized. Emissions would only affect the immediate project area and would have limited effects to off–site areas.

Description of Simple Cycle Operations

TVA requires a combination of peaking and baseload generation capabilities to meet electricity demands that fluctuate daily. Baseload generation needs are typically met by the operation of nuclear and coal-fired plants, which are well suited to continual, steady operation with low cost per kilowatt hour generation (\$/kWh). To meet peak demand (demands above baseload), TVA must bring units on- and off-line for a few hours at a time to match capacity to demand. Although \$/kWh costs are higher for CTs than for CCs, nuclear or coal-fired units, the quicker response time for natural gas-fired CTs allows for a more cost-effective means by which to accommodate frequent demand fluctuations.

Simple-cycle configuration is the condition where only useful energy for electricity generation is captured from the expansion of gases, which occurs when natural gas is combusted in the presence of air. The products of combustion pass through a turbine attached to a generator, which produces electricity as the turbine shaft turns. Simple-cycle plants are best suited for peaking power due to their lower capital cost and intermittent operation to meet peaking power requirements, which can change within minutes. The typical startup time for a coal-fired boiler is four to six hours whereas the typical startup time for a natural gas or fuel oil-fired combustion turbine operating in simple-cycle mode is 10 to 30 minutes.

Simple cycle CTs were selected for development at Paradise and Colbert to fulfill peak generating needs (i.e., operated infrequently during high demand periods for short durations, but capable of being started up at short notice). Peaking resources are essential for maintaining system reliability requirements since they can start up quickly and meet sudden changes in demand or supply. Frame CT units were specifically selected as they have inherently low cost per installed MW, versus aeroderivative units. They also better integrate with renewable resources, such as solar, by filling in the gaps created by intermittent generation.

The proposed simple-cycle CT facilities to be constructed at Paradise and Colbert would include three CT units at each site. Each CT unit would have a gross electrical generating capacity of 229 MW at 59 degrees Fahrenheit (°F). The CT units are equipped with DLN combustion for control of NO_x emissions; there are no add-on controls such as selective catalytic reduction. An evaporative cooling system is installed at the compressor inlet of each CT. As the CT units require the temperature of the natural gas at the turbine interface

to be above the dew point, three natural gas-fired heaters are included at each location. Both facilities would also include ancillary equipment as needed, such as natural gas metering and handling systems, instrumentation and control systems, transformers, buildings, etc. The CTs would operate during periods of peak demand when sufficient generating capacity may not be available from other TVA assets and to maintain transmission system reliability.

Regulatory Air Permit Requirements

Construction of both proposed plants are subject to permitting programs that regulate the construction of new stationary sources of air pollution, typically referred to as New Source Review (NSR). Major NSR is applicable to major sources under PSD which are sources that have 250 tpy of potential emissions of any criteria pollutant or 100 tpy for specifically listed source categories. There are two NSR permitting programs, based on the attainment status of the area in which the proposed project is located. In attainment areas, PSD is the applicable permitting program. In nonattainment areas, the applicable permitting program is nonattainment NSR. As both plants are located in attainment areas, any significant emission increases from the proposed projects would be subject to PSD pre-construction review to ensure air quality in the area is protected and attainment status is maintained.

PSD review is required if the project by itself is a major source or if the facility is already a major source (both Paradise and Colbert are major sources) and the project will constitute a major modification (i.e., any physical change or change in the method of operation of a major stationary source that would result in a significant emissions increase of a regulated pollutant and a significant net emissions increase of that pollutant from the major stationary source). Significant emission increase levels, for purposes of PSD, were established as allowable increases in air pollutants over a baseline level that would not have a detrimental impact to air quality.

For new emission units, increases are calculated using the “actual to potential” test, meaning that emissions from new emission units must be evaluated for the potential emission/worst-case scenario, which may far exceed anticipated actual emissions from normal operation. Net emission increases for new emission units are defined as the potential increase in emissions from the project and any other increases and decreases in baseline actual emissions at the major stationary source that are contemporaneous with the change and otherwise creditable.

Both plants have existing Title V permits, which are required for facilities which have emissions exceeding the major source thresholds for criteria pollutants, HAPs, and in certain cases, greenhouse gases (GHGs). Each plant’s Title V permit includes emission limits (as established by federal/state/local regulation) and include the data tracking, recordkeeping, and reporting measures to verify compliance.

Construction of the proposed equipment at both Paradise and Colbert require modification of both Title V permits. Permit modifications will incorporate limitations from applicable state and federal regulations, including the following:

- New Source Performance Standards (NSPS):40 CFR 60, Subpart KKKK is applicable to all stationary gas CT units with a heat input at peak load equal to or greater than 10 MMBTU (Million British Thermal Units) per hour for which construction or modification is commenced after February 18, 2005. Under this NSPS, NO_x emissions while firing

natural gas are limited to 15 parts per million, corrected to 15% O₂, and SO₂ emissions are limited to 0.06 pounds SO₂ per MMBTU.

40 CFR 60, Subpart TTTT is applicable to CT electrical generating units constructed after January 8, 2014, for the control of GHG emissions. For CT units of the size and capacity considered under this alternative, the proposed CO₂ emission standard is 1,100 pounds per megawatt-hour of generation (120 pounds CO₂ per MMBTU). These, and other potentially applicable state and federal regulations, will be evaluated when final permit modification applications are prepared to ensure that appropriate limitations based on the most recent regulatory updates are incorporated.

Emissions from the proposed CT plants would meet these applicable standards, as well as any additional requirements established by state and local regulations.

Operational Impacts

Emissions from natural gas-fired plants are lower than emissions from other fossil plants. Emissions of SO₂ are very low, and direct emissions of NO_x and CO₂ are low relative to other fossil plants (TVA 2019b). Natural gas-fired plants also do not emit mercury.

Potential annual-emission estimates are provided in Table 3-1, which presents emission contributions from both CT operations and gas heater operations. CT emissions vary with ambient temperature and operating configuration. Annual emission estimates are based on CT performance at 59°F, which is deemed most representative of site annual-average temperature, and baseload operations occurring approximately 3,400 hours per CT per year. Because variation in ambient temperatures has negligible impacts on gas heater performance, annual emissions are based on the gas-heater burner's maximum heat input and annual operations occurring approximately 3,400 hours per gas heater per year.

Anticipated baseload operating hours would be expected to be lower based on TVA's experience at other simple cycle CT plants.

To check for PSD applicability, contemporaneous creditable emission increases and decreases are used to determine the net emission increase. The net emission increase for the project was determined by adding the anticipated emissions from the proposed CT Plant to the actual baseline emissions from the recently installed CC plant (2017) and subtracting the baseline emissions from Paradise coal-fired Unit 3 (2020 shutdown). The result of this netting analysis was a net emission decrease for each regulated pollutant as shown in the following table. Therefore, PSD review does not apply.

Table 3-1. Net Emission Analysis – Paradise CT Plant

Pollutant	Emissions (tons/year)				
	Potential Paradise CT	2017 Paradise CC	Retired Paradise Coal Fired Unit 3	Difference (net increase)	PSD Significance Threshold
CO	307	58.2	-506	-141	100
NO _x	627	695	-3,988	-2,666	40
SO ₂	6.8	12.8	-2,829	-2,809	40
PM	46.4	81	-409	-282	25
PM ₁₀	160	162	-814	-492	15
PM _{2.5}	128	162	-683	-393	10
VOC	36.6	45.6	-111	-29	40
Lead (Pb)	<0.01	0.01	-0.1	-0.09	0.6
SO ₃ as H ₂ SO ₄	0.5	7.1	-441	-433	7
CO _{2e}	1,367,414	2,541,000	-4,827,711	-919,297	75,000

Although the Paradise CT will not require a PSD evaluation, it must meet the requirements and limits provided in KDAQ and federal regulations. The Paradise plant-site currently operates under a Title V operating permit, which will require a modification for the proposed project. TVA has taken the first step in compliance with air permit requirements as the netting analysis, HAP evaluation, and appropriate application forms have been completed and were submitted to KDAQ in early December 2020. The project has also been formally discussed with the agency.

A commercial gas company (Texas Gas Transmission, LLC) proposes to install a new natural gas-fired reciprocating engine at an existing compressor station. The facility currently operates under Title V permit V-15-064, issued by KDEP on May 4, 2016. Texas Gas has submitted an application to KDEP for a minor revision to the facility's Title V permit to reflect the new equipment (Texas Gas Transmission, LLC 2020). The engine would be installed in an existing compressor building in place of two engines that were removed several years ago. The primary air emission sources at the existing facility are one natural gas-fired reciprocating engine and three natural gas-fired turbines that all drive natural gas compressors. Emissions at the existing site also result from natural gas venting activities and fugitive equipment leaks from natural gas piping and components. Table 3-2 summarizes the annual estimated emission rates of criteria pollutants from the proposed new facilities and existing facilities. Total emissions from the compressor station will increase by 10 percent as a result of the proposed upgrades.

Table 3-2. Estimated Criteria Pollutant Emission Rates Associated with the Natural Gas Upgrades to Support the Paradise CT Plant

	Annual Potential Emissions (tpy)				
	NOx	CO	VOC	SO ₂	PM10
New Project Emissions	18.11	5.58	8.99	0.07	1.22
Existing Emissions	166.42	131.91	35.66	0.47	9.21
Totals	184.53	137.49	44.65	0.54	10.43

Source: Texas Gas Transmission, LLC 2020

An air dispersion modeling analysis for the project was conducted as part of that application (Texas Gas Transmission, LLC 2020). The modeled concentrations meet the NAAQS for all pollutants when combined with the existing ambient background concentrations. The existing compressor station is located in an attainment area and the emission increases associated with the proposed project will be below the threshold requirements for PSD permitting, and the facility will remain a PSD minor source. Therefore, impacts to air quality associated with the installation of the natural gas-fired engine at the offsite compressor station would be minor.

3.1.2.2.2 Colbert CT Plant Project Area, Offsite Natural Gas Loop Line, and Offsite TL Upgrades

Construction Impacts

Onsite and offsite construction activities associated with the CT plant at Colbert would be similar to those described for construction of the CT plant at Paradise and would be minor and temporary.

Operational Impacts

Potential emissions from the Colbert CT Plant are anticipated to exceed PSD significance thresholds, as shown in Table 3-3. These emissions are based on approximately 3,400 hours of baseload operations per CT per year. As described for the proposed Paradise CT plant, the basis upon which the emissions were estimated are established upon a conservatively high operating scenario (i.e., 3,400 hours of baseload operations).

Table 3-3. Potential Annual Emission Estimates and PSD Applicability Thresholds – Colbert CT Plant

Pollutant	Emissions (tons/year)	
	Potential Colbert CT Plant	PSD Applicability Thresholds
CO	342	100
NO _x	368	40
SO ₂	6.52	40
PM	33.6	25
PM ₁₀	116	15
PM _{2.5}	93	10
VOC	34.5	40
Pb	<0.01	0.6
Sulfuric Acid	0.47	7
CO _{2e}	1,306,000	75,000

For the Colbert CT Plant, for which there are no creditable increases or decreases of emissions in the contemporaneous period, anticipated emissions and the net emission increase from the proposed modification exceed PSD applicability thresholds for several pollutants. As such, the project is subject to PSD.

PSD does not prevent sources from increasing emissions, but instead it preserves and protects air quality, ensures economic growth will occur in a manner consistent with preserving clean air resources. It also ensures any increase in air pollution to which PSD applies is made only after careful evaluation of all consequences of such a decision and after adequate procedural opportunities for informed public participation are provided (EPA 2019).

PSD requires installation of Best Available Control Technology (BACT), an air quality analysis, additional impact analysis, and public involvement. Further detail on each of these requirements is provided below.

- BACT is an emission limitation which is based on the maximum achievable degree of control. BACT is determined on a case-by-case basis and considers the energy, environmental, and economic impact of the proposed limitation. BACT can be an add-on pollution control device or a modification of the production process or method or, in some cases, a design, equipment, work practice or operational standard, if an emission standard is infeasible.
- An air quality analysis is performed to demonstrate that the new emissions from a proposed modification, in conjunction with other applicable emissions increases and decreases from existing sources, will not cause or contribute to a violation of any applicable NAAQS or PSD increment. The analysis includes an assessment of existing air quality, which may include ambient monitoring and air dispersion modeling, as well as dispersion modeling predictions of ambient concentrations resulting from the proposed project and future growth associated with the project.
- Additional impact analyses evaluate the other impacts caused by an increase in emissions, such as ground and water pollution impacts on soils, decreases in

visibility caused by the emissions and associated growth. Associated growth is growth in the area due to the proposed modification, including industrial, commercial, and residential.

- Public participation allows the public to review and comment on the permit before it is issued.

TVA has begun the process of complying with PSD requirements with the submission of Class I and Class II modeling protocols to ADEM in August 2020. The PSD program provides extra protection for large pristine areas of the US, such as national parks, forests, and wildlife refuges, referred to as Class I areas. Class II areas are areas that are in attainment or noted to be unclassifiable. Based on the location of the Colbert Plant, both Class I and Class II areas are potentially impacted, therefore a protocol for each has been submitted.

Based on this PSD analysis, ADEM is expected to issue a construction permit, which allows initial unit operations for approximately one year. The terms of the construction permit will be rolled into the existing Colbert Title V operating permit via a Title V permit modification after the initial 365 days.

Natural Gas Upgrades

Operation of the proposed pipeline(s) could result in a small increase in emissions from the increased operation of compressor stations but would have little overall effect on air quality.

The CTs at Paradise and Colbert are intended to meet future demand since they are intended to replace the loss of peaking capacity related to closure of the old units at Allen and Johnsonville. Emission estimates presented above, represent conservatively high operating conditions, as it is unlikely these emissions would be generated from peaking operations. While the new generation units would result in an increase in local emissions, compliance with PSD requirements, as described above, ensures there is no significant impact to or deterioration of air quality due to the proposed project.

3.1.2.2.3 Summary of Air Emissions Associated with Alternative B

The proposed construction and operation of the CT units at Paradise and Colbert, together with the retirement of Allen Frame CTs (Units 1-20) and Johnsonville Frame CTs would result in a decrease in regional emissions by removing CT units considered most challenged from TVA's generation portfolio and replacing them with six high efficiency natural gas-fired combustion powered generating units that are subject to regulations for new sources that are more stringent than regulations for existing sources. Table 3-4 compares emissions from existing permitted Allen CT Units 1-20 and Johnsonville CT Units 1-16 to the permitted emissions limits associated with proposed units at Paradise and Colbert as presented in the associated state permit applications.

Table 3-4. Permitted Limits for Existing and Proposed CT Plants

CT Performance (Natural-Gas Firing)		Allen ² Units 1-16	Allen ² Units 17-20	Johnsonville Units 1-16	Permitted Limits for Proposed CT Plants at Paradise and Colbert
Heat rate	Btu/kWh	13,334	11,798	10,950	8,883
Capacity	MW/CT	21.4	54.2	59.1	229
Estimated Capacity Factor (annual)	%	100	100	40.6	38
Pollutant		lb/MWh ¹	lb/MWh ¹	lb/MWh ¹	lb/MWh ¹
Particulate Matter	PM	0.098	0.154	0.142	0.039
Sulfur Dioxides	SO ₂	0.009	0.008	0.007	0.006
Nitrogen Dioxides	NO _x	5.351	4.731	4.391	0.322
Volatile Organic Compounds	VOC	0.029	0.022	0.026	0.025
Carbon Dioxide	CO ₂	1,733	1,532	1,422	1,181
GHG (CO ₂ equivalent)	CO _{2e}	1,734	1,534	1,423	1,182

Notes:

¹ Lower "lb/MWh" indicates less polluting per hour of generation.² Allen CT Units 1-16 predate the installation of the circa 1970's Allen Units 17-20 – assuming no better performance than the Allen CT Units 17-20.

Table 3-4 shows that the more efficient new units could replace power from the retired units with a marked decrease in emissions depending on which units are retired. For example, as allowed by the existing unit operating permits, the older units are currently allowed to emit (depending on fuel-type fired: natural gas or fuel oil) to produce 5.8 million to 7.7 million (total) tons of CO₂ per year. The proposed Colbert and Paradise units will only be allowed – via 40 CFR part 60, Subpart TTTT – to produce approximately 2.7 million (total) tons of CO₂ per year. The other regulated pollutants follow this trend as well.

3.2 Climate Change and Greenhouse Gas

3.2.1 Affected Environment

“Climate change” refers to any substantive change in measures of climate, such as temperature, precipitation, or wind lasting for an extended period (decades or longer) (EPA 2016). The amount of warming projected beyond the next few decades, by these studies, is directly linked to the cumulative global emissions of GHGs (e.g., CO₂, methane). In 2019, U.S. GHG emissions totaled 6,558 million metric tons of carbon dioxide equivalents, or 5,769 million metric tons of carbon dioxide equivalents after accounting for sequestration from the land sector. This represents a 13 percent decrease below 2005 levels (EPA 2021). Climate change is primarily a function of excessive CO₂ in the atmosphere. CO₂ is the primary GHG emitted through human activities. Forested areas that absorb and store CO₂ from the atmosphere via a process known as carbon sequestration help to reduce levels of CO₂ in the atmosphere. Activities associated with the proposed action that produce CO₂ are primarily related to emissions related to fossil-fuel-powered equipment (e.g., bulldozers, loaders, haulers, trucks, generators) used during construction activities and from operation of the proposed CT plants.

Additional GHGs that contribute to climate change include methane, nitrous oxide (NO_x) and fluorinated gases (such as hydrofluorocarbons and sulfur hexafluoride). Methane is emitted during production and transport of oil and natural gas as well as coal. Livestock and other agricultural practices also produce methane emissions. Nitrous oxide is emitted during combustion of fossil fuels and from agricultural and industrial practices. Fluorinated gases do not occur naturally and are emitted from a variety of industrial processes as well as commercial and household uses (EPA 2021).

The leading U.S. scientific body on climate change is the U.S. Global Change Research Program (USGCRP), composed of representatives from 13 federal agencies that conduct or use research on global change and its impacts on society. It functions under the direction of the Subcommittee on Global Change Research of the National Science and Technology Council's Committee on Environment. In 2017 and 2018, the USGCRP issued its *Climate Science Special Report: Fourth National Climate Assessment*, Volumes I and II (Fourth Assessment Report; USGCRP 2017 and USGCRP 2018, respectively). The Fourth Assessment Report states that climate change has resulted in a wide range of impacts across every region of the country. Those impacts extend beyond atmospheric climate change alone and include changes to water resources, transportation, agriculture, ecosystems, and human health. The U.S. and the world are warming, global sea level is rising and acidifying, and certain weather events are becoming more frequent and more severe. These changes are driven by accumulation of GHG in the atmosphere through combustion of fossil fuels (i.e., coal, petroleum, and natural gas), combined with agriculture, clearing of forests, and other natural sources. These impacts have accelerated throughout the end of the 20th and into the 21st century (USGCRP 2018).

The USGCRP's Fourth Assessment Report notes the following observations of environmental impacts are attributed to climate change in the Southeast region (area of the proposed project) of the United States (USGCRP 2017, USGCRP 2018):

- The decade of 2010 through 2017 has been warmer than any previous decade since 1920 for average daily maximum and average daily minimum temperature.
- The length of the freeze free season was 1.5 weeks longer on average in the 2010s compared to any other historical period on record.
- The number of extreme rainfall events is increasing. The number of days with 3 or more inches of rain has been historically high over the past 25 years. The 1990s, 2000s, and 2010s rank first, third, and second, respectively, in number of events.
- Sixty-one percent of major southeast cities are exhibiting some aspects of worsening heat waves, which is a higher percentage than any other region of the country.
- Rising temperatures and increases in the duration and intensity of drought are expected to increase wildfire occurrence and reduce the effectiveness of prescribed fire.

Chapter 19 of the USGCRP's Fourth Assessment Report assesses the long-term impacts of climate change on the Southeast U.S. under various emissions scenarios. Predicted impacts include increases in temperature and extreme precipitation and, in urban areas, more frequent and longer summer heat waves, increased risk of vector-borne diseases, reduced air quality, and stresses on infrastructure. These include the following projections

of climate change impacts in the southeast U.S. with a high or very high level of confidence (USGCRP 2018):

- Climate models project nighttime temperatures above 75°F and daytime maximum temperatures above 95°F become the summer norm. Nights above 80°F and days above 100°F, which are now relatively rare, would become common
- Cooling degree days (a measure of the need for air conditioning) nearly double while heating degree days (a measure of the need for heating) decrease by over a third
- The freeze-free season lengthens by more than a month and the frequency of freezing temperatures decrease substantially.

GHGs were identified by the EPA as pollutants in the context of climate change. GHG emissions do not result in proportional local and immediate impacts; it is the combined concentration in the atmosphere that affects the global climate system. The USGCRP'S Fourth Assessment Report models have proven accurate in simulating climate change experienced in the last 60 years or so. Today, the largest uncertainty in projecting future climate conditions is the level of GHG emissions going forward. Future global GHG emissions levels and resulting impacts depend on factors that can be difficult to predict. Therefore, the USGCRP's projections of climate outcomes rely on the use of "Representative Concentration Pathway" which capture a range of potential GHG emissions pathways and associated atmospheric concentration levels through 2100 (USGCRP 2018).

TVA has achieved a 63 percent reduction in its carbon emissions as compared to 2005 baseline standards (TVA 2021a). This decrease is mainly due to the retirement of coal plants, which emit larger quantities of CO₂ relative to other types of electrical generation, and the replacement of the retired coal generation with nuclear and natural gas-fueled generation. Nuclear generation does not result in emissions of CO₂, and the CO₂ output rate from natural gas fueled electricity generation is about half that of coal (TVA 2019b). As a generation fleet, TVA has demonstrated a commitment to continued reduction and management of GHG emissions while maintaining a balanced generation portfolio.

3.2.2 Regulatory Requirements

Although there have been a series of recent administrative changes, no clear GHG emission reduction requirements have been established at the federal level for fossil-fired power plants. The national emissions reduction requirements established in the EPA's Clean Power Plan (CPP) rule were repealed on July 8, 2019 (84 Fed. Reg. 32,250, 32,522-32, 532) and the targets in the Paris Climate Accord were withdrawn in November of 2020. The emission reduction requirements established by EPA in the Affordable Clean Energy (ACE) rule, which replaced the CPP rule, were vacated by the D.C. Circuit Court of Appeals on January 19, 2021. On January 20, 2021, President Biden issued the EO on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis (EO 13990) and on January 27, 2021, the EO on Tackling the Climate Crisis at Home and Abroad (EO 14008). Amongst other objectives, the EOs set an aspirational target to achieve a net-zero emission economy by 2050 and a carbon-free electricity sector by 2035. In addition, on January 20, 2021, President Biden announced that the U.S. will rejoin the Paris Climate Agreement, and the U.S. became a party to the Agreement on February 19, 2021. The Agreement is a binding international agreement to reduce GHG emissions and impacts due to climate change that was signed by 196 parties on December 12, 2015 and entered into force on November 4, 2016. The Agreement aims to limit global warming to

well below 2 degrees Celsius, and preferably to 1.5 degrees Celsius, compared to pre-industrial levels. Prior to the U.S. withdrawal from the Agreement in November 2020, the U.S. had proposed a 26 to 28 percent domestic reduction in GHG by 2025 compared to 2005 levels. It is likely that the U.S. would retain or modify these goals upon rejoining the Agreement. On April 22, 2021, the United States submitted its nationally determined contribution (NDC) in line with Article 3 of the Paris Agreement. In the NDC, the United States is setting an economy-wide target of reducing GHG emissions by 50-52 percent below 2005 levels in 2030.

3.2.3 TVA Carbon Trajectory and Strategic Intent

At its May 6, 2021 meeting, the TVA Board adopted the “TVA Strategic Intent and Guiding Principles,” which focuses on energy supply and decarbonization initiatives (TVA 2021b) (source: [strategic-plan-documentc67079e2-d479-4f3d-a13b-1fa6fd714cde.pdf](https://www.azureedge.net/strategic-plan-documentc67079e2-d479-4f3d-a13b-1fa6fd714cde.pdf) (azureedge.net)). This document reiterates TVA’s carbon reduction results to date of a 63% reduction in mass emissions from 2005 to 2020. Additionally, it explains how TVA is executing a plan to 70% carbon reduction by 2030, has a path to approximately 80% carbon reduction by 2035, and aspires to achieve net-zero carbon emissions by 2050. Additional details can be found in TVA’s Strategic Intent and Guiding Principles document (TVA 2021b), Leadership and Innovation on the Path to Net-Zero (TVA 2021a), and the FY20 Sustainability Report (TVA 2021c).

3.2.4 Environmental Consequences

3.2.4.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not retire Units 1-20 of Frame CTs at Allen and Units 1-16 of Frame CTs at Johnsonville. However, under this alternative, TVA would make the repairs needed to maintain operation of these units, and associated emissions from refurbishment activities is expected to be negligible. As such, any incremental impact to GHG emissions or climate change associated with the No Action alternative would be negligible.

3.2.4.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

Construction and operation of the CT units proposed at Paradise and Colbert will result in emission of GHG. The following emissions analysis provides an estimate of GHG emissions as (1) a percentage of GHG emissions on a state level (2) a percentage of total U.S. GHG emissions; and (3) a percentage of total global GHG emissions. This proportionate estimate of GHG emissions serves as a reasonable proxy for assessing potential climate change impacts. The current state of climate science does not allow for specific linkage between particular GHG emissions and particular climate impacts. The use of the information currently available (i.e., use of the emissions analysis described below as a proxy for climate impacts) is consistent with 2020 Council on Environmental Quality (CEQ) regulations for implementing NEPA at 40 CFR 1500-1508 as well as the earlier CEQ regulations for implementing NEPA at 40 CFR 1500-1508 issued in 1978. While GHG emissions from the proposed operation of the CT units would have some impact on climate, the pro-rata effect cannot be determined with precision. Even so, the analysis includes other information (i.e., emissions analysis at national and global level) that can credibly be calculated to serve as a reasonable proxy of the proposed project’s contribution to climate change.

TVA also considered use of the social cost of carbon (SCC) metric in the assessment of climate change impacts resulting from operation of the CT plants. However, after due consideration, TVA believes that the SCC metric is not an appropriate measure or proxy of project-level climate change impacts and their significance under NEPA. The SCC metric is not appropriate or informative because (1) the lack of consensus on the appropriate discount rate leads to significant variation in outputs, rendering those outputs unreliable; (2) the SCC tool does not measure the actual incremental impacts of an individual project due to both scale and complexity; and (3) there are no established criteria identifying the monetized values considered significant for NEPA purposes

3.2.4.2.1 Paradise CT Plant Project Area, Offsite Natural Gas Upgrade, and Offsite TL Upgrades

Construction Impacts

Construction-related CO₂ emissions associated with the Paradise CT plant would occur from internal combustion engines during site preparation, borrow transport, facility construction and minor TL upgrades and would result in a minor temporary increase in CO₂ emissions. The emissions from construction-related activity are expected to be insignificant.

Impacts Associated with Forest Clearing

EPA's quantification tool was used to estimate the carbon sequestration that may be lost from clearing of forested land within the Paradise CT project area to support construction of the 500-kV TL (EPA 2020g). Assuming 9.5 acres of forested areas (the land cover with the greatest potential carbon sink) are completely cleared to accommodate construction activities and, using EPA's estimate for carbon sequestered annually by forested areas as a whole, TVA estimates that the conversion of these forested lands would result in the loss of approximately 7.3 metric tons of carbon sequestered in one year. This loss of carbon sequestered, or stored, is very small relative to the carbon sequestered in local and regional forested areas. Overall, carbon sequestration within forests in the region has increased due to net increases in forest areas (e.g., conversion of farmland to forested areas), improved forest management, as well as higher vegetation growth productivity rates and longer growing seasons. Existing forested lands in Muhlenberg County (estimated at 126,000 acres) sequester approximately 97,020 metric tons of carbon per year. By comparison, therefore, the loss of 7.3 metric tons of carbon sequestration due to construction phase clearing of forests in the Paradise CT Plant project area is considered insignificant.

Operational Impacts

As noted in Section 3.1.2.2.1, operation of the CT units at Paradise would result in a net emission decrease of regulated pollutants (see Tables 3-1 and 3-2) after applying the PSD netting methodology. However, GHGs would be emitted as a result of the operation of the CT units at Paradise, which would result in local emissions of GHGs. In addition, operation of the proposed pipeline(s) (both onsite and offsite) at Paradise would result in emissions of CO₂ from increased operation of compressor plants and emissions of small quantities of methane during gas extraction, processing, storage, and transport. However, based on estimates of CO₂ emissions for the state of Kentucky by the U.S. Energy Information Administration (EIA 2020), total emissions of CO₂ for the state were 114 million metric tons and emissions from the US were 6,870 million metric tons in 2017. Therefore, the potential emissions of GHGs associated with the operation of the CT plant at Paradise represent

approximately 1.1 percent of total statewide emissions, approximately 0.02 percent of the total US emissions, and 0.002 percent of the estimated 55.6 billion metric tons of total global GHG emissions for 2019 (Olivier and Peters 2020). Moreover, the percentages identified in the previous sentence for national and global levels would be even smaller (or even negative) since the composite TVA proposal being reviewed in this EA involves not just the construction and operation of the Paradise and Colbert CTs, but also the simultaneous retirement of the older CTs at Allen and Johnsonville barring the use of a few CTs at Allen for regional black start in an emergency. Thus, TVA's composite proposal is expected to result in a net reduction since the newer vintage CTs installed at Paradise and Colbert would operate at a higher thermal efficiency than the ones being retired at Allen and Johnsonville.

Further, TVA has achieved a 63 percent reduction in its carbon emissions as compared to 2005 baseline standards (TVA 2021a). This decrease is mainly due to the retirement of coal plants, which emit large quantities of CO₂ relative to other types of electrical generation, and the replacement of coal generation with nuclear and natural gas-fueled generation. Nuclear generation does not result in emissions of CO₂, and the CO₂ output rate from natural gas fueled electricity generation is about half that of coal (TVA 2019b). As a generation fleet, TVA has demonstrated a commitment to continued reduction and management of GHG emissions while maintaining a balanced generation portfolio. Therefore, the operation of the CT plant at Paradise would not negatively impact regional and national GHG emissions or climate change.

3.2.4.2.2 Colbert CT Plant Project Area, Offsite Natural Gas Loop Line, and Offsite TL Upgrades

Construction Impacts

GHG emissions from construction activities associated with the Colbert CT plant would be similar to those described for the Paradise plant and would be expected to be insignificant.

Impacts Associated with Forest Clearing

EPA's quantification tool was used to estimate the carbon sequestration that may be lost from clearing of forested land within the Colbert CT project area to support construction of onsite transmission lines connecting the existing switchyard to the proposed CT plant and the proposed natural gas upgrades (EPA 2020g). Assuming five acres of forested areas (the land cover with the greatest potential carbon sink) are completely cleared to accommodate these construction activities and, using EPA's estimate for carbon sequestered annually by forested areas as a whole, TVA estimates that the conversion of these forested lands would result in the loss of approximately 4 metric tons of carbon sequestered in one year. Existing forested land in Colbert County (estimated at 193,000 acres) sequester approximately 148,610 metric tons of carbon per year. By comparison, therefore, the loss of 10 metric tons of carbon sequestration due to construction phase clearing of forests in the Colbert CT plant project area is considered insignificant.

Operational Impacts

The units proposed at Colbert would result in an increase in local emissions of GHGs (see Table 3-3); however, based on estimates of CO₂ emissions for the state of Alabama by the U.S. Energy Information Administration (EIA 2020), total emissions of CO₂ for the state were 108 million metric tons in 2017. Therefore, the potential emissions from the CT plant

would represent approximately a 1.1 percent of total statewide emissions, approximately 0.02 percent of total US emissions, and 0.002 percent of total global GHG emissions. Moreover, the percentages identified in the previous sentence for national and global levels would be even smaller (or even negative) since the composite TVA proposal being reviewed in this EA involves not just the construction and operation of the Paradise and Colbert CTs, but also the simultaneous retirement of the older CTs at Allen and Johnsonville barring the use of a few CTs at Allen for regional black start in an emergency. Thus, TVA's composite proposal is expected to result in a net reduction since the newer CTs installed at Paradise and Colbert would operate at a higher thermal efficiency than the ones being retired at Allen and Johnsonville.

Further, as noted in the 2019 IRP, during the decade following the CT retirements, i.e., 2021–2030, annual average system-wide emissions of CO₂ would decrease by 0.6 percent. Thus, the operation of the CT plant at Colbert would not negatively impact regional and national GHG emissions or climate change.

3.3 Geology and Soils

3.3.1 Affected Environment

3.3.1.1 Geologic Setting

The Paradise Reservation lies within the Shawnee Hills section of the Interior Plateau Physiographic Province in Northwestern Kentucky (Fenneman 1938). The reservation is underlain by Pennsylvanian-aged bedrock of the Carbondale Formation, which consists of shale, coal, sandstone, and limestone. The most extensively mined coal seams listed within this formation includes the No. 9 and No. 11 seams (USGS 2001). Extensive strip mining operations have significantly altered the topography and geology within the vicinity of the plant and, as such, large areas of the property are underlain by deep mine spoil deposits. However, depth to bedrock across the proposed CT plant site is variable, ranging from 4 feet to over 90 feet below ground surface (S&ME 2020a).

The Colbert Reservation lies within the Highland Rim Section of the Interior Plateau Physiographic Province (Fenneman 1938). The primary bedrock underlying the Colbert Reservation is Tuscumbia limestone, a cherty limestone characterized by fine to medium grained fossils and layers of chert nodules (USGS 2020b). This Mississippian age bedrock may be overlain by residual and alluvial deposits. Depth to bedrock is variable, ranging from 17 feet to more than 67 feet below ground surface with differential solution activity and weather producing an irregular bedrock surface (S&ME 2020b).

The proposed offsite TL upgrades are located in Tennessee, Kentucky, and Alabama, and are primarily included in two sections of the Interior Plateau Physiographic Province, the Highland Rim Section and the Nashville Basin (TVA 2019d). The Highland Rim section is a plateau that occupies much of central Tennessee and parts of Kentucky and northern Alabama. The bedrock of the Highland Rim is Mississippian limestones, chert, shale, and sandstone. The Nashville Basin section is an oval area in middle Tennessee with an elevation about 200 feet below the surrounding Highland Rim. The bedrock is comprised of generally flat-lying limestones (TVA 2019d).

3.3.1.2 Geologic Hazards

3.3.1.2.1 Seismic Events

According to the USGS illustration of expected frequency of damaging earthquakes, the Paradise and Colbert reservations are located within an area with a moderate seismic hazard (USGS 2018). This rating is based on an historical earthquake having a magnitude of 7.5 to 8 that occurred within the New Madrid Seismic Zone (NMSZ) approximately 146 miles and 137 miles from each site, respectively (S&ME 2020a and 2020b).

The NMSZ is located along the Mississippi Valley in the areas of western Kentucky and Tennessee, southwestern Missouri, and northwest Arkansas. The NMSZ is best known for a series of intense earthquakes which occurred in 1811 and 1812. These earthquakes were estimated to have magnitudes ranging from 7.0 to 8.6 and caused significant disruption at the ground surface (landslides, fissures, sand boils, lateral spreads, subsidence, submergence, and uplift) and damage to structures (S&ME 2020a and 2020b).

3.3.1.2.2 Faulting

Based on a review of the USGS website, which contains information on faults and associated folds in the United States that are believed to be sources of more than six earthquakes having a magnitude greater than 6 during the Quaternary Period (the past 1,600,000 years including Holocene Epoch), there are no known faults of this age located within the vicinity of the Paradise and Colbert reservations or the proposed TL upgrades (USGS 2020c).

3.3.1.3 Karst Topography

“Karst” refers to a type of topography that is formed when rocks with a high carbonate content, such as limestone and dolomite, are dissolved by groundwater to form sink holes, caves, springs, and underground drainage systems. Karst topography forms in areas where limestone and dolomite are near the surface. There is no evidence of a karst environment on or near the Paradise CT plant project area (TVA 2017a).

Karst features have been identified in the bedrock at the Colbert Reservation. The bedrock in such areas is characterized by differential weathering and solution activity producing deep bedrock cuts and sharp peaks known as “pinnacle and cutter” topography (TVA 2016c), which results in the variable depth to bedrock noted above. No other evidence of other karst features is present on the Colbert CT plant project area (Geologic Survey of Alabama [GSA] 2020).

3.3.1.4 Soils

According to the Natural Resources Conservation Service (NRCS) web soil survey (USDA NRCS 2020), most of the soils on the Paradise CT plant project area are mapped as Fairpoint-Bethesda and the Bethesda-Fairpoint complex which are generally silty clay loams. Most of the other soils are mapped as dumps, Pits and Udorthents (fill material). This material consists of those lands that had previously been disturbed by surface mining practices. Unconsolidated overburden materials overlying bedrock include alluvial and residual soils and strip mine spoil. Soils mapped on the Paradise CT plant project area are shown on Table 3-5.

As indicated on the NRCS online web soil survey, the soils on the Colbert site are predominantly urban land, mostly covered by streets, parking lots, buildings, and other

structures. Approximately 30 percent of the Colbert CT project area is mapped as the Decatur-Urban land complex, which is a mixture of Decatur soil and urban land, and 23 percent is mapped as urban land. The remaining soil types present within the project area are forms of silt loam, including Fullerton cherty silt loam, Fullerton gravelly silt loam (together comprising 29 percent of the project area) and Fullerton-Bodine complex (USDA NRCS 2020). Soils mapped on the Colbert CT plant project area are shown on Table 3-6.

Table 3-5. Soil Types Mapped Within the Paradise CT Plant Project Area

Soil Mapping Unit	Acres	Percent of Total
Belknap silt loam,	11.3	1.9%
Bethesda-Fairpoint complex	121.5	20.0%
Fairpoint-Bethesda complex	248.3	40.9%
Weinbach silt loam	11.7	1.9%
Lindside silt loam	3.0	0.5%
Oatwood silt loam	3.7	0.6%
Wellston silt loam	10.7	1.8%
Zanesville silt loam	11.4	1.9%
Pits	5.6	0.9%
Udorthents	123.0	20.2%

Source: USDA NRCS 2020

Table 3-6. Soil Types Mapped Within the Colbert CT Plant Project Area

Soil Mapping Unit	Acres	Percent of Total
Capshaw Silt Loam	8.9	2.3%
Decatur silt loam	21.8	5.6%
Decatur-Urban land complex	118.5	30.3%
Emory silt loam	10.1	2.6%
Fullerton gravelly silt loam	114.0	29.2%
Fullerton-Bodine complex	2.0	0.5%
Tupelo-Colbert complex	11.7	3.0%
Urban Land	89.0	22.8%
Water	14.8	3.8%

Source: USDA NRCS 2020

3.3.2 Environmental Consequences

3.3.2.1 Alternative A – No Action Alternative

Under Alternative A, there would be no project-related impacts to geologic resources or soils as TVA would not construct the CT plants at the Paradise or Colbert reservations.

3.3.2.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

Grading and site preparation activities associated with the construction of the CT plant at Paradise have the potential to disturb soil stability and increase erosion. Despite these proposed actions, impacts to soil resources associated with surface disturbances related to the proposed construction activities are expected to be minor, as BMPs described in the project-specific SWPPP would be implemented to minimize erosion during clearing and site preparation.

The proposed CT plant at Paradise would be constructed on a site that is heavily disturbed and comprised of fill material. Onsite and local geologic and geomorphic features within and around the proposed CT plant features were evaluated during the screening level geotechnical investigation at the site. The geotechnical exploration did not encounter any onsite features that would prohibit development of a CT plant at Paradise. As identified in the report (S&ME 2020a), the design of the CT plant would address soils and materials susceptible to liquefaction, soil strength and slope stability, differential settlement potential, seismic considerations, and fill material selection and compaction requirements. These design considerations are expected to minimize any effects on geological and soil resources.

The proposed borrow site is located in a previously disturbed area that has been extensively mined. Despite this, impacts to soil resources associated with surface disturbances related to the proposed clearing and grubbing activities are expected to be minor. BMPs outlined in the SWPPP would be implemented to minimize erosion during land clearing, site preparation, and access road construction. Stockpiles of topsoil would be used for borrow site restoration and to help promote native soil biota and re-establishment of soil functions.

Construction of the natural gas compressor at the offsite existing compressor station to support the CT plant at Paradise would occur on previously developed paved or gravel areas and only minor amounts of excavation would be required. Therefore, there would be no impacts to geology or soils.

Proposed offsite TL upgrades associated with the proposed Paradise CT plant would require minimal ground disturbance and may result in increased erosion. BMPs described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities, Revision 3* (TVA 2017b) and outlined in the project-specific SWPPP would be implemented to minimize erosion during site preparation. Therefore, impacts to soils would be minor.

Onsite construction activities at Colbert would also include grading and site preparation that would result in minor impacts to soil resources. Impacts to groundwater would be minor and minimized through implementation of BMPs outlined in the project-specific SWPPP.

Similar to the proposed CT plant at Paradise, the proposed CT plant at Colbert would be constructed on a site that is heavily disturbed. Onsite and local geologic and geomorphic features within and around the proposed CT plant features were evaluated during the screening level geotechnical investigation at the site. The geotechnical exploration did not encounter any onsite features that would prohibit development of a CT plant at Colbert. As identified in the report, the design of the CT plant would address soils and materials susceptible to liquefaction, soil strength and slope stability, differential settlement potential,

seismic considerations, and fill material selection and compaction requirements (S&ME 2020b). These design considerations are expected to minimize any effects on geological and soil resources.

Offsite upgrades to the existing natural gas supply at Colbert would require minimal ground disturbance and would not impact regional geologic conditions as BMPs outlined in the CBMPP would be implemented to minimize erosion during land clearing and site preparation. Therefore, impacts to geology or soils would be minor.

Offsite TL upgrades associated with the construction of the CT plant at the Colbert Reservation would be similar to the TL upgrades described for construction of the CT plant at the Paradise Reservation. As described above, the impacts would be localized and minimized with the appropriate use of BMPs and erosion control measures. Therefore, impacts associated with soil erosion during construction activities would be minimized with implementation of BMPs and would be minor.

Operation of the CT plants at Paradise and Colbert would not impact soils or geological resources.

3.4 Groundwater

3.4.1 Affected Environment

3.4.1.1 Regional Aquifers

Regional aquifers within five miles of the Paradise Reservation are represented by the bedrock carbonate aquifer and the alluvial aquifer associated with the Green River. Water-bearing units at the Paradise Reservation include the following units (from surface to depth): coal-mine spoils/fill, alluvium/residuum, and the bedrock carbonate aquifer (Carbondale Formation). Groundwater flow generally follows surface topography with flow toward the Green River and Jacobs Creek (Stantec 2020b). Based on borings collected in June 2020, depth to groundwater ranges from 13 feet to approximately 38 feet across the proposed project site (S&ME 2020a).

The Tusculumbia-Fort Payne aquifer (Tusculumbia Limestone bedrock aquifer) is the regional water-bearing aquifer underlying the Colbert Reservation. The groundwater flow direction is toward the north northeast to the Tennessee River/Pickwick Reservoir (Stantec 2020a). Based on borings collected in May 2020, depth to groundwater ranges from 14 feet to over 50 feet across the proposed CT plant site (S&ME 2020b).

Groundwater within the carbonate bedrock of the Highland Rim and Nashville Basin provinces associated with the offsite TL upgrades is encountered at depths ranging from 50 to 200 feet (TVA 2019d). Groundwater directional flow is generally reflective of site topography and local geologic conditions.

3.4.1.2 Groundwater Use

Most of the public water supply in Muhlenberg County is sourced from the Green River and provided by a water utility (Central City Water and Sewer System) (Stantec 2020b, 2020c, and 2020d). Previous studies identified four wells (three domestic and one industrial well) within two miles of the plant reservation. Two of the domestic wells were reviewed in 2003 by TVA and were found to no longer exist. No new public drinking water sources have been located near the reservation (TVA 2019c).

Three public water supply utilities are present within a five-mile radius of the Colbert Reservation: the Colbert County Rural Water System, the Cherokee Water Department, and the Hawk Pride Mountain Water System. Only one, the Hawk Pride Mountain Water System, supplies approximately 1,350 customers with groundwater supplied by two wells that are approximately five miles east-southeast of the Colbert Reservation and that were completed in the Tusculumbia-Fort Payne bedrock aquifer (Stantec 2020a).

Groundwater use across Tennessee, Kentucky, and Alabama (area spanned by the proposed TL upgrades) is variable and dependent upon several factors including groundwater availability and quality, surface water availability and quality, and population. Groundwater use is typically characterized by municipal public supply wells in densely populated areas and is generally limited to private domestic water supply wells in rural areas (TVA 2019d).

3.4.1.3 Groundwater Quality

No directly applicable groundwater monitoring data are available from TVA's monitoring network for the proposed CT plant at Paradise. However, TVA has established three networks of monitoring wells within separate areas on the Paradise Reservation: Gypsum Disposal Area, Peabody Ash Pond, and Slag Pond Area. Groundwater from these wells is monitored in accordance with the requirements of the EPA Final Disposal of Coal Combustion Residuals from Electric Utilities Rule (CCR Rule). Monitoring results from samples taken in 2019 show arsenic as the only constituent detected above groundwater protection standards at the Peabody Ash Pond Unit and Slag Pond Unit (Stantec 2020c and 2020d). No constituents detected above the groundwater protection standards were recorded in the certified monitoring well network for the Paradise Gypsum Disposal Area Unit (Stantec 2020b).

At Colbert, a groundwater monitoring well network has been established for the Ash Disposal Area 4, located southeast of the proposed CT plant. For the 2019 assessment monitoring, cobalt and arsenic were detected at levels above groundwater protection standards (Stantec 2020a).

The quality of groundwater in the TVA region largely depends on the chemical composition of the aquifer in which the water occurs. Groundwater in the carbonate bedrock present in the Highland Rim and Nashville Basin (where the proposed TL upgrades would occur) may contain high sulfide or sulfate concentrations in places. However, the chemical quality of most groundwater in the overall TVA region is within health-based drinking water standards identified by the EPA (TVA 2019d).

The Safe Drinking Water Act of 1974 established the sole source aquifer protection program that regulates certain activities in areas where the aquifer (water-bearing geologic formations) provides at least half of the drinking water consumed in the overlying area. No sole source aquifers exist in Tennessee, Kentucky, or Alabama (EPA 2020f).

3.4.2 Environmental Consequences

3.4.2.1 Alternative A – No Action Alternative

Under Alternative A, there would be no change in groundwater conditions at the reservations that would be associated with construction of the proposed CT plants. TVA would continue to monitor the groundwater at the former coal-fired plant sites at Paradise

and Colbert in accordance with federal and state requirements and would institute corrective actions if needed.

3.4.2.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

Construction of CT plant components at Paradise would require below ground construction activities that may encounter groundwater. Such activities include installation of deep foundations, if needed, to support the proposed CT plant and associated facilities, as well as the development of the natural gas pipeline trench to bury the pipeline at 10 to 12 feet below grade. Additionally, shallow excavation is also expected to be required for proposed construction of the onsite TL. If groundwater is encountered during any of these activities, dewatering activities would be used to control groundwater infiltration into the excavation site and all state and federal requirements relating to groundwater protection would be followed. However, because such activities and their effects to groundwater patterns or availability are localized and generally limited to the construction phase, impacts from construction are expected to be minor.

Construction of the natural gas compressor at the existing compressor station is not expected to adversely impact groundwater quality or supply. Construction of the project facilities as well as activities in the temporary workspaces would occur on a previously developed sites and minimal excavation would be required. Therefore, there would be no impacts to groundwater.

Proposed TL upgrades associated with the Paradise CT plant would require minimal ground disturbance and impacts to groundwater associated with TL upgrades are not anticipated. During revegetation and maintenance activities, impacts to groundwater would be minor and mitigated through use of BMPs as described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority* (TVA 2017b). As such, impacts to groundwater associated with ROW maintenance would be minor.

Demineralized water currently used at the Paradise CC plant would be used for the proposed CTs. Potable water would be obtained from the existing public supply. Therefore, no impacts to groundwater associated with operation of the CT plant are anticipated.

Onsite and offsite construction activities associated with the construction of the CT plant at the Colbert Reservation would be like those described for construction of the CT plant at the Paradise Reservation. Although preliminary geotechnical analysis indicates that shallow foundation systems could be used for some plant facilities, deeper foundations may be required to support others. If shallow groundwater is encountered, trench dewatering activities would be used during installation of the pipeline. However, because such activities and their effects are localized, and generally limited to the construction phase, impacts from construction are expected to be minor.

Groundwater impacts associated with the proposed TL upgrades to support the CT Plant at Colbert would be the same as described for Paradise and would be associated with TL maintenance and revegetation activities. These impacts would be minimized with the implementation of BMPs (TVA 2017b) and would be minor.

No impacts to groundwater are expected from operation of the proposed facilities at Colbert. Demineralized water for CT compressor washing would be trucked to the site. Potable water would be obtained from the existing public supply.

3.5 Surface Water Resources

3.5.1 Affected Environment

3.5.1.1 Paradise CT Plant Project Area, Offsite Natural Gas Upgrade, and Offsite TL Upgrades

Surface water features identified on the Paradise CT plant project area are shown on Figure 3-1. The Paradise CT plant project area is drained by permitted storm water outfalls, wet weather conveyances, red water ditches (which ultimately flow to either the bottom ash pond or fly ash pond), the condenser cooling water discharge (Outfall 005), and process and storm water discharges from the fly (Outfall 001) and bottom ash impoundment systems (Outfall 002). The plant intake for Units 1 and 2 is located approximately at Green RM 100.6 and the intake for Unit 3 is located at RM 100.3.

The Green River basin contains approximately one-fourth of Kentucky's land area and is the largest drainage basin in the state with a total of 18,858 acres (KDEP 2014). Reservoirs have been constructed by the U.S. Army Corps of Engineers (USACE) on the Rough, Nolin, and Barren Rivers, as well as on the main stem of the Green River in the upper basin. Major sources of stream contamination in the upper basin are agriculture (sediment, nutrients, and pesticides); mining or drilling (chloride); on-site and municipal wastewater-treatment systems (decomposable organic matter, nutrients, and bacteria); and urban storm water runoff (metals, nutrients, and sediment).

3.5.1.1.1 Surface Water Quality

The federal CWA requires all states to identify all waters where required pollution controls are not sufficient to attain or maintain applicable water quality standards and to establish priorities for the development of limits based on the severity of the pollution and the sensitivity of the established uses of those waters. States are required to submit reports to the EPA. The term "303(d) list" refers to the list of impaired and threatened streams and water bodies identified by the state.

The overall water quality in the Green River Basin is good. Two segments of the Green River upstream of the Paradise CT plant project area and the entire 8,210-acre Green River Reservoir are listed on the state 303(d) report as impaired and only partially support their designated uses. One impaired segment from Green River Mile (RM) 210.4 to Green RM 250.2 is designated for primary contact recreation water and fish consumption uses. The listed pollutants of concern include *E. coli* and mercury in fish tissue from an unknown source. The other impaired segment is from Green RM 283.10 to Green RM 309.0 and is also designated for primary contact recreation water. The listed pollutant is fecal coliform from a package plant or other permitted small flow discharges. The Green Reservoir is designated for fish consumption. The listed pollutants of concern are mercury and Polychlorinated Biphenyls (PCBs) in fish tissue (KDEP 2016). Jacobs Creek and the portion of the Green River adjacent to the Paradise Reservation are currently not assessed. The Green River at Green RM 189-290, approximately 90 miles upstream, is on the Nationwide Rivers Inventory (NRI; USNPS 2020); however, no NRI streams or Wild and Scenic Rivers are located near the Paradise CT plant project area.

3.5.1.1.2 Existing Wastewater Streams

The majority of the process flows (including any CCR discharges) ceased in February 2020, when the fossil plant was retired. However, all flows are not expected to cease completely

until sometime in 2021. Currently, stations sumps, water treatment plant flows, sewage treatment, minimal cooling water, and fire protection water through the bottom ash sluice system, in addition to other ancillary waste streams, are still flowing and being discharged. To better facilitate the closure of both the ash and bottom ash impoundments a series of process water basins are in the process of being constructed and should begin discharging through Outfall 002B sometime in 2020-2021.

Currently the KPDES permit KY00004201 (modified and effective September 1, 2020) requires monitoring of all the above-mentioned outfalls on a tiered basis based on current conditions. These tiers have different monitoring requirements and limits (KDEP 2020).

The existing plant site runoff is regulated under the KPDES Permit KY0004201. Existing facilities and BMPs are used to ensure compliance with the permit conditions. Some plant runoff is directed through the fly ash and the bottom ash impoundment systems, whereas other runoff goes directly to the Green River or Jacobs Creek through permitted discharge points.

The Paradise CC Plant was added to the grid in late 2016. The KPDES permit KY011902 for this facility was effective on September 1, 2016 and was later incorporated into the Paradise Fossil Plant KPDES Permit KY0004201 (KDEP 2020) and includes discharges to the Green River of storm water and internal Outfall 102 (cooling tower blowdown) from Outfall 101 located at approximately Green RM 99.4 and raw water intake for cooling water from Outfall 103. The parameters monitored and/or limited from Outfall 101 are flow, temperature, total suspended solids (TSS), pH and acute whole effluent toxicity. For Outfall 102, monitoring is required for flow, pH, free available chlorine, total residual oxidants oxidant discharge time, total chromium, total zinc, and priority pollutants. For Outfall 103, the facility intake, monitoring requirements include flow, intake velocity, and intake inspection.

3.5.1.1.3 Surface Water Features

TVA contractors conducted field surveys in September and October 2020 to delineate surface water features within the Paradise CT plant project area and the offsite TL upgrades and associated access roads (Wood 2020 a-c). These features are summarized in Table 3-7. Surface water features identified on the Paradise CT plant project area are shown on Figure 3-1.

Table 3-7. Surface Water Features within Paradise CT Plant Project Area and Associated Offsite TL Upgrade Areas

Project Area	Stream Type					
	Ephemeral		Intermittent		Perennial	
	Number	Length (ft)	Number	Length (ft)	Number	Length (ft)
Paradise CT Plant Project Area	4	2,496	3	2,185	1	1,113
TL 5823	1	100	-	-	-	-
TL 6057	1	39	1	25	-	-

Source: Wood 2020a-Wood 2020c

Surface water features identified in the offsite TL upgrades associated with the Paradise CT plant are shown in Appendix B, Figures B-1 through B-6. Surface water streams within the offsite TL upgrades project areas would be expected to be designated for warm water

aquatic habitat, primary contact recreation, secondary contact recreation, and domestic water supply (KDOW 2013). Streams are designated as High-Quality Waters of the State when they are not listed on the 303(d) list as impaired or when they are not designated as Outstanding National Resource Waters or Exceptional Waters. None of the streams identified within the offsite TL upgrades are designated as High-Quality Waters of the State.

The Paradise CT plant offsite natural gas compressor station is located within a previously developed area. No surface water features occur within the project area of this facility.

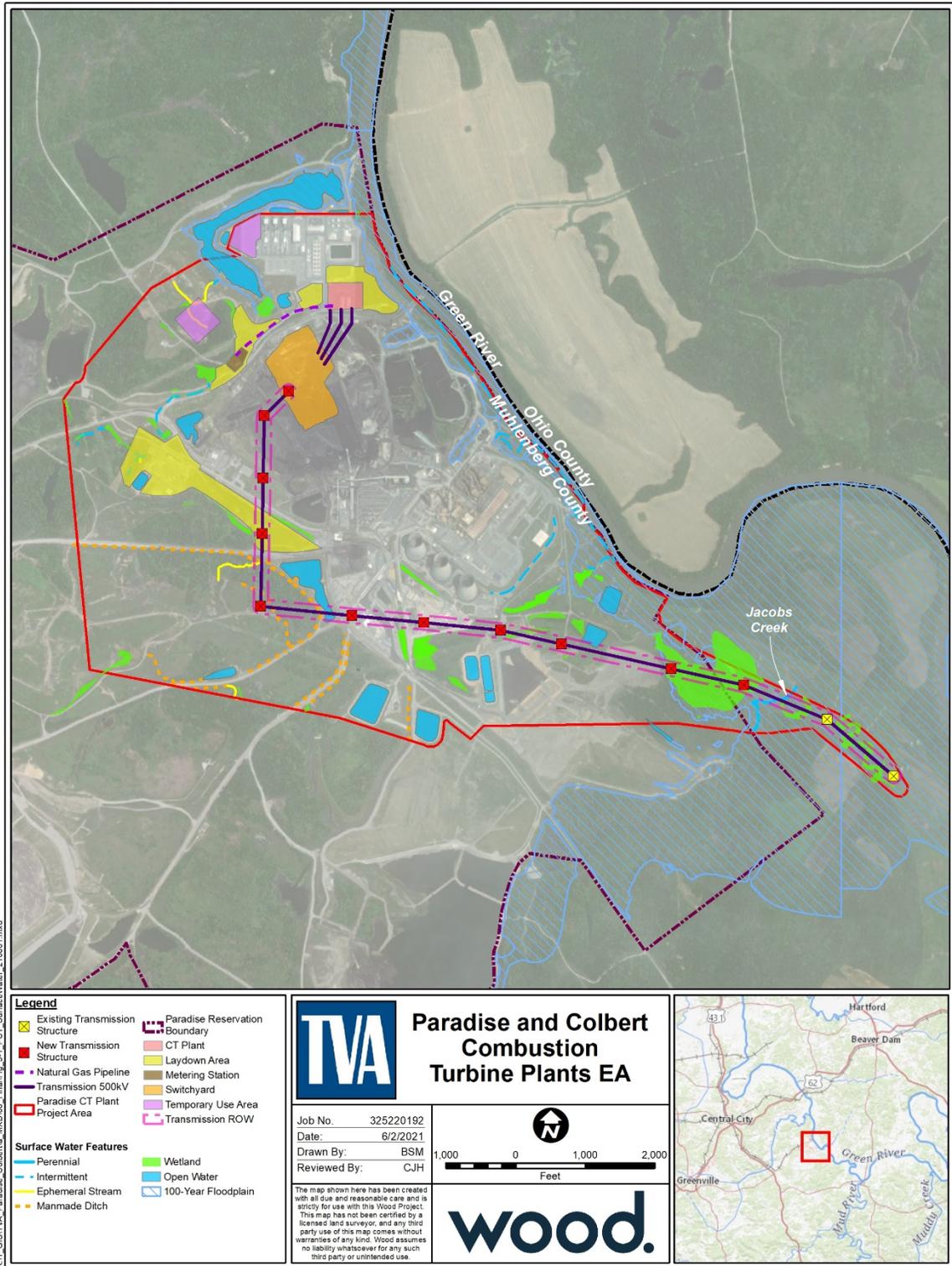


Figure 3-1. Surface Water Features Within the Paradise CT Plant Project Area

3.5.1.2 Colbert CT Plant Project Area, Offsite Natural Gas Loop Line, and Offsite TL Upgrades

Surface water features identified on the Colbert CT plant project area are shown on Figure 3-2. The Colbert CT plant project area is located on TVA's Pickwick Reservoir on the Tennessee River in Alabama at Tennessee RM 245 near the community of Barton. The nearest major cities are Florence, Sheffield, Muscle Shoals, and Tusculumbia, Alabama, 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/Pickwick Reservoir is classified for the uses of public water supply, fish and wildlife, swimming, and other whole body water contact sports (ADEM 2017).

River flow rates past the site are regulated by Wheeler 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).

3.5.1.2.1 Surface Water Quality

TVA has taken action to improve water quality and flows within its reservoirs. Most notably, TVA monitors the ecological condition of its reservoirs as part of the Vital Signs Monitoring Program which was initiated by TVA in 1990. Reservoirs throughout the Tennessee Valley have been monitored for physical and chemical characteristics of waters, sediment contaminants, benthic macroinvertebrates (bottom-dwelling animals such as worms, mollusks, insects, and snails living in or on the sediments), and fish community assemblage. Five key indicators (i.e., dissolved oxygen, chlorophyll, fish, bottom life, and sediment contaminants) are monitored and contribute to a final rating that describes the "health" and integrity of an aquatic ecosystem.

The reservoir ecological health evaluation system is reviewed each year, and improvements needed to address problems are identified. These improvements include installing equipment to add oxygen to the water as it flows through dams and adjusting reservoir flows. The overall ecological condition of Pickwick Reservoir rated "fair" in 2018 (TVA 2020d). Ecological health ratings for the reservoir have fluctuated between "good" and "fair", but scores have been lower, overall, since 2008. Weather conditions, particularly the timing and amount of rainfall, and the related changes in runoff have proven to be major factors in the variation of ecological health scores for Pickwick and many other reservoirs (TVA 2020d).

The section of the Tennessee River/Pickwick Reservoir near the Colbert Reservation has been listed on the most recent ADEM 303(d) list as impaired because of nutrients from agriculture (ADEM 2018a). Cane Creek also runs through the Colbert CT plant project area and is also listed as impaired for nutrients due to agriculture reasons.

3.5.1.2.2 Existing Wastewater Streams

National Pollution Discharge Elimination System (NPDES) Permit number AL0003867 (ADEM 2018b) covers water discharges at the Colbert Fossil Plant and the CT plant. Drainage from the Colbert Reservation discharges to both Cane Creek and the Tennessee River. Process wastewater discharges from the facility are permitted under NPDES permit and include outfalls that are sampled, monitored, and reported on monthly discharge monitoring reports. The intake is no longer used, and most discharges are primarily, if not completely, driven by precipitation. The existing Colbert CTs discharge to a process water

basin that discharges to Outfall 0011 to Cane Creek. The NPDES permit requires that pH, total suspended solids, oil and gas, TSS, ammonia as N, arsenic, copper, iron and selenium be monitored/reported.

3.5.1.2.3 Surface Water Features

TVA contractors conducted field surveys in September and October 2020 to delineate surface water features within the Colbert CT plant project area and the offsite TL upgrades and associated access roads (Wood 2020d, Wood 2020e-h). These features are summarized in Table 3-8. Surface water features identified on the Colbert CT plant project area are shown on Figure 3-2.

Table 3-8. Surface Water Features within Colbert CT Plant Project Area and Associated Offsite TL Upgrade Areas

Project Area	Stream Type					
	Ephemeral		Intermittent		Perennial	
	Number	Length (ft)	Number	Length (ft)	Number	Length (ft)
Colbert CT Plant Project Area*	-	-	1	650	1	1,885
TL 5676	-	-	-	-	-	-
TL 5617	-	-	-	-	6	744
TL 5670	3	135	1	447	-	-
TL 5989	-	-	-	-	-	-

* The Tennessee River is located adjacent to the site but not included in the table.
Source: Wood 2020d-Wood 2020h

Surface water features identified in the survey areas for the offsite TL upgrades associated with the Colbert CT plant are shown in Appendix B, Figures B-7 through B-20. The streams within the TL 5617 project area are classified by the state of Tennessee for fish and aquatic life, recreation, livestock watering and wildlife and irrigation designations (TDEC 2013). A portion of Shoal Creek is also listed as Exceptional Tennessee Waters, domestic water supply, and industrial water supply. A portion of Brewer Branch is also listed as Exceptional Tennessee Waters, and Factory Creek is also listed as a trout stream and for domestic water supply. The project area for TL 5670 is located in Alabama, and the streams would be designated for fish and wildlife uses. Surface water features were not observed within the TL 5676 or TL 5989 survey areas.

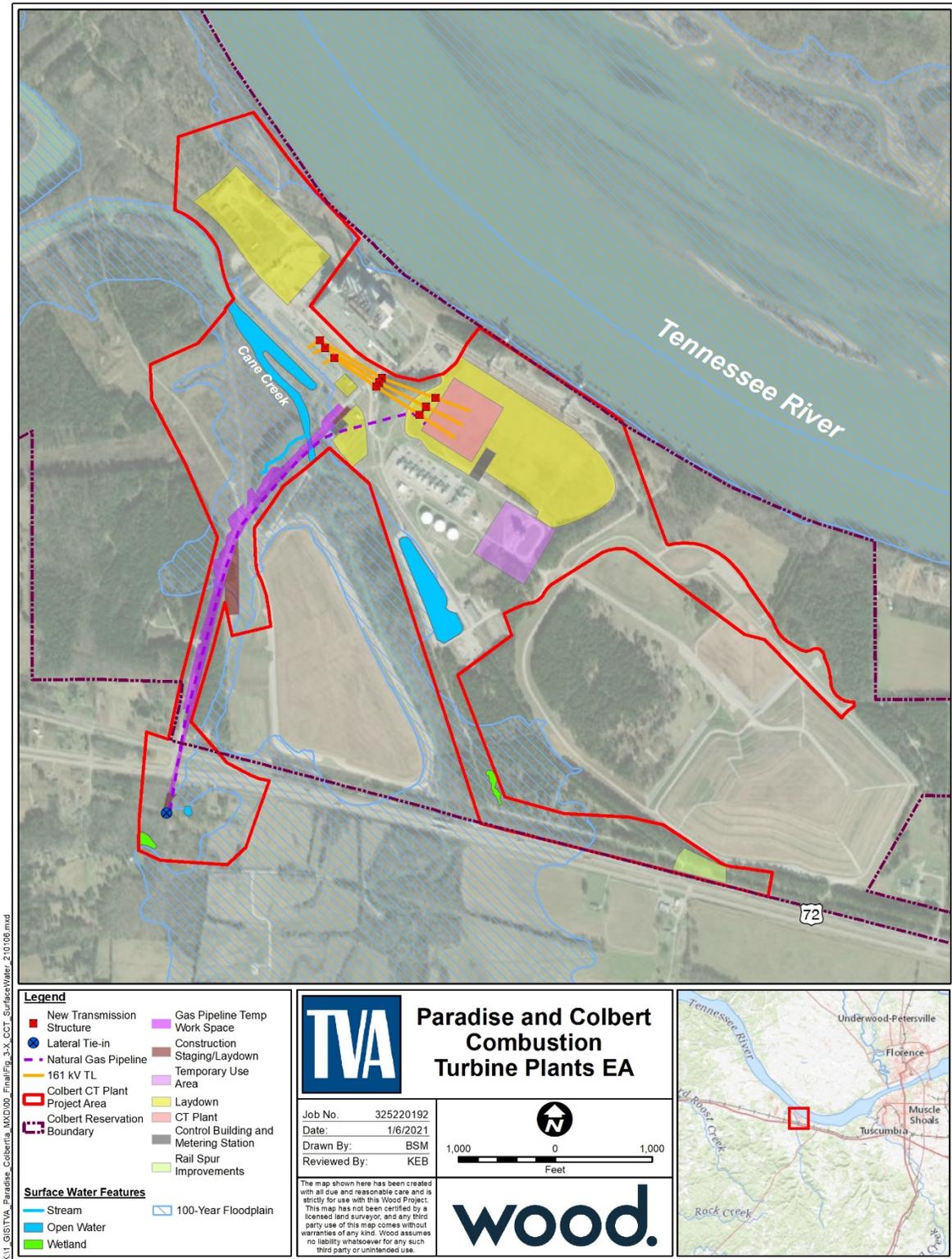


Figure 3-2. Surface Water Features Within the Colbert CT Plant Project Area

3.5.2 Environmental Consequences

3.5.2.1 Alternative A – No Action Alternative

Under Alternative A, there would be no project-related impacts to surface water resources as TVA would not construct the CT plants at Paradise or Colbert and associated TL upgrades would not be required. It is assumed that current operations would not create any additional impacts. The need for repair and maintenance of the existing CT units at Allen or Johnsonville would not cause any additional impacts to surface waters with implementation of proper BMPs and management of hazardous and solid wastes.

3.5.2.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

3.5.2.2.1 Paradise CT Plant Project Area, Offsite Natural Gas Upgrade, and Offsite TL Upgrades

Construction Impacts

Soil disturbances associated with construction of the CT plant at Paradise could potentially result in adverse water quality impacts. Soil erosion and sedimentation can accumulate in small streams and threaten aquatic life. Construction activities where surface water could be impacted by stormwater include:

- Preparation of laydown and temporary use areas
- Construction of the CT plant and associated equipment and systems such as natural gas metering and handling systems, instrumentation, and control systems, etc.
- Construction of the switchyard
- Reconfiguration of the onsite TL
- Construction of the natural gas pipeline
- Excavation of borrow material

During construction, TVA would comply with all appropriate state and federal permit requirements. The current KPDES permit would require development of a project-specific BMP. This plan would identify specific BMPs to address construction-related impacts. Appropriate BMPs would be followed, and 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. Areas where soil disturbance could occur would be stabilized and vegetated with native or non-native, non-invasive grasses and mulched.

The natural gas pipeline would be constructed in a trench in a disturbed area. BMPs listed above would be used to minimize impacts associated with clearing and site preparation.

Sanitary Wastewater

With an increased onsite workforce, it would be necessary to make arrangements to provide additional restroom facilities. During the construction phase, temporary toilet facilities would be provided by a licensed vendor and sanitary wastewater would be disposed at an approved facility.

Portable toilets would be provided for the construction workforce to support the proposed offsite TL upgrades as needed. These toilets would be pumped out regularly, and the sewage would be transported by tanker truck to a publicly owned wastewater treatment works that accepts pump out.

Equipment Washing and Dust Control

Equipment washing and dust control discharges would be handled in accordance with BMPs described in the Best Management Practices Plan required by the site's KPDES Permit KY0004201 to minimize construction impacts to surface waters.

Equipment washing and dust control discharges associated with the offsite TL upgrades would be handled in accordance with BMPs described in the SWPPP for water-only cleaning.

Hydrostatic Testing

For onsite hydrostatic testing, the Paradise CT plant will have the option to use potable or surface waters and the activity would be covered under the current KPDES Permit KY000420.

Surface Water Features

One proposed laydown and warehouse area would encompass approximately 577 linear feet of a potentially jurisdictional stream (Figure 3-1). TVA will establish a 50-foot buffer around the stream and will avoid any ground disturbing actions within the buffer to avoid direct impacts this feature. In addition, as shown on Figure 3-1, approximately 565 feet of ephemeral stream is located within one of the proposed temporary use areas. Based on current guidance, ephemeral streams are non-jurisdictional features. As no jurisdictional streams would be impacted by the work proposed at the Paradise CT plant project area, no additional permitting or stream mitigation would be expected. With proper implementation of these controls, only minor temporary impacts to local surface waters would be expected during the construction phase. Construction activities would avoid other surface water features within the Paradise CT plant project area. Therefore, no streams would be directly impacted by the proposed project.

The installation of the natural gas-fired reciprocating engine at an existing compressor station to support the Paradise CT plant would include new natural gas piping to tie the new compressor into the existing pipeline system. No surface water features are present within the existing compressor station site. BMPs would be utilized during the construction phase to minimize offsite erosion discharges.

Construction activities associated with the proposed offsite TL upgrades have the potential to temporarily affect surface water via storm water runoff. Soil erosion and sedimentation can accumulate in small streams and threaten aquatic life. TVA would comply with all appropriate state and federal permit requirements including obtaining a storm water construction permit if the project disturbs more than one acre of land. Appropriate BMPs would be followed, and 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.

Approximately 139 linear feet of ephemeral streams and 25 linear feet of intermittent streams may be impacted by access roads improvements and/or other land-disturbing activities associated the Paradise CT plant offsite TL upgrades. Streams within the offsite TL project areas associated with the Paradise CT plant are shown in Appendix B on Figure B-1 and Figures B-3 through B-5. TVA expects to utilize existing access roads and as such potential impacts to streams present will be minimized through avoidance (if practical) and the implementation of erosion and sediment BMPs identified in the BMP Plan developed for work in Kentucky and the site-specific SWPPP developed for construction work in Tennessee, to reduce potential sediment-laden runoff into adjacent or downgradient streams. However, temporary stream crossings may be required. Temporary stream crossings and other construction and maintenance activities would comply with appropriate state permit requirements and TVA requirements as described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority* (TVA 2017b).

Discharges into jurisdictional streams would not occur unless authorized by the USACE through the CWA Section 404 permitting process and/or TDEC Aquatic Resources Alteration Permit (ARAP) process or Kentucky Water Quality Certification Program, as applicable. Mitigation measures are not anticipated but will be incorporated into the final design of the project, if required through the permitting processes. As a result of implementing these measures, impacts to surface waters associated with the proposed offsite TL upgrades would be minor.

Operational Impacts

Storm Water

After construction, storm water BMPs would continue to be implemented so that surface water runoff from parking lots and industrially used areas of the site would be diverted to existing retention pond(s) with a controlled rate(s) of release. Runoff from areas with potential oil leaks, such as the two distillate-oil storage tanks, would be directed to an oil/water separator with subsequent discharge to the Paradise CC process pond. Oil collected in the oil/water separator would be periodically removed and trucked off site to an approved, waste oil recycling facility.

Sanitary Wastewater

During plant operations, there would be a small workforce at the site. If restroom facilities are to be part of this project's scope, they would be properly installed and permitted per local, state, and federal regulatory requirements.

Process Wastewater

The proposed Paradise CT plant would require up to about 100 gpm of water for inlet air evaporative cooling in summer ambient temperatures and demineralized water for CT compressor washing. Water is expected to be drawn through the current intake 103 from the Green River and treated prior to use. The current KPDES permit would need to be modified to include the discharges from the proposed Paradise CT plant. There would be a discharge in the summer from the cooling system; however, it would not be expected to impact thermal levels in the discharge. The Paradise CC plant already has ample means of demineralized water production that would be used for the CTs. Wash effluent would be

collected in tanks and, after analysis, disposed of at an approved wastewater treatment facility offsite. Restroom facilities and other needs for potable water uses at the proposed Paradise CT plant would be obtained from an existing public water supply.

Additionally, impervious buildings and infrastructure prevent rain from percolating through the soil and result in additional runoff of water and pollutants into storm drains, ditches, and streams. Clearing of vegetation and ground cover, and the addition of impervious buildings and pavement could alter the current storm water flows. Construction of the CT plant and switchyard could increase the impervious cover on the project area, thus altering and possibly increasing the concentrated storm water runoff. This flow would be properly treated through implementation of the proper stormwater BMPs or by diverting the storm water discharges to the Paradise CC process water basin for co-treatment, and ultimately released through permitted Outfall 101 and 102 to the Green River. No direct or indirect negative impacts to the surface waters would be anticipated from the operation of this facility because any discharges would be required to meet KPDES limits and Kentucky Water Quality Standards that are developed to be protective of designated waters.

3.5.2.2.2 Colbert CT Plant Project Area, Offsite Natural Gas Loop Line, and Offsite TL Upgrades

Construction Impacts

Construction activities at Colbert where surface water could be impacted by stormwater include:

- Preparation of laydown and temporary use areas
- Construction of the CT plant and associated equipment and systems such as natural gas metering and handling systems, instrumentation, and control systems etc.
- Construction of three new 161-kV TLs to connect the existing switchyard to the new CT plant
- Construction of the natural gas pipeline.

During construction, TVA would comply with all applicable state and federal permit requirements. Alabama requires a stormwater construction permit be obtained if more than one acre is disturbed, including the development and implementation of a CBMPP. Additionally, any in-stream work may require a Section 404 permit from the USACE and a 401 Water Quality Certifications from ADEM for any stream crossing activities. The activities that are not covered under the construction storm water permit, such as hydrostatic testing, would be covered under the sites NPDES permit AL0003867 or other permitting would be required.

No jurisdictional streams would be impacted by construction activities within the Colbert CT plant site (Figure 3-2); therefore, no additional permitting or stream mitigation would be expected.

The natural gas pipeline would be constructed in a trench that would run parallel to the existing 10-inch-diameter natural gas pipeline lateral. The segment of the pipeline crossing Cane Creek would be installed using HDD to avoid impacts to aquatic resources. BMPs

listed above would be used to minimize impacts associated with clearing and site preparation.

With proper implementation of these controls, only minor temporary impacts to surface water features within the Colbert CT Plant project area would be expected.

Approximately 135 linear feet of ephemeral streams and 447 linear feet of intermittent streams may be impacted by access road improvements and/or other land-disturbing activities associated with the Colbert CT plant. Streams within the offsite TL project areas associated with the Colbert CT plant are shown in Appendix B on Figures B-7 through B-11, Figures B-14 through B-17, and Figure B-19. Construction impacts associated with the offsite TL upgrades required to support the Colbert CT plant would be similar to the impacts of offsite TL upgrades required to support the Paradise CT plant. TVA would comply with all appropriate state and federal permit requirements and appropriate BMPs would be followed, and 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 is minimized. As a result of implementing these measures, impacts to surface waters associated with the proposed offsite TL upgrades would be minor.

Operational Impacts

Storm Water

After construction, storm water BMPs would continue to be implemented so that surface water runoff from parking lots and previously developed industrial lands of the site would be diverted to existing retention pond(s) with a controlled rate(s) of release. Runoff from areas with potential oil leaks, such as the two distillate-oil storage tanks, would be directed to an oil/water separator with subsequent discharge to the Colbert CT process pond. Oil collected in the oil/water separator would be periodically removed and trucked off site to an approved, waste oil recycling facility.

Sanitary Wastewater

During plant operations, there would be a small workforce at the site. If restroom facilities are to be part of this project's scope, they would be properly installed and permitted per local, state, and federal regulatory requirements.

Process Wastewater

The proposed Colbert CT plant would require up to about 100 gpm of water for inlet air evaporative cooling in summer ambient temperatures and demineralized water for CT compressor washing. Additionally, restroom facilities and safety showers and eye wash stations would require potable water. All water needs for this facility would be provided from an existing public water supply. The current NPDES permit would need to be modified to include the discharges from the proposed CTs. There would be no impacts from increased thermal loading from this waste stream. The Colbert plant has historically produced and stored limited amounts of demineralized water, and those facilities could be re-used/upgraded for the new CTs or demineralized water would be trucked to the site from offsite sources.

Additionally, impervious buildings and infrastructure prevent rain from percolating through the soil and result in additional runoff of water and pollutants into storm drains, ditches, and streams. Clearing of vegetation and ground cover, and the addition of impervious buildings and pavement could alter the current storm water flows. Construction of the CT plant and associated equipment systems could increase the impervious cover on the project area, thus altering and possibly increasing the concentrated storm water runoff. Any discharges would be sent to the current Colbert CT process water basin for co-treatment and ultimately released through permitted Outfall 0011 to Cane Creek. No direct adverse impacts to surface waters would be anticipated from the operation of this facility as any discharges would be required to meet NPDES limits and ADEM Water Quality Criteria that are developed to be protective of designated uses.

3.6 Floodplains

3.6.1 Affected Environment

A floodplain is the relatively level land area along a stream or river that is subject to periodic flooding. The area subject to a one-percent chance of flooding in any given year is normally called the 100-year floodplain. The area subject to a 0.2-percent chance of flooding in any given year is normally called the 500-year floodplain. It is necessary to evaluate development in the floodplain to ensure that the project is consistent with the requirements of EO 11988, Floodplain Management.

3.6.1.1 Paradise CT Plant Project Area, Offsite Natural Gas Upgrade, and Offsite TL Upgrades

The Paradise CT Plant project area is located on the Green River between RM 99.7 and RM 102.5, left descending bank, in Muhlenberg County, Kentucky. Flood elevations for the Green River are provided in Table 3-9.

Table 3-9. Green River Flood Elevations

Return Period (years)	Elevation at Green River Mile 99.7 (feet NAVD* 88)	Elevation at Green River Mile 102.5 (feet NAVD* 88)
10	397.0	397.8
50	400.2	401.0
100	401.8	402.2
500	404.2	405.0

*NAVD = North American Vertical Datum

Source: FEMA 2013

Portions of the proposed offsite TL upgrades needed to support the CT plant at Paradise would cross several floodplain areas in Sumner County, Tennessee; and Todd and Muhlenberg counties, Kentucky. Floodplains identified in the survey areas for the offsite TL upgrades associated with the Paradise CT plant are shown in Appendix B, Figures B-1 through B-6.

3.6.1.2 Colbert CT Plant Project Area, Offsite Natural Gas Loop Line, and Offsite TL Upgrades

The Colbert CT plant site is located along the Tennessee River between RM 244.7 and RM 245.5 and Cane Creek RM 2.5-3.8, left descending bank, in Colbert County, Alabama. Flood elevations for the Tennessee River are provided in Table 3-10. Cane Creek enters Pickwick Reservoir and the Tennessee River at Tennessee River Mile 244.0. The Cane Creek watershed is about 52 square miles, and the watershed of the Tennessee River at Cane Creek is about 31,000 square miles (TVA 1970). Because the watershed of the Tennessee River is so much larger, and thus contributes much more discharge in a storm event, the 100-year flood on the Tennessee River would be higher than the 100-year flood on Cane Creek; therefore, the 100-year flood on the Tennessee River is used in this analysis.

Table 3-10. Tennessee River Flood Elevations

Return Period (years)	Elevation at Tennessee River Mile 244.0 - Cane Creek mouth (feet NGVD 29)	Elevation at Tennessee River Mile 244.7 (feet NGVD 29)	Elevation at Tennessee River Mile 245.5 (feet NGVD 29)
10	420.8	421.1	421.4
50	422.2	422.5	422.8
100	422.6	422.8	423.2
500	423.6	423.9	424.4

Source: TVA 1992 (HEC-2 model)

Portions of the proposed offsite TL upgrades needed to support the CT plant at Colbert work would cross several floodplain areas in Hardin, Lawrence, Montgomery, Wayne, and Wilson counties, Tennessee; and Colbert, Lauderdale, and Morgan counties, Alabama. Floodplains with the TL corridors are shown on figures in Appendix B. Floodplains identified in the survey areas for the offsite TL upgrades associated with the Colbert CT plant are shown in Appendix B, Figures B-7 through B-20.

3.6.2 Environmental Consequences

As a federal agency, TVA adheres to the requirements of EO 11988, Floodplain Management. The objective of EO 11988 is “to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative” (EO 11988, Floodplain Management). The EO is not intended to prohibit floodplain development in all cases, but rather to create a consistent government policy against such development under most circumstances (U.S. Water Resources Council 1978). The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative. For critical actions, the minimum floodplain of concern is the 500-year floodplain. A critical action is an action for which even a slight chance of flooding would be too great. Such facilities include, but are not limited to, hospitals, large generating facilities, and museums (U.S. Water Resources Council 1978).

3.6.2.1 Alternative A – No Action Alternative

Under the Alternative A, TVA would not construct or operate CT plants at Paradise and Colbert. Therefore, there would be no impacts to floodplains as there would be no physical changes to the current conditions found within the local floodplains.

3.6.2.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

Floodplains within the Paradise CT plant project area are shown in Figure 3-1. The proposed CT plant would be located at elevation 418 feet mean sea level (msl), which would be at least 10 feet above the 500-year flood elevation. Therefore, construction of the CT units at this location would be consistent with EO 11988 for both regular and critical actions. The laydown and temporary use areas, borrow site, the natural gas pipeline, and the 500-kV switchyard, would be located outside 100-year floodplains, which is also consistent with EO 11988.

Portions of the re-configured onsite 500-kV TL would be located within the 100-year floodplain of the Green River. Consistent with EO 11988, TLs and their support structures are considered to be repetitive actions in the 100-year floodplain that should result in minor impacts. The conducting wires of the TL would be located well above the 100-year flood elevation. The support structures for the TL would not be expected to result in any increase in flood hazard, either as a result of increased flood elevations or changes in flow-carrying capacity of the streams being crossed. Construction in the floodplain would be consistent with EO 11988 provided the TVA subclass review criteria for TL location in floodplains are followed (TVA 1981).

Muhlenberg County participates in the National Flood Insurance Program (NFIP), and any development must be consistent with its floodplain regulations. One structure on the re-configured 500-kV TL would be located in the Green River floodway. The Green River floodway is about 4,500 feet wide at this location, and the structure would be located at the edge of the floodway. The construction of one structure at the edge of the floodway would result in an imperceptible rise in flood elevations but create no obstruction in the floodway. The placement of the structure would thus be consistent with Muhlenberg County floodplain regulations, and thereby be consistent with EO 11988.

The proposed offsite TL upgrades for the Paradise CT plant would be located high off the ground and well above the 100-year flood elevation, which would be consistent with EO 11988. Some existing access roads, including access roads to TL 5823 structures 87 and 94 and TL 6057 structures 7-10, 23, 195, and 219 are located in the 100-year floodplain. These areas are shown in Appendix B, Figures B-1, B-2, and B-6. Access roads are considered to be repetitive actions in the 100-year floodplain that should result in minor impacts. To minimize adverse impacts, any road improvements proposed in floodplains but not floodways would be constructed in such a manner that upstream flood elevations would not be increased by more than 1.0 foot.

A portion of the access road to TL 6057 structures 7-10 and 94 would also be located within the Green River and Bulls Creek floodways, respectively. To prevent an obstruction in the floodway: (1) any fill, gravel or other modifications in the floodway that extend above the pre-construction road grade would be removed after completion of the project; (2) this excess material would be spoiled outside of the published floodway; and (3) the area would be returned to its pre-construction condition.

The onsite and offsite upgrades to the natural gas supply for the Paradise CT plant would be located outside 100-year floodplains, which would be consistent with EO 11988.

Floodplains within the Colbert CT plant project area and associated TL improvements are shown in Figure 3-2. The proposed CT units at Colbert would be located at or above elevation 459 feet msl, which would be over 30 feet above the 500-year flood elevation. Therefore, construction of the CT units at this location would be consistent with EO 11988 for both regular and critical actions. The control building and rail spur improvements would be located outside the 100-year floodplain, which would be consistent with EO 11988. Portions of the laydown and temporary use areas would be located in 100-year floodplains.

The pipeline company evaluated alternatives to locating the laydown areas in floodplains, and these alternatives would have increased impacts to environmental and cultural resources. Additionally, the pipeline is existing, and the laydown areas would need to be situated adjacent to the pipeline. The laydown area located approximately half-way along the roughly one-mile pipeline lateral route from the southern mainline tie-in point and the northern delivery station terminus would predominantly be used for staging or laydown of equipment and material. This staging location is expected to be used as a centralized location for equipment and material storage in order to minimize the aggregate impact area of the pipeline project along the route. This specific location (approximately halfway between the origin and terminus of the pipeline and immediately adjacent to the route) would result in construction efficiency and reduce third-party disturbance by minimizing traffic associated with mobilization and demobilization (initially, daily, and at completion).

Therefore, there is no practicable alternative to locating a portion of the laydown areas within the floodplain. To minimize adverse impacts, the natural gas provider reduced its original staging and laydown footprint in this area by increasing its expected temporary workspace at the north end of the project in a surface parking lot.

The pipeline company would also develop an evacuation plan prior to mobilization to relocate flood-damageable, loose, or valuable equipment out of the floodplain during a flood. Therefore, construction laydown areas within the floodplain would be consistent with EO 11988. Upon completion of the pipeline upgrades, the laydown and temporary use areas would be returned to existing conditions.

A portion of the new natural gas pipeline would be constructed within the 100-year floodplain. Consistent with EO 11988, utilities are considered to be repetitive actions in the 100-year floodplain that should result in minor impacts. To minimize adverse impacts, the portions of the pipeline trench that would be located within the floodplain would be backfilled such that the final settled ground elevation would be no higher than pre-construction elevation.

The proposed 161-kV TL onsite at Colbert would be located outside 100-year floodplains, which would be consistent with EO 11988.

The proposed offsite TL upgrades for the Colbert CT plant would be located high off the ground and well above the 100-year flood elevation, which would be consistent with EO 11988. Existing access roads to TL 5676 structures 503-505, TL 5617 structure 130, TL 5670 structures 125, 123, 121, 137, 139, 140, 153, and 154-158; and to TL 5989 structure 90; would be located in 100-year floodplains. These areas are shown in Appendix B, Figures B-8 through B-11, B-14 through B-16, and Figure B-18. Access roads are

considered to be repetitive actions in the 100-year floodplain that should result in minor impacts. To minimize adverse impacts, any road improvements proposed in floodplains but not floodways would be done in such a manner that upstream flood elevations would not be increased by more than 1.0 foot.

A portion of the access roads to TL 5670 structures 137 and 140 would also be located within the Clark Spring Branch Tributary floodway. To prevent an obstruction in the floodway: (1) any fill, gravel or other modifications in the floodway that extend above the pre-construction road grade would be removed after completion of the project; (2) this excess material would be spoiled outside of the published floodway; and (3) the area would be returned to its pre-construction condition.

The offsite upgrades to the natural gas supply for the Colbert CT plants would consist of installing a new lateral tie into the main gas pipeline. The tie-in is located outside 100-year floodplains, which is consistent with EO 11988.

The proposed project would have no significant impact on floodplains and their natural and beneficial values provided the following mitigation measures are followed:

- New TL construction would adhere to the TVA subclass review criteria for TL location in floodplains.
- To prevent an obstruction in the floodway due to construction or modification of the access roads to TL 6057 Structures 7-10 in the Green River floodway; TL 5823 Structure 94 in the Bulls Creek floodway; and TL 5670 Structures 137 and 140 in the Clark Spring Branch Tributary floodway: (1) any fill, gravel or other modifications in the floodway that extend above the pre-construction road grade would be removed after completion of the project; (2) this excess material would be spoiled outside of the published floodway; and (3) the area would be returned to its pre-construction condition.
- At Colbert, the portions of the natural gas pipeline trench that would be located within the floodplain would be backfilled such that the final settled ground elevation would be no higher than the pre-construction ground elevation.
- Any road improvements proposed in floodplains but not floodways would be constructed in such a manner that upstream flood elevations would not be increased by more than one foot.
- The commercial natural gas provider at Colbert would develop an evacuation plan prior to mobilization to relocate flood-damageable, loose, or valuable equipment out of the floodplain during a flood.

3.7 Wetlands

3.7.1 Affected Environment

The USACE regulates the discharge of dredged or fill material into waters of the United States (WOUS), including wetlands, under the CWA Section 404 Permit [33 USC § 1344]. Additionally, EO 11990 – Protection of Wetlands – requires federal agencies to avoid possible long- and short-term impacts to wetlands and minimize their impact in order 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 a

prevalence of vegetation typically adapted for life in saturated soil conditions. Types of 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 [33 CFR 328.39(b)].

3.7.1.1 Paradise CT Plant Project Area, Offsite Natural Gas Upgrade, and Offsite TL Upgrades

The Paradise CT plant project area is located along the left descending bank (west side) of the Green River between approximate RM 99 and 101. The site has undergone major land disturbances and natural drainage has been altered throughout the site. Past alterations within the site that directly affect the local hydrology include the construction of the facility, mining, disposal impoundments, roads within the site, and other previously conducted industrial activities. As a result, there are multiple manmade ponds, ditches, and swales throughout the site, some of which have developed wetland characteristics such as hydric soils and hydrophytic vegetation. As identified on the USGS topographic quadrangle map for the area, there are two streams (Jacobs Creek and an unnamed tributary to Jacobs Creek) located in the southeastern portion of the project area within the Green River floodplain, and they flow north to the Green River. The National Wetlands Inventory map identified forested wetlands and open water features along these streams.

Wetland delineation field surveys were conducted within all project areas in September and October 2020 in general accordance with the routine wetland determination method as published by the U.S. Army Corps of Engineers (USACE), 1987 edition (Technical Report Y-87-1; Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* [(Regional Supplement) (USACE 2012)].

As shown on Figure 3-1, 40 wetlands totaling 38.0 acres were identified within the Paradise CT Plant project area (Wood 2020a and HDR 2020). Relatively large, mostly emergent wetlands were identified within the existing TL corridor within the Green River floodplain in the southeastern portion of the project area; additional wetlands were identified throughout the site, mostly in previously disturbed areas, adjacent to ponds, and/or along constructed ditches and swales. The majority of the wetlands within the Paradise CT plant project area have either been previously impacted by land disturbance activities or were inadvertently created as a result of land disturbance activities. Most of the wetlands are at least partially dominated by common reed, an invasive species common throughout the project area (Wood 2020a and HDR 2020).

The Paradise CT plant offsite natural gas compressor will be located within a previously developed area that is paved. No wetlands occur within the project area of this proposed facility.

The Paradise CT plant offsite TL upgrades would occur along existing maintained ROW. Field delineations along the proposed upgrades and associated access roads were conducted in September and October 2020 (Wood 2020b; and Wood 2020c). Two wetlands

were identified within the offsite TL project areas as detailed below and shown on figures in Appendix B:

- TL 5823 – One herbaceous wetland adjacent to Old Hickory Lake was identified near Structure 87 (Appendix B, Figure B-2). Less than 0.01 acre occurs within the project area.
- TL 6057 – One herbaceous wetland totaling 0.02 acre was identified along the proposed access road within the TL ROW near Structure 23 (Appendix B, Figure B-6).

3.7.1.2 Colbert CT Plant Project Area, Offsite Natural Gas Loop Line, and Offsite TL Upgrades

The Colbert CT plant project area is located along the left ascending bank (west side) of the Tennessee River between approximate RM 243 and 246. Water resources in the vicinity include the Tennessee River and adjacent wetlands north-northeast of the project area, as well as Cane Creek which flows north- northwestwardly through the area. The National Wetlands Inventory identified forested wetlands adjacent to Cane Creek and within a forested area south of US 72.

Based on the wetland delineation of the Colbert CT plant project area (Wood 2020d), two forested wetlands, totaling 0.9 acre, were identified within the project area (Figure 3-2). Tree species included cottonwood, sycamore, American elm, box elder, and sugarberry. One of the delineated wetlands was identified along the proposed natural gas pipeline upgrades that extend from within the Colbert CT plant project area to the south side of US 72 (offsite).

The Colbert CT plant offsite TL upgrades would occur along existing maintained TL ROW. Field delineations along the proposed upgrades and associated access roads were conducted in September and October 2020 (Wood 2020e-h). The wetlands along the offsite TL project areas and proposed access roads primarily included herbaceous or shrub wetlands associated with swales, wetlands adjacent to streams and lakes, or low elevation areas within floodplains.

Five wetlands were identified along the offsite TL project areas associated with the Colbert CT plant as detailed below and shown on figures in Appendix B:

- TL 5617 – One herbaceous wetland was identified between Structure 122 and Structure 123 (Appendix B, Figure B-7). Less than 0.01 acre occurs within the project area.
- TL 5670 – Three wetlands totaling 0.18 acre were identified within the existing ROW. Wetlands occur near Structures 123 (Appendix B, Figure B-1) and 153 (Appendix B, Figure B-18). There is also a wetland located along an access road between Structures 130 and Structure 131 (Appendix B, Figure B-13).
- TL 5989 – One herbaceous wetland totaling 0.03 acre was located along the proposed access road within the existing ROW (Appendix B, Figure B-20).

3.7.2 Environmental Consequences

3.7.2.1 Alternative A – No Action Alternative

Under Alternative A, there would be no project-related impacts to wetlands as TVA would not construct the CT plants at Paradise or Colbert and associated TL upgrades would not be required.

3.7.2.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

Potential impacts to wetlands associated with the construction of CT units at Paradise and Colbert have mostly been avoided in conjunction with project planning. TVA has sited proposed project activities primarily within previously developed areas, and the potential to impact wetlands is low. Total estimated impacts to wetlands for all project areas is estimated to be approximately 0.29 acre.

A summary of potential impacts associated with the construction of the Paradise CT plant and offsite TL upgrades is included in Table 3-11. Wetlands within the Paradise CT plant project area have been avoided. However, re-configuration of the 500-kV line would require placement of two structures within an identified wetland resulting in an impact of 0.04 acre of forested wetland. In addition, approximately 0.03 acre of herbaceous wetland may be impacted by the potential improvements to existing access roads and/or other land-disturbing activities associated with the offsite TL upgrades. These impacts are anticipated to be temporary and limited to the construction phase.

Table 3-11. Summary of Wetland Impacts Associated with Paradise CT Plant

Feature Type	Paradise¹	TL 5823²	TL 6057²
PEM (acres)	0.04	0.01	0.02
PSS (acres)	0	0	0
PFO (acres)	0	0	0
Total (acres)	0.04	0.01	0.02

PEM = Palustrine emergent wetlands

PSS = Palustrine scrub-shrub wetlands

PFO = Palustrine forested wetlands

¹ Includes area within Paradise CT plant project area identified on Figure 3-1.

² Includes areas within TL corridors and access roads identified on figures in Appendix B.

Source: Wood 2020

Proposed activities associated with the construction of the CT units within the Colbert CT plant site have been sited to avoid all wetland impacts. Therefore, no wetland impacts would occur within the Colbert CT plant project area. In addition, the offsite gas supply upgrades located south of US 72 would avoid impacts to the delineated wetland.

Approximately 0.09 acre of herbaceous wetlands and 0.13 acre of shrub wetland may be impacted by potential improvements to existing access roads and/or other land-disturbing activities associated the Colbert CT plant offsite TL upgrades. These impacts are anticipated to be temporary and limited to the construction phase. Table 3-12 summarizes potential wetland impacts associated with the Colbert CT plant project.

Table 3-12. Summary of Wetland Impacts Associated with Colbert CT Plant

Feature Type	Colbert ¹	Offsite				
		Natural Gas Upgrade	TL 5617 ²	TL 5670 ²	TL 5989 ²	TL 5676 ²
PEM (acres)	0	0	<0.01	0.05	0.03	0
PSS (acres)	0	0	0	0.13	0	0
PFO (acres)	0	0	0	0	0	0
Total (acres)	0	0	<0.01	0.18	0.03	0

PEM = Palustrine emergent wetlands

PSS = Palustrine scrub-shrub wetlands

PFO = Palustrine forested wetlands

¹ Includes area within Colbert CT plant project area north of US 72 identified on Figure 3-2.

² Includes areas within TL corridors and access roads identified on figures in Appendix B.

Source: Wood 2020

During final design of the project, potential impacts to wetlands throughout all project areas will be minimized through further avoidance (if practical) and the implementation of erosion and sediment BMPs as well as a site-specific SWPPP to reduce potential sediment-laden runoff into adjacent or downgradient wetlands. BMPs will include those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities, Revision 3* (TVA 2017b) and outlined in the site-specific SWPPP. As a result of implementing these measures, impacts to wetlands would be minor.

TVA will coordinate with the USACE and appropriate state agency to determine jurisdictional status of any wetlands that cannot be avoided. Unavoidable impacts to jurisdictional wetlands will not occur unless authorized by the USACE through the CWA Section 404 permitting process and/or TDEC ARAP process, Kentucky Water Quality Certification Program, or ADEM as applicable. Potentially required mitigation measures are not anticipated, but they will be incorporated into the final design of the project, if required.

3.8 Aquatic Ecology

3.8.1 Affected Environment

3.8.1.1 Paradise CT Plant Project Area, Offsite Natural Gas Upgrade, and Offsite TL Upgrades

The primary aquatic environment related to the Paradise CT plant project area is the Green River. Other stream features delineated within the project area include four ephemeral and three intermittent streams, as described in Section 3.5 (Surface Water). Historical and current alterations to the hydrology of these aquatic features have likely occurred from the operations of the Paradise Fossil Plant and the CC Plant.

Historically, TVA commissioned a biological survey in 1961 of the Green River in the vicinity of the Paradise Reservation for the purpose of obtaining information regarding the biological, chemical, and physical conditions of the Green River before fossil plant operations began. Results from the survey indicated that the river's primary production (i.e., algal growth) was not as great as found in similar size rivers. Plankton species richness was high, but diversity scores were low in the river near the Paradise Reservation. Invertebrates (other than protozoa and insects) collected indicated that all sample stations below the reservation (i.e., Stations 2-5) did not support a balanced invertebrate fauna.

Insect fauna was sparse and scattered, presumably due to unfavorable habitat conditions from barge traffic and dredging activities in the Green River. Fish sampling spaced over a 14-day period was regarded as insufficient for valid conclusions. Chemistry and bacteriology results indicated that all characteristics or qualities measured were favorable to support aquatic life (Academy of Natural Sciences 1962). A 1965 follow-up study determined that overall conditions at the sampling stations were somewhat lower quality than in 1961, which was believed to be the result of high water temperatures and low dissolved oxygen in the summer months combined with coal dust and heavy barge traffic (Academy of Natural Sciences 1966).

TVA collected 43 species of fish during impingement studies at the Paradise Reservation in 1974-1975. Threadfin shad comprised 52 percent and gizzard shad 44 percent of the total impinged fish assemblage. Channel catfish and white crappie were the next most abundant species in that assemblage. Recent (2006-2008) impingement studies at the reservation found gizzard shad was the dominate species, followed by threadfin shad and freshwater drum. All other species comprised one percent or less of the total fish assemblage impinged at the plant (TVA 2009). TVA also conducted a fish survey in the Green River near the Paradise Reservation (RM 98.4 to RM 105 in 2010 and 2011). The 2010 survey collected 596 individuals representing 36 species, with gizzard shad (56 percent), bluegill (5 percent), and spotted gar (4 percent) making up the three most abundant species. In 2011, 1,952 individuals representing 51 species were collected, with Mississippi silvery minnow (16 percent), bullhead minnow (13 percent), and bluegill (13 percent) dominating the assemblage collected.

In 1985, a barge-unloading facility was added to the Paradise Fossil Plant so that coal could be delivered by barge via the Green River. A 2008 mussel survey (TVA 2008) of the Green River near the Paradise coal unloading facility found very low densities of a small number of common mussel species.

The surface water resources in the offsite TL upgrade project areas include two ephemeral streams and one intermittent stream (Table 3-7 in Section 3.5). The use designations of these streams would be expected to be designated warm water aquatic habitat, primary contact recreation, secondary contact recreation, and domestic water supply (KDOW 2013). Watercourses that convey surface water only during storm events (such as ephemeral streams/wet weather conveyances [WWCs]) do not continuously support aquatic biota but can transfer surface water runoff to adjacent streams during precipitation events.

Intermittent streams are features that typically run dry during portions of the summer months. Water during this period usually is confined to large pools. Smaller intermittent streams can run completely dry for extended periods of time. Because of this fluctuation in water and available habitat, the aquatic community within intermittent streams tends to be temporary, relatively simple in composition and transient. Substrate observed within the intermittent streams documented during fall 2020 field surveys primarily consisted of cobble, sand, clay/ silt, and some boulders.

3.8.1.2 Colbert CT Plant Project Area, Offsite Natural Gas Loop Line, and Offsite TL Upgrades

The Colbert CT plant project area is located within the Tennessee River-Pickwick Lake watershed. A fall 2020 field survey of the proposed project area documented the main stem of the Tennessee River (Pickwick Reservoir) adjacent to the project boundary, a perennial stream (Cane Creek), and an unnamed intermittent stream within the project area. The

Colbert CT plant project area is located on the right descending bank of the Pickwick Reservoir at Tennessee RM 245. The reach of the Tennessee River adjacent to the project area has been altered from its former free-flowing character by the presence of Pickwick Dam, located approximately 38 river miles downstream of the Colbert CT plant project area, and Wilson Dam, located approximately 14 miles upstream. This reach of the Tennessee River near the CT plant project area historically supported and currently supports a rich diversity of aquatic species.

A total of seven streams (six perennial and one intermittent) and three WWCs/ephemeral streams were documented within the existing TL ROW and access roads where upgrade activities would occur (Table 3-8 in Section 3.5). Brewer Branch and Factory Creek were the only named streams documented and are located within TL 5617. All other stream features documented were small and provide minimal aquatic habitat.

3.8.2 Environmental Consequences

3.8.2.1 Alternative A – No Action Alternative

Under Alternative A, there would be no project-related impacts to aquatic resources as TVA would not construct the CT plants at Paradise or Colbert reservations, and associated TL upgrades would not be required. It is assumed that current operations would not create any additional impacts.

3.8.2.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

One perennial stream, three intermittent streams and four ephemeral streams were identified within the Paradise CT project area. However, no direct impacts to surface water on the Paradise project site are anticipated and therefore there would be no direct impacts to aquatic ecological resources. Soil disturbances associated with construction activities could potentially result in indirect adverse water quality impacts. Soil erosion and sedimentation can clog small streams and threaten aquatic life. TVA would comply with all appropriate state and federal permit requirements. BMPs described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities*, Revision 3 (TVA 2017b) would be implemented to minimize erosion during clearing and site preparation. 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. The current KPDES permit would cover the site during construction and would require development of a project-specific BMP. This plan would identify site-specific BMPs to address construction-related activities that would be adopted to minimize storm water impacts. Indirect impacts to any of the aquatic features would be avoided with proper implementation of BMPs to prevent surface water run-off from carrying siltation into adjacent streams.

Streams identified within the offsite TL ROWs associated with the Paradise CT plant included two ephemeral and one intermittent stream. Ground disturbance near the delineated streams would be minimized, and all work would be completed in accordance with BMPs. These BMPs are designed in part to minimize erosion and subsequent sedimentation. TVA will utilize existing access roads for TL upgrades. However, if necessary, any new temporary stream crossings would include the placement of culverts or riprap in the stream to allow for equipment access. Mobile biota such as fish may be temporarily impacted but would be able to avoid areas impacted by construction. After

construction is complete, the mobile biota would be able to inhabit these areas again. Less mobile organisms such as macroinvertebrates may be directly impacted since they cannot avoid construction activities, but they would be expected to quickly recolonize these areas once construction is complete. All materials would be removed, and the banks would be restored to pre-construction contours after construction is complete. Therefore, with proper implementation of BMPs, impacts to aquatic ecological resources would be minor.

One perennial stream and one intermittent stream were identified within the Colbert CT plant project area. However, no direct impacts to surface water on the Colbert project site are anticipated and therefore there would be no direct impacts to aquatic ecological resources. As described for the Paradise CT plant, indirect impacts to aquatic ecological resources would be avoided with proper implementation of BMPs to prevent surface water run-off from carrying siltation into adjacent streams. In addition, Alabama requires a stormwater construction permit be obtained, including the development and implementation of a CBMPP. With implementation of BMPs, no impacts to the Tennessee River, Cane Creek, or to the unnamed intermittent stream located within the Colbert CT plant project area are anticipated.

Six perennial, one intermittent, and three ephemeral streams were identified within the offsite TL ROW and access roads associated with the proposed Colbert CT plant. Ground disturbance near the streams would be minimized, and all work would be completed in accordance with BMPs. As described above, if necessary, temporary stream crossings may result in temporary impacts to aquatic biota. However, impacts associated with the use of temporary stream crossings would be minor with implementation of BMPs.

3.9 Vegetation

3.9.1 Affected Environment

The Paradise and Colbert CT plant project areas intersect nine Level IV ecoregions including the Caseyville Hills, Crawford-Mammoth Cave Uplands, Eastern Highland Rim, Green River Southern Wabash Lowlands, Inner Nashville Basin, Outer Nashville Basin, Southeastern Plains, Western Highland Rim, and Western Pennyroyal Karst Plain (Omernik 1987). These ecoregions support a diverse array of plant communities including deciduous, mixed evergreen-deciduous, and evergreen forest, as well as herbaceous vegetation. Many specific plant communities occur throughout these ecoregions, including bottomland hardwood, mixed mesophytic, upland oak-hickory, and swamp forests along with an array of herbaceous plant habitats.

Field surveys of the proposed Paradise and Colbert CT plant project areas were conducted by TVA in August of 2020 while offsite TL segments and the associated access roads were surveyed in September and October of the same year. Surveys focused on documenting plant communities, infestations of invasive plants, and possible threatened and endangered plant populations. Using the National Vegetation Classification System (Grossman et al. 1998), vegetation types observed during field surveys can be categorized as a combination of deciduous, evergreen, mixed evergreen-deciduous forest, and herbaceous vegetation. No forested areas in the proposed project area had structural characteristics indicative of old growth forest stands (Leverett 1996). All plant communities within proposed project areas are common and well represented across Alabama, Kentucky, and Tennessee.

Executive Order (EO) 13112 directed TVA and other federal agencies to prevent the introduction of invasive species (both plants and animals), control their populations, restore

invaded ecosystems, and take other related actions. EO 13751 amends EO 13112 and directs federal agencies to continue coordinated federal prevention and control efforts related to invasive species. This Order incorporates considerations of human and environmental health, climate change, technological innovation, and other emerging priorities into federal efforts to address invasive species.

Some invasive plants have been introduced accidentally, but most were brought here as ornamentals or for livestock forage and have subsequently escaped from cultivation. Because these robust plants arrived without their natural predators (insects and diseases) their populations spread quickly across the landscape displacing native species and degrading ecological communities or ecosystem processes (Miller 2010). No federal-noxious weeds were observed within the project areas, but populations of many non-native species were observed during field surveys. Presence of invasive plants is ubiquitous across the project areas, which indicates a high level of previous disturbance throughout the project areas.

3.9.1.1 Paradise CT Plant Project Area, Offsite Natural Gas Upgrade, and Offsite TL Upgrades

Nearly all of the proposed Paradise CT plant project area has been heavily disturbed by the construction, operation, and maintenance of the generation and transmission infrastructure. In general, the most heavily disturbed and degraded habitats are currently covered with herbaceous vegetation and large, mostly unvegetated ponds. The vast majority of herbaceous vegetation on the Paradise CT plant project area is dominated by non-native plant species and possesses little conservation value. Common herbaceous species include American pokeweed, annual marsh elder, Canadian horseweed, common milkweed, common reed, field thistle, Fuller's teasel, Johnson grass, Queen Anne's lace, tall goldenrod, white sweet clover, and Chinese lespedeza. In herbaceous wetlands, vegetation is mostly common reed and annual marsh elder, while the woody species, autumn olive and sandbar willow, predominate in scrub/shrub wetlands.

Deciduous forest throughout the Paradise CT plant project area typically contains small diameter trees indicative of the previous disturbance onsite. Deciduous forest is defined as stands where deciduous trees account for more than 75 percent of total canopy cover. Canopy trees in these areas typically consist of American sycamore, black locust, box elder, eastern cottonwood, eastern red cedar, green ash, southern hackberry, and Osage orange with an understory of Carolina buckthorn, winged elm, and white mulberry. The woody vines, heartleaf peppervine, Japanese honeysuckle, poison ivy, and Virginia creeper, are also common. The herbaceous layer in these forest stands is depauperate; common reed, Japanese stiltgrass, and yellow wingstem dominate. Scrub/shrub old fields in the process of transitioning from herbaceous vegetation to deciduous forest are dominated by many of the tree species mentioned above as well as early successional plants including autumn olive, Chinese lespedeza, common reed, and sawtooth blackberry.

Relatively undisturbed mixed evergreen-deciduous forest stands, where evergreen and deciduous species contribute 25 to 75 percent of the total woody cover, occur in the northwest corner of the Paradise CT plant project area. These areas support the overstory trees American beech, American sycamore, black cherry, black gum, eastern cottonwood, mockernut and pignut hickories, as well as several oak species; the evergreens loblolly pine and Virginia pine are common in the overstory. Devil's walking stick, redbud, and winged

sumac are common in the shrub layer. The herbaceous layer is depauperate with few species.

Disturbed evergreen forests in the Paradise CT plant project area, where evergreen trees account for more than 75 percent of total canopy cover, are dominated by loblolly pine and eastern red cedar. These stands occur only on two parallel ridges near the center of the Paradise CT plant project area.

Plant communities associated with offsite TL project areas associated with the proposed Paradise CT plant are entirely herbaceous and a mixture of early successional fields, cropland, pasture, mowed lawns, and other developed areas. Plants in these areas are weedy and typical of species found in highly disturbed habitats. The particular species present are dependent on the type of disturbance most prevalent at specific sites. In agricultural areas where row crops are grown, species like corn and soybeans were common, though fields had been harvested by the time of survey. Pastures and old fields located within the TL ROW and along access roads support more natural vegetation, but non-native species are still common. Common plants in these areas include beaked panicgrass, bearded beggarstick, broomsedge, browneyed Susan, flat-topped goldentop, frostweed, horsenettle, purple top grass, slender paspalum, and thoroughworts. Lawns and developed areas are more disturbed than areas of naturalized vegetation and contain species tolerant of frequent mowing including Bermuda grass, crabgrasses, Japanese clover, Japanese stiltgrass, lanceleaf plantain, and tall fescue.

Vegetation within the project areas associated with the Paradise CT plant and offsite TL upgrades do not contain high quality herbaceous plant communities; all areas were relatively disturbed.

3.9.1.2 Colbert CT Plant Project Area, Offsite Natural Gas Loop Line, and Offsite TL Upgrades

The majority of the Colbert CT plant project area is comprised of disturbed herbaceous vegetation, lawns, and sparsely vegetated developed areas. Much of this site has been heavily disturbed in the past by construction, operation, and maintenance activities on the Colbert Reservation and is incapable of supporting intact, native plant communities. Common plant species found in areas of naturalized herbaceous vegetation include blackberries, purple top grass, Johnson grass, passion flower, thistle, red maple seedlings, and smooth sumac.

Mixed evergreen-deciduous forest, where both evergreen and deciduous species account for more than 25 percent of canopy cover, covers approximately 86 acres of the Colbert CT plant project area. Prominent canopy species in these even-aged stands include loblolly pine, Virginia pine, southern red oak, and shagbark hickory. The sparse shrub layer includes Carolina buckthorn, flowering dogwood, sassafras, spicebush, and the non-native species Chinese privet.

The natural gas pipeline lateral tie-in is located in areas with existing pipeline ROW as well as mixed evergreen-deciduous forest. Common species in the open pipeline, which had been recently mowed at the time of survey, include bristle grass, broomsedge, Illinois bundleflower, and tall goldenrod. The forest in this area includes the evergreen species eastern red cedar and loblolly pine in the overstory, along with the deciduous species Osage orange, slippery elm, sugarberry, white ash, and willow oak. The shrub and

herbaceous layers are species poor throughout and contain species such as Chinese privet and Cherokee sedge.

Plant communities associated with offsite TL segments requiring upgrades associated with the proposed Colbert CT plant are similar to those mentioned for the Paradise CT plant in Section 3.7.1.1. The species vary, but all the habitats are a comparable mixture of early successional fields, cropland, pasture, mowed lawns, and other developed areas that are dominated, in most locations, by non-native plants. These disturbed, open habitats are common and well represented throughout the region.

None of the project areas associated with the Colbert CT plant project area, offsite natural gas loop line, and offsite TL upgrades contain high quality plant communities. All areas are relatively disturbed and possess little standalone conservation value.

3.9.2 Environmental Consequences

3.9.2.1 Alternative A – No Action Alternative

Under Alternative A, there would be no project-related impacts to vegetation, as TVA would not construct the Paradise or Colbert CT plants. Changes to local plant communities resulting from natural ecological processes and human-related disturbance would continue to occur, but they would not result from the proposed project. The existing TL ROWs would continue to be managed per the TVA ROW Vegetation Management Plan.

3.9.2.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

Under Alternative B, impacts resulting from conversion of some amount of forest land to herbaceous vegetation or to unvegetated, developed areas for the proposed CT plants and associated offsite upgrades would be long-term in duration, but minor. All herbaceous plant communities found throughout the project areas are heavily disturbed, early successional habitats. In areas of offsite TL and natural gas pipeline upgrades, project-related work would temporarily affect herbaceous plant communities, but these areas would likely recover to their pre-project conditions in less than one year. Small areas of low-quality herbaceous vegetation would be permanently converted to developed land to support proposed construction.

Construction of the Paradise CT plant would result in the removal of 9.5 acres of forest vegetation. The largest amount of tree clearing, 8.5 acres, would occur in association with construction of 500-kV TL (See Figure 3-3). In the offsite TL upgrade project areas associated with the Paradise CT plant, relatively small amounts of tree trimming may be required along a few existing access roads, but tree removal is not anticipated and if required would be a negligible amount. All of these forested areas contain substantial populations of non-native plant species and have been heavily disturbed in the past. All plant communities found within the Paradise CT plant site, onsite and offsite natural gas pipeline project areas, and TL upgrade project areas are common and well represented throughout the region. As of 2017, at least 126,000 acres of forest occurred in Muhlenberg County, Kentucky (U.S. Forest Service 2020). Therefore, project-related effects to forest resources would be negligible when compared to the total amount of forest land in the region.

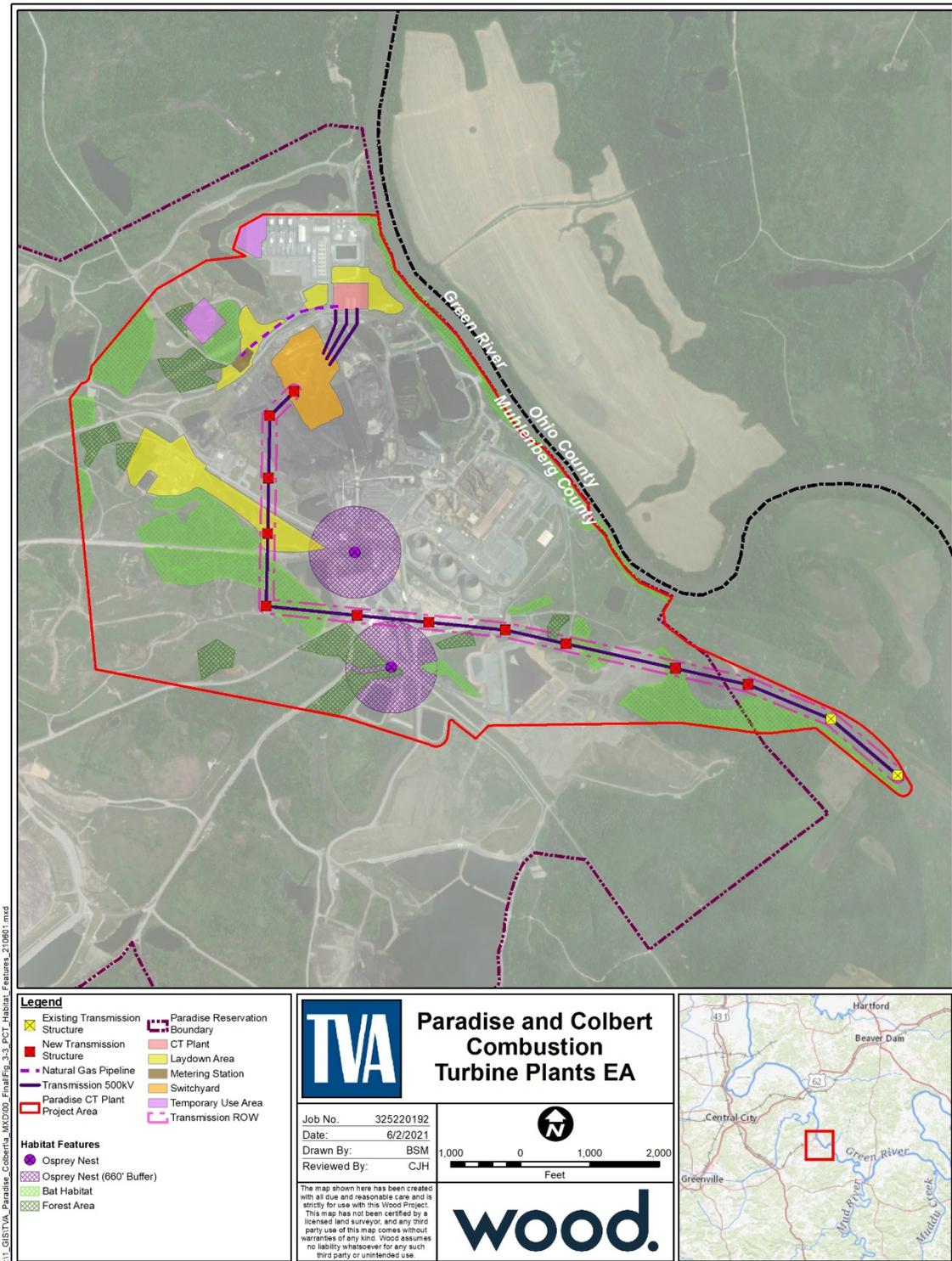
All elements of the borrow excavation would be performed in accordance with established TVA and other applicable federal, state, and local guidelines for earthwork activities. After

all needed suitable borrow materials are exhausted, the area will be graded to promote positive drainage and upon completion reseeded with an appropriate native seed mixture.

Impacts to vegetation from the construction of the Colbert CT plant and associated offsite TL upgrades would be similar to those for the Paradise CT plant. Construction of the Colbert CT plant would result in the removal of approximately 5 acres of forest vegetation. The largest amount of tree clearing would occur to support the new 161-kV TLs (Figure 3-4). Impacts to vegetation resulting from offsite TL upgrades associated with the Colbert CT plant would be similar to those described for the Paradise CT plant. All plant communities found within the Colbert CT plant site, onsite and offsite natural gas pipeline project areas, and TL upgrade project areas are common and well represented throughout the region. As of 2017, more than 193,000 acres of forest occurs in Colbert County, Alabama (U.S. Forest Service 2020). Therefore, project-related effects to forest resources would be negligible when compared to the total amount of forest land in the region.

Large parts of the project areas associated with both the Paradise and Colbert CT plants currently have substantial amounts of invasive terrestrial plants, and adoption of Alternative B would not significantly affect the extent or abundance of these species at the county, regional, or state level. The use of the TVA standard operating procedure of revegetating areas disturbed by construction, upgrades, and maintenance activities with noninvasive species (TVA 2017b) would serve to minimize the potential introduction and spread of invasive species on the Colbert and Paradise CT plant sites and along TVA TL and natural gas pipeline ROW. Following project activities, disturbed areas would be graded and vegetated with a noninvasive seed mix to prevent erosion and limit the invasion of non-native, weedy species. After construction, upgrades, and restoration are complete, the new and existing ROWs would continue to be managed per the TVA ROW Vegetation Management Plan.

Activities associated with Alternative B are expected to impact vegetation with limited conservation value that is common to the region. Therefore, overall impacts to vegetation from proposed project activities would be minor.



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Figure 3-3. Habitat Features Within the Paradise CT Plant Project Area

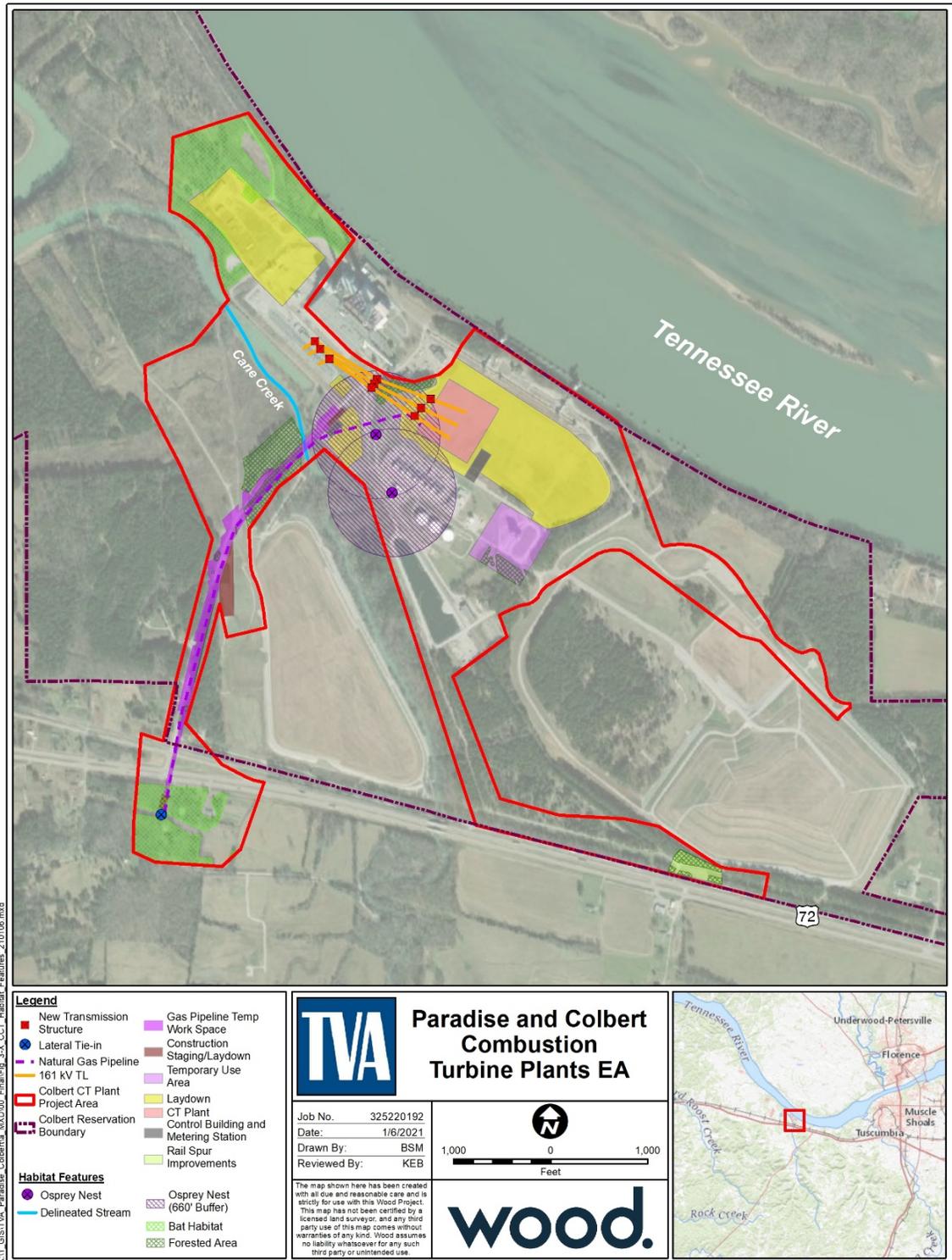


Figure 3-4. Habitat Features Within the Colbert CT Plant Project Area

3.10 Wildlife

3.10.1 Affected Environment

3.10.1.1 Paradise CT Plant Project Area, Offsite Natural Gas Upgrade, and Offsite TL Upgrades

Much of the Paradise CT plant project area is heavily disturbed including some areas that are already paved or graveled. In addition, other laydown areas, some temporary use areas, and some sections of proposed new onsite TL ROWs are located in herbaceous fields that have been heavily disturbed. These areas can be used by common species, but do not offer suitable habitat for rare wildlife species. The proposed Paradise CT plant project area includes some areas that are forested, and the proposed temporary use areas and TLs contain mixed deciduous-coniferous bottomland and upland forest. Small stands dominated by scrubby cedar or locust also exist near developed portions within the project areas. These stands have, on average, shorter canopies, and smaller diameter trees.

Birds typically found in forested habitats of this region include American robin, barred owl, blue jay, common yellowthroat, downy woodpecker, hairy woodpecker, eastern phoebe, eastern kingbird, eastern towhee, eastern wood-pewee, gray catbird, hooded warbler, indigo bunting, mourning dove, pileated woodpecker, prairie warbler, red-eyed vireo, red-tailed hawk, tufted titmouse, white-breasted nuthatch, white-eyed vireo, yellow-billed cuckoo, and yellow-rumped warbler (National Geographic 2002). Some sections of forest within the proposed Paradise CT plant project area also provide foraging and roosting habitat for several species of bat, particularly in areas where the forest understory is more open. Examples of common bat species likely found within this habitat include big brown, eastern red, and hoary. Eastern chipmunk, eastern woodrat, white-footed mouse, and woodland vole are other mammals that may be present within this habitat (Kays and Wilson 2002; Whittaker 1996). Eastern box turtle, eastern fence lizard, eastern garter snake, North American racer, rat snake, and ring-necked snake are common reptiles of these forests in the project region (Conant and Collins 1998; Gibbons and Dorcas 2005).

The addition of a natural gas-fired reciprocating engine at the existing compressor station would be constructed within the existing paved and graveled site which does not provide suitable habitat for rare wildlife species.

Existing offsite TL ROWs requiring upgrades are comprised of a variety of herbaceous habitats ranging from cultivated crops to pastures and early successional habitats. Birds that utilize these areas include chipping sparrow, field sparrow, killdeer, grasshopper sparrow, red-tailed hawk, red-winged blackbird, and white-throated sparrow (National Geographic 2002). Mammals that can be found in these areas are common mole, coyote, ground hog, least shrew, white-footed mouse, and white-tailed deer (Whitaker 1996). Reptiles that may use these habitats in this region include black racer, black rat snake, corn snake, eastern kingsnake, and eastern milksnake (Gibbons and Dorcas 2005). Emergent wetlands and saturated wet weather conveyances within field settings also provide habitat for common amphibians and reptiles. Amphibians likely present in riparian areas include American bullfrog, American toad, southern leopard frog, spring peeper, and upland chorus frog (Conant and Collins 1998). Reptiles with the potential to occur in riparian areas of the offsite TL ROWs include gray rat snake, northern watersnake, rough green snake, and black racer (Conant and Collins 1998; Gibbons and Dorcas 2005).

The TVA Natural Heritage database indicates that six caves are known within three miles of the proposed TL upgrades associated with the Paradise CT plant. No caves or cave-like habitats were observed within the project areas.

Two records of wading bird colonies occur within three miles of the proposed TL upgrades associated with the Paradise CT plant. The closest of these records is approximately 2.2 miles from project areas.

The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) website (<https://ecos.fws.gov/ipac/>) indicates several migratory bird species of concern have the potential to occur in the Paradise CT plant project area and offsite TL upgrade areas. These include bald eagle, eastern whip-poor-will, Henslow's sparrow, Kentucky warbler, lesser yellowlegs, prairie warbler, red-headed woodpecker, rusty blackbird, wood thrush. See Section 3.11 (Threatened and Endangered Species) for a discussion of impacts to bald eagle and Henslow's sparrow. Early successional and edge habitats, primarily those in or adjacent to existing TL ROWs, could provide potentially suitable habitat for a few of these species including prairie warbler and red-headed woodpecker. Lesser yellowlegs and rusty blackbird could be found in wetlands within existing and proposed ROWs. Eastern whip-poor-will, Kentucky warbler, and wood thrush are not likely to occur in project areas as they require larger areas of mature forest not found in these areas.

3.10.1.2 Colbert CT Plant Project Area, Offsite Natural Gas Loop Line, and Offsite TL Upgrades

Much of the Colbert CT plant project area is heavily disturbed. Several areas are already paved or graveled, and some laydown areas are located above the former coal pile now covered with maintained fields. A few forested areas are located within the Colbert CT plant project area, within proposed natural gas pipeline areas, and along existing access roads associated with offsite TL upgrades. Herbaceous areas located within the CT plant project area are typically mowed fields that do not offer suitable habitat for rare wildlife species but can be used by common species. A variety of common wildlife species can utilize habitat in existing offsite TL and natural gas pipeline ROWs and along access roads associated with TL upgrades.

Existing TL and natural gas pipeline ROWs requiring upgrades are comprised of a variety of herbaceous habitats ranging from cultivated crops to pastures and early successional habitats. Birds that utilize these areas as well as herbaceous areas on the Colbert CT plant project area include chipping sparrow, field sparrow, house finch, killdeer, grasshopper sparrow, mourning dove, red-tailed hawk, red-winged blackbird, wild turkey, and white-throated sparrow (National Geographic 2002). Mammals that can be found in these areas are common mole, coyote, least shrew, white-footed mouse, and white-tailed deer (Whitaker 1996). Reptiles that may use these habitats in this region include black racer, gray rat snake, corn snake, eastern black kingsnake, and scarlet kingsnake (Gibbons and Dorcas 2005). Emergent wetlands and saturated wet weather conveyances within field settings provide habitat for common amphibians. Amphibians likely present include American bullfrog, American toad, southern leopard frog, spring peeper, as well as upland chorus frog (Powell et al. 2016).

Some areas of the proposed Colbert CT plant project area are forested. Proposed temporary use areas, railroad spur improvements, and associated natural gas pipeline ROW areas contain mixed evergreen-deciduous forest. Birds observed during August 2020

field investigations in these forested areas included American crow, American goldfinch, blue-gray gnatcatcher, Carolina wren, eastern phoebe, northern cardinal, northern mockingbird, worm-eating warbler, and yellow-billed cuckoo. Some sections of onsite forested areas also provide foraging and roosting habitat for several species of bat, particularly in areas where the forest understory is more open. Some examples of common bat species likely found within this habitat include big brown, eastern red, and hoary. Armadillo, eastern chipmunk, eastern woodrat, striped skunk, Virginia opossum, white-footed mouse, and white-tailed deer are other mammals that may be present or were observed within this habitat in the onsite project areas (Kays and Wilson 2002; Whittaker 1996; TVA 2020e). Reptile and amphibian species that may use these terrestrial forested communities include American toad, black racer, black rat snake, dusky salamander, eastern box turtle, eastern fence lizard, eastern garter snake, eastern hog-nosed snake, five-line skink, gray treefrog, green frog, leopard frog, ring-necked snake, rough green snake, slimy salamander, and spring peeper (Gibbons and Dorcas 2005; Powel et al. 2016).

The TVA Natural Heritage database indicates that 61 caves are known within three miles of the Colbert CT plant project area and offsite TL upgrades associated with the proposed Colbert CT plant. Two of these records occur within the Colbert Reservation, but are not within the proposed project area. Furthermore, neither of these caves currently exist as one is under the fossil plant and the other was not found during field surveys and was likely destroyed decades ago. Five extant caves are known from along the Tennessee River shoreline, directly adjacent to the northern edge of the onsite project area.

Two records of wading bird colonies occur within 3 miles of the TL upgrades associated with the proposed Colbert CT plant. Both records indicate that the colonies are greater than 660 feet from the TL upgrade action areas.

The USFWS IPaC website indicated the potential for several migratory bird species of concern to occur in the proposed Colbert CT plant project area and offsite project areas. These include bald eagle, blue-winged warbler, Cerulean warbler, eastern whip-poor-will, Kentucky warbler, lesser yellowlegs, prairie warbler, red-headed woodpecker, red-throated loon, rusty blackbird, semipalmated sandpiper, and wood thrush. A discussion of impacts to bald eagle and cerulean warbler is included in Section 3.11 (Threatened and Endangered Species). Prairie warbler was observed in forest/field edge habitat during field surveys of the proposed Colbert CT plant project area. Early successional and forest edge habitats could provide potentially suitable habitat for a few more of these species including blue-winged warbler and red-headed woodpecker. Lesser yellowlegs, semipalmated sandpiper, and rusty blackbird could be found in and around wetlands on the proposed Colbert CT plant project area or on existing offsite ROWs. Eastern whip-poor-will, Kentucky warbler, and wood thrush could occur in forested areas. Red-throated loon could use large bodies of water such as Pickwick, Wilson, and Wheeler Reservoirs.

3.10.2 Environmental Consequences

3.10.2.1 Alternative A – No Action Alternative

Under the Alternative A, TVA would not retire Units 1-20 of Frame CTs at Allen or Units 1-16 of Frame CTs at Johnsonville. Accordingly, soil and vegetation would remain in their current state, and current communities of terrestrial animals and their habitats would not be affected.

3.10.2.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

Under Alternative B, habitat that could support common wildlife would be removed at both the proposed Paradise and Colbert CT plant project areas and in some areas along existing offsite ROW upgrades.

A relatively small amount of woody vegetation would be removed in association with the construction of the Paradise CT plant and onsite laydown areas (9.5 acres). The largest amount of habitat removal would occur in association with construction of the 500-kV TL ROW (8.5 acres) at Paradise. Some migratory birds of conservation concern identified by the USFWS may be impacted by the proposed action. Forest edge habitats would be impacted along smaller forest fragments where the 500-kV TL would be re-routed and at one onsite temporary use area near the proposed Paradise CT plant site.

A small amount of tree trimming may need to occur along existing access roads associated with proposed offsite TL upgrades at Paradise; however, no tree removal is anticipated as all access roads through forested areas are relatively well maintained. Forest edge habitats, primarily those in or adjacent to existing offsite TL ROWs, could provide suitable habitat for a few of these species including prairie warbler and red-headed woodpecker. Small areas of forested edge impacts could occur along the few offsite TL access roads requiring tree trimming. Lesser yellowlegs and rusty blackbird could be found in wetlands within existing offsite TL ROWs. Potential impacts to bald eagle and Henslow's sparrow are addressed in Section 3.11 (Threatened and Endangered Species).

Habitat removal would result in the displacement of any wildlife (primarily common, habituated species) currently using the project areas. Direct effects to some individuals may occur if those individuals are immobile during the time of habitat removal. This could be the case if activities took place during breeding/nesting seasons (e.g., eggs, babies, nestlings). Habitat removal likely would disperse mobile wildlife into surrounding areas in an attempt to find new food sources, shelter sources, and to reestablish territories. BMPs would be used to minimize impacts to streams and wetlands (TVA 2017b). Due to the heavily disturbed nature of habitat proposed for removal at the onsite Paradise CT plant project area, the small size and discrete locations of the areas of proposed impacts across Kentucky and Tennessee for the offsite TL upgrades, and the amount of similar, suitable habitat in areas immediately adjacent to or near proposed project areas, the impact to populations of common wildlife species would be minor.

Areas associated with construction of the Colbert CT plant are previously disturbed. The largest area of vegetative disturbance would occur on a former coal pile now covered in grass. Approximately 5 acres of fragmented forest may also be removed within the Colbert CT plant project area. The largest amount of forest to be removed would occur in association with construction of the north transmission line (approximately 1.4 acres). A small amount of tree trimming may need to occur along offsite access roads associated with proposed offsite TL upgrades; however, no tree removal is anticipated as all access roads through forested areas are relatively well maintained.

Some migratory birds of conservation concern identified by the USFWS may be impacted by the proposed action at Colbert. Forest edge habitat would be impacted at onsite forest fragments along the proposed new natural gas pipeline, a temporary use area, and a railroad spur. Small areas of forested edge impacts could occur along the few offsite TL access roads that would require tree trimming. Removal of this edge habitat could impact

blue-winged warbler, prairie warbler and red-headed woodpecker. Impacts to forested areas within the CT plant project area would remove habitat for Eastern whip-poor-will, Kentucky warbler, and wood thrush. Lesser yellowlegs, semipalmated sandpiper, and rusty blackbird could be found in and around wetlands at the Colbert CT plant project area or within existing offsite TL ROWs that may be impacted. However, BMPs would be used in and around all wetlands, thereby minimizing impacts to the habitat. No impacts to red-throated loon or its habitat are anticipated due to the minimal amount of work occurring in these areas and the use of BMPs along all large bodies of water in the Colbert CT plant project area and at offsite TL upgrades. Potential impacts to bald eagle and cerulean warbler are addressed in Section 3.11 (Threatened and Endangered Species).

Wildlife displacement impacts at Colbert would be similar to those described for the Paradise CT plant. Due to the heavily disturbed nature of habitat proposed for removal at the proposed Colbert CT plant project area, the small size and discrete locations of the areas of proposed impacts across Alabama and Tennessee for the offsite TL upgrades, and the amount of similar, suitable habitat in areas immediately adjacent to or near proposed project areas, the impact to populations of common wildlife species would be minor.

3.11 Threatened and Endangered Species

3.11.1 Affected Environment

The ESA (16 USC §§ 1531-1543) was passed to conserve the ecosystems upon which endangered and threatened species depend, and to conserve and recover those species. An endangered species is defined by the ESA as any species in danger of extinction throughout all or a significant portion of its range, whereas a threatened species is likely to become endangered within the foreseeable future throughout all or a significant part of its range. Critical habitats, essential to the conservation of listed species, can also be designated under the ESA. The ESA establishes programs to conserve and recover endangered and threatened species and makes their conservation a priority for Federal agencies. Section 7 of the ESA requires federal agencies to consult with the USFWS when their proposed actions may affect endangered or threatened species or their critical habitats.

The States of Tennessee, Kentucky, and Alabama each provide protection for species considered threatened, endangered, or deemed in need of management within the state other than those federally listed under the ESA. The listings in Tennessee are managed by the Tennessee Wildlife Resources Agency (TWRA); additionally, the Tennessee Natural Heritage Program maintains a database of species that are considered threatened, endangered, in need of management, or tracked in Tennessee.

The species listings in Kentucky are managed by the state wildlife agency, Kentucky Department of Fish and Wildlife Resources (KDFWR). Additionally, the Kentucky State Nature Preserves Commission (KSNPC) maintains a database of aquatic and terrestrial animal species that are considered threatened, endangered, special concern, or are otherwise tracked in Kentucky because the species is rare and/or vulnerable within the state. Plant species are protected in Kentucky through the Kentucky Rare Plant Recognition Act of 1994.

The species listings in Alabama are managed by the Alabama Department of Conservation and Natural Resources (ADCNR); however, the Alabama Natural Heritage Program

maintains a database of aquatic animal species that are considered threatened, endangered, special concern, or tracked in Alabama.

TVA also maintains a database of threatened and endangered plant and animal species in TVA's power service area, which includes all of Tennessee and parts of six surrounding states, including Kentucky and Alabama. The USFWS IPaC website and the TVA Natural Heritage database were queried in October 2020 for species of conservation concern, including federal and state-listed species. Records of terrestrial animal species that occur or have the potential to occur within the project areas are shown on Table 3-13. A discussion of these species and the potential for their habitats to occur within the project areas is included in the following sections.

The TVA Natural Heritage database indicated that there are 27 records of Tennessee, Kentucky, and Alabama state-listed terrestrial animal species, one federally protected terrestrial animal species (bald eagle) and one federally listed terrestrial animal species (gray bat) within 3 miles of the Paradise and Colbert CT plant project areas and associated offsite natural gas pipeline and TL upgrades. According to the USFWS IPaC website, three additional federally listed terrestrial animal species (Indiana bat, northern long-eared bat, and red-cockaded woodpecker) have also been reported from within one or more of the project counties (Table 3-13). No designated critical habitat for terrestrial species occurs within the proposed project areas.

Table 3-13. Terrestrial Species of Conservation Concern Known from Within Three Miles¹ of Paradise and Colbert CT Plant and Offsite Project Areas and Federally Listed and Candidate Species Listed in Project Counties²

Common Name	Scientific Name	Federal Status ³	State Status ⁴	State Rank ⁵
Alabama				
AMPHIBIANS				
Hellbender	<i>Cryptobranchus alleganiensis</i>	PS	SP	S2
BIRDS				
Bald Eagle	<i>Haliaeetus leucocephalus</i>	DM	S	S3B, S3S4N
Osprey	<i>Pandion haliaetus</i>		SP	S4
Red-cockaded Woodpecker ⁶	<i>Picoides borealis</i>	LE	SP	S2
INVERTEBRATES				
A Beetle	<i>Batriasymmodes spelaeus</i>			S3
A Beetle	<i>Batrisodes jonesi</i>			S2S3
A Ground Beetle	<i>Rhadine caudata</i>			S2
MAMMALS				
Gray Bat	<i>Myotis grisescens</i>	LE	SP	S2
Indiana Bat ⁶	<i>Myotis sodalis</i>	LE	SP	S2
Northern Long-eared Bat ⁶	<i>Myotis septentrionalis</i>	LT	SP	S1
Rafinesque's Big-eared Bat	<i>Corynorhinus rafinesquii</i>		SP	S2
Tricolored Bat	<i>Perimyotis subflavus</i>			S3

Common Name	Scientific Name	Federal Status³	State Status⁴	State Rank⁵
REPTILES				
Alligator Snapping Turtle	<i>Macrochelys temminckii</i>		SP	S3
Kentucky				
AMPHIBIANS				
Bird-Voiced Treefrog	<i>Hyla avivoca</i>		N	S3S4
Barking Treefrog	<i>Hyla gratiosa</i>		N	S3S4
BIRDS				
Bald Eagle	<i>Haliaeetus leucocephalus</i>	DM	S	S3B, S3S4N
Bank Swallow	<i>Riparia riparia</i>		S	S3B
Bell's Vireo	<i>Vireo bellii</i>		S	S2S3B
Common Gallinule	<i>Gallinula galeata</i>		T	S1S2B
Great Egret	<i>Ardea alba</i>		T	S2B
Henslow's Sparrow	<i>Ammodramus henslowii</i>		S	S3B
Hooded Merganser	<i>Lophodytes cucullatus</i>		T	S2B, S3S4N
Lark Sparrow	<i>Chondestes grammacus</i>		S	S2S3B
Least Bittern	<i>Ixobrychus exilis</i>		T	S1S2B
Northern Harrier	<i>Circus hudsonius</i>		T	S1S2B, S4N
Osprey	<i>Pandion haliaetus</i>		S	S3S4B
Sedge Wren	<i>Cistothorus platensis</i>		S	S3B
INVERTEBRATES				
Whitewashed Rabdotus	<i>Rabdotus dealbatus</i>		T	S1S2
MAMMALS				
Gray Bat	<i>Myotis grisescens</i>	LE	T	S2
Indiana Bat ⁶	<i>Myotis sodalis</i>	LE	E	S1S2
Northern Long-eared Bat ⁶	<i>Myotis septentrionalis</i>	LT	E	S1
REPTILES				
Eastern Slender Glass Lizard	<i>Ophisaurus attenuatus longicaudus</i>		T	S2
Common Ribbon Snake	<i>Thamnophis sauritus sauritus</i>		S	S3
Tennessee				
AMPHIBIANS				
Hellbender	<i>Cryptobranchus alleganiensis</i>	PS	E	S3
Streamside Salamander	<i>Ambystoma barbouri</i>		E	S2
Barking Treefrog	<i>Hyla gratiosa</i>		N	S3S4
BIRDS				
Bald Eagle	<i>Haliaeetus leucocephalus</i>	DM	D	S3
Cerulean Warbler	<i>Setophaga cerulea</i>		D	S3B
Great Egret	<i>Ardea alba</i>			S2BS3N
Common Barn-owl	<i>Tyto alba</i>			S3

Common Name	Scientific Name	Federal Status ³	State Status ⁴	State Rank ⁵
MAMMALS				
Gray Bat	<i>Myotis grisescens</i>	LE	E	S2
Indiana Bat ⁶	<i>Myotis sodalis</i>	LE	E	S1
Northern Long-eared Bat ⁶	<i>Myotis septentrionalis</i>	LT	T	S1S2
REPTILES				
Western Pigmy Rattlesnake	<i>Sistrurus miliarius streckeri</i>		T	S2S3
Alligator Snapping Turtle	<i>Macrochelys temminckii</i>		T	S2S3

¹ Source: TVA Natural Heritage Database, queried October 2020

² Includes Colbert, Lauderdale, and Morgan Counties, Alabama; Hardin, Lawrence, Montgomery, Sumner, Wayne, and Wilson Counties, Tennessee; and Muhlenberg and Todd Counties, Kentucky

³ Federal Status Codes: DM = Delisted, Recovered, and Being Monitored; LE = Listed Endangered; LT = Listed Threatened; PS = Partial Status; – = Not Listed by USFWS

⁴ State Status Codes: E = Listed Endangered; S = Listed Special Concern; T = Listed Threatened; SP = State Protected; D = Deemed in Need of Management; CE = Commercially Exploited; N = No Status

⁵ State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure; S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2); S#B = Status of Breeding Population; S#N = Status of Non-Breeding Population.

⁶ Federally listed or protected species known from the county, but not within three miles of the project footprint.

The TVA Regional Natural Heritage Project database and the USFWS IPaC website indicated that 15 federally listed endangered, two federally listed threatened, and 22 state-listed aquatic animals are currently known from or have the potential to occur within the 10-digit hydrologic unit code (HUC) watersheds encompassing the Paradise and Colbert CT plant project areas (Table 3-14). Another 23 species were also listed but are believed to be extirpated from this portion of their former ranges.

The TVA Regional Natural Heritage database and the USFWS IPaC website also indicated that 24 federally listed endangered, three federally listed threatened, and 23 state-listed aquatic animals are currently known from or have the potential to occur within the 10-digit HUC watersheds encompassing the offsite TL and natural gas pipeline project areas (Table 3-15).

Table 3-14. Aquatic Species of Conservation Concern Known from Within the Watersheds of Paradise and Colbert CT Plant Project Areas and Federally Listed and Candidate Species Listed in Onsite Project Counties¹

Common Name	Scientific Name	Element Rank ²	Federal Status ³	State Rank ⁴
FISH				
Alabama Cavefish	<i>Speoplatyrhinus poulsoni</i>	E	LE	SP (S1)
Chestnut Lamprey	<i>Ichthyomyzon castaneus</i>	E		S (S2)
Snail Darter	<i>Percina tanasi</i>	AB	LT	SP (S1)
Southern Cavefish	<i>Typhlichthys subterraneus</i>	E		SP (S3)
MACROINVERTEBRATES				
Alabama Blind Cave Shrimp	<i>Palaemonias alabamiae</i>	E	LE	SP (S1)
MUSSELS				
Birdwing Pearlymussel	<i>Lemiox rimosus</i>	E	LE	SP (S1)

Common Name	Scientific Name	Element Rank ²	Federal Status ³	State Rank ⁴
Black Sandshell	<i>Ligumia recta</i>	E		PSM (S2)
Butterfly	<i>Ellipsaria lineolata</i>	E		PSM (S4)
Cracking Pearlymussel	<i>Hemistena lata</i>	H	LE	SP, P1 (S1)
Cumberland Moccasinshell	<i>Medionidus conradicus</i>	H		SP (S1)
Cumberlandian Combshell	<i>Epioblasma brevidens</i>	H	LE	SP (S1)
Deertoe	<i>Truncilla truncata</i>	E		PSM (S1)
Fanshell	<i>Cyprogenia stegaria</i>	E	LE	SP (S1)
Fine-rayed Pigtoe	<i>Fusconaia cuneolus</i>	H	LE	SP (S1)
Kidneyshell	<i>Ptychobranthus fasciolaris</i>	E		PSM (S2)
Longsolid	<i>Fusconaia subrotunda</i>	H		PSM (S1)
Monkeyface	<i>Quadrula metanevra</i>	E		PSM (S3)
Mountain Creekshell	<i>Villosa vanuxemensis</i>	H?		PSM (S3)
Ohio Pigtoe	<i>Pleurobema cordatum</i>	E		PSM (S2)
Painted Creekshell	<i>Villosa taeniata</i>	H		PSM (S2)
Pink Mucket	<i>Lampsilis abrupta</i>	E	LE	SP (S1)
Pocketbook	<i>Lampsilis ovata</i>	E		PSM (S2)
Purple Lilliput	<i>Toxolasma lividus</i>	E		PSM (S2)
Pyramid Pigtoe	<i>Pleurobema rubrum</i>	E		SP (S1)
Rock Pocketbook	<i>Arcidens confragosus</i>	E		PSM (S3)
Rough Pigtoe	<i>Pleurobema plenum</i>	E	LE	SP (S1)
Round Hickorynut	<i>Obovaria subrotunda</i>	H		PSM (S2)
Round Pigtoe	<i>Pleurobema sintoxia</i>	E		SP (S1)
Sheepnose	<i>Plethobasus cyphus</i>	E	LE	SP (S1)
Slabside Pearlymussel	<i>Pleuroaia dolabelloides</i>	H	LE	SP (S1)
Smooth Rabbitsfoot	<i>Quadrula cylindrica cylindrica</i>	H	LT	SP (S1)
Snuffbox	<i>Epioblasma triquetra</i>	H	LE	PSM (S1)
Spectaclecase	<i>Cumberlandia monodonta</i>	E	LE	SP (S1)
Spike	<i>Elliptio dilatata</i>	E		PSM (S1)
Tennessee Clubshell	<i>Pleurobema oviforme</i>	H		PSM (S1)
Tennessee Pigtoe	<i>Pleuroaia barnesiana</i>	H		PSM (S1)
Wavy-rayed Lampmussel	<i>Lampsilis fasciola</i>	H		PSM (S2)
White Wartyback	<i>Plethobasus cicatricosus</i>	E	LE	SP (S1)
SNAILS				
Anthony's River Snail	<i>Athearnia anthonyi</i>	E	LE	SP (S1)

¹ Source: TVA Natural Heritage Database, queried on 10/9/2020. Records are from the Tennessee River-Pickwick Lake (0603000508) and Lewis Creel-Green River (0511000305) 10-digit HUC watersheds

² Heritage Element Occurrence Rank; E = extant record ≤25 years old; H=historical record ≥ 25 years old; H? = possibly historical; AB = Good estimated viability

³ Status Codes: LE = Listed Endangered; LT = Listed Threatened; SP = Special Protection; PSM = Partial Status Mussel

⁴ State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure

Table 3-15. Aquatic Species of Conservation Concern Known from Within the Watersheds of Proposed Offsite TL Project Areas and Federally Listed and Candidate Species Listed in Offsite Project Counties¹

Common Name	Scientific Name	Element Rank ²	Federal Status ³	State Status ³	State Rank ⁴
CRUSTACEANS					
Alabama Blind Cave Shrimp	<i>Palaemonias alabamae</i>	E	LE	SP	S1
Alabama Crayfish	<i>Orconectes alabamensis</i>	E		D	S2
Hardin Crayfish	<i>Orconectes wrighti</i>	E		LE	S2
Tennessee Bottlebrush Crayfish	<i>Barbicambarus simmonsii</i>	E		LT	S2?
FISH					
Alabama Cavefish	<i>Speoplatyrhinus poulsoni</i>	E	LE	SP	S1
Ashy Darter	<i>Etheostoma cinereum</i>	E		LE	S2S3
Blackfin Sucker	<i>Thoburnia atripinnis</i>	H?		D	S2
Blotchside Logperch	<i>Percina burtoni</i>	H?		D	S2
Blue Sucker	<i>Cycleptus elongatus</i>	H?		LT	S2
Boulder Darter	<i>Etheostoma wapiti</i>	E	LE	LE	S1
Coppercheek Darter	<i>Etheostoma aquali</i>	E		LT	S2S3
Crown Darter	<i>Etheostoma corona</i>	E		LE	S1S2
Egg-mimic Darter	<i>Etheostoma pseudovulatum</i>	E		LE	S1
Lake Sturgeon	<i>Acipenser fulvescens</i>	AC		LE	S1
Lollipop Darter	<i>Etheostoma neopterum</i>	E		D	S1S2
Longhead Darter	<i>Percina macrocephala</i>	H?		LT	S2
Flame Chub	<i>Hemitremia flammea</i>	E		D	S3
Highfin Carpsucker	<i>Carpoides velifer</i>	E		D	S2S3
Redband Darter	<i>Etheostoma luteovinctum</i>	H?		D	S4
Saddled Madtom	<i>Noturus fasciatus</i>	E		LT	S2
Scaly Sand Darter	<i>Ammocrypta vivax</i>	H?		D	S2
Slackwater Darter	<i>Etheostoma boschungii</i>	E	LT	SP	S1
Slenderhead Darter	<i>Percina phoxocephala</i>	H?		D	S3
Smallscale Darter	<i>Etheostoma microlepidum</i>	H?		D	S2
Sooty Darter	<i>Etheostoma olivaceum</i>	H?		D	S3
Southern Cavefish	<i>Typhlichthys subterraneus</i>	E		SP	S3
Spotfin Chub	<i>Erimonax monachus</i>	E	LT	LT	S2
Stonecat	<i>Noturus flavus</i>	AC		CNGF	S1
Tennessee logperch	<i>Percina apina</i>	E		D	S2
MUSSELS					
Appalachian Monkeyface	<i>Quadrula sparsa</i>	H	LE	LE	S1
Birdwing Pearlymussel	<i>Lemiox rimosus</i>	E	LE	SP	S1
Black Sandshell	<i>Ligumia recta</i>	E		PSM	S2
Clubshell	<i>Pleurobema clava</i>	H	LE	LE	SH

Common Name	Scientific Name	Element Rank ²	Federal Status ³	State Status ³	State Rank ⁴
Cracking Pearlymussel	<i>Hemistena lata</i>	H	LE	LE	S1
Cumberland Moccasinshell	<i>Medionidus conradicus</i>	H		SP	S1
Cumberlandian Combshell	<i>Epioblasma brevidens</i>	H	LE	SP	S1
Deertoe	<i>Truncilla truncata</i>	E		PSM	S1
Dromedary Pearlymussel	<i>Dromus dromas</i>	E	LE	LE	S1
Elktoe	<i>Alasmidonta marginata</i>	H		PSM	S1
Fanshell	<i>Cyprogenia stegaria</i>	H	LE	LE	S1
Fine-rayed Pigtoe	<i>Fusconaia cuneolus</i>	H	LE	SP	S1
Kidneyshell	<i>Ptychobranthus fasciolaris</i>	E		PSM	S2
Longsolid	<i>Fusconaia subrotunda</i>	H	PT	PSM	S1
Monkeyface	<i>Quadrula metanevra</i>	E		PSM	S3
Mountain Creekshell	<i>Villosa vanuxemensis</i>	H?		PSM	S3
Ohio Pigtoe	<i>Pleurobema cordatum</i>	E		PSM	S2
Orange-foot Pimpleback	<i>Plethobasus cooperianus</i>	E	LE	LE	S1
Oyster Mussel	<i>Epioblasma capsaeformis</i>	E	LE	SP	SX
Painted Creekshell	<i>Villosa taeniata</i>	E		PSM	S2
Pink Mucket	<i>Lampsilis abrupta</i>	E	LE	LE	S2
Pocketbook	<i>Lampsilis ovata</i>	E		PSM	S2
Purple Catspaw	<i>Epioblasma obliquata obliquata</i>	H?	LE	LE	S1
Purple Lilliput	<i>Toxolasma lividus</i>	E		PSM	S2
Pyramid Pigtoe	<i>Pleurobema rubrum</i>	E		SP	S1
Ring Pink	<i>Obovaria retusa</i>	E	LE	LE	S1
Rock Pocketbook	<i>Arcidens confragosus</i>	E		PSM	S3
Rough Pigtoe	<i>Pleurobema plenum</i>	E	LE	SP	S1
Round Hickorynut	<i>Obovaria subrotunda</i>	H	PT	PSM	S2
Round Pigtoe	<i>Pleurobema sintoxia</i>	E		SP	S1
Scaleshell	<i>Leptodea leptodon</i>	H	LE	SP	SX
Sheepnose	<i>Plethobasus cyphus</i>	E	LE	LE	S2S3
Slabside Pearlymussel	<i>Pleuronaia dolabelloides</i>	H	LE	SP	S1
Smooth Rabbitsfoot	<i>Quadrula cylindrica cylindrica</i>	H	LT	SP	S1
Snuffbox	<i>Epioblasma triquetra</i>	H	LE	PSM	S1
Spectaclecase	<i>Cumberlandia monodonta</i>	E	LE	SP	S1
Spike	<i>Elliptio dilatata</i>	E		PSM	S1
Sugarspoon	<i>Epioblasma arcaeformis</i>	H		PSM	SX
Tennessee Clubshell	<i>Pleurobema oviforme</i>	H		PSM	S1
Tennessee Pigtoe	<i>Pleuronaia barnesiana</i>	H		PSM	S1
Wavy-rayed Lampmussel	<i>Lampsilis fasciola</i>	H		PSM	S2
White Wartyback	<i>Plethobasus cicatricosus</i>	E	LE	LE	S1

Common Name	Scientific Name	Element Rank ²	Federal Status ³	State Status ³	State Rank ⁴
SNAILS					
Anthony's River Snail	<i>Athearnia anthonyi</i>	E	LE	SP	S1

¹ Source: TVA Natural Heritage Database, queried on 10/29/2020. Records are from the Cumberland River (0513020103 & 0513020106), Station Camp Creek (0513020105), Stone River (051302030), Factory Creek (0603000504), Shoal Creek (0603000505), Wilson Lake – Shoal Creek (0603000505), Tennessee River- Cypress Creek (0603000506), Tennessee River – Pickwick Lake (0603000508), Tennessee River (0604000105), and Buffalo River – Upper (0604000401) ten-digit HUC watersheds.

² Heritage Element Occurrence Rank; E = extant record ≤25 years old; H=historical record ≥ 25 years old; H? = possibly historical; AB = Good estimated viability

³ Status Codes: LE = Listed Endangered; LT = Listed Threatened; PT = Proposed Threatened; CNGF = Commercial or Nongame Fish (Alabama); D = Deemed in Need of Management; SP = Special Protection; PSM = Partial Status Mussel

⁴ State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure, SX = Presumed extirpated.

The TVA Natural Heritage database indicates 36 plant species tracked by the states of Alabama, Kentucky, and Tennessee have been previously reported from within a five-mile vicinity of the of the Colbert and Paradise CT plant project areas and associated offsite infrastructure upgrades. No federally listed plant species have been previously reported from within a five-mile vicinity of the project areas, but eight federally listed plants have been documented from the counties where work would occur (Table 3-16). No designated critical habitat for plants occurs within the project areas.

All species listed in Table 3-16 have specific habitat requirements that are not common in states where those species are listed and tracked. These specialized habitats are varied and include rocky grasslands, rich cove forests, sandstone rock shelters, limestone glades over bedrock, calcareous seeps, and forested wetlands. No populations of species listed in Table 3-16 were observed during comprehensive surveys of all CT plant and offsite TL and natural gas pipeline project areas. Field surveys indicate that all plant communities within the project areas are disturbed and do not contain habitat capable of supporting protected plant species.

Table 3-16. Plant Species of Conservation Concern Known from Within Five Miles¹ of Proposed Paradise and Colbert CT Plant and Offsite Project Areas and Federally Listed and Candidate Species Listed in Project Counties²

Common Name	Scientific Name	Federal Status ³	State Status ³	State Rank ⁴
Alabama				
Price's potato-bean ⁵	<i>Apios priceana</i>	LT		S2
Wall-rue Spleenwort	<i>Asplenium ruta-muraria</i>			S1
American Hart's Tongue Fern ⁵	<i>Asplenium scolopendrium</i> var. <i>americanum</i>	LT		S1
River Bulrush	<i>Bolboschoenus fluviatilis</i>			S1
Blue-eyed Mary	<i>Collinsia verna</i>			S1
Leafy prairie-clover ⁵	<i>Dalea foliosa</i>	LE		S1
Dutchman's Breeches	<i>Dicentra cucullaria</i>			S2
False Rue-anemone	<i>Enemion biternatum</i>			S2

Common Name	Scientific Name	Federal Status³	State Status³	State Rank⁴
Alabama Gladecress	<i>Leavenworthia alabamica</i>			S2
Fleshy-fruit Gladecress ⁵	<i>Leavenworthia crassa</i>	LE		S2
White fringeless orchid ⁵	<i>Platanthera integrilabia</i>	T		S2
Prairie-dock	<i>Silphium pinnatifidum</i>			S2
Tennessee Yellow-eyed Grass ⁵	<i>Xyris tennesseensis</i>	LE		S1
Kentucky				
Fly Poison	<i>Amianthium muscitoxicum</i>		LE	S1
Blue Wild-indigo	<i>Baptisia australis</i> var. <i>minor</i>		S	S2S3
Yellow Wild-indigo	<i>Baptisia tinctoria</i>		LT	S1S2
Broadwing Sedge	<i>Carex alata</i>		LT	S1S2
Carolina Larkspur	<i>Delphinium carolinianum</i>		LT	S1S2
Water-purslane	<i>Didiplis diandra</i>		LE	S1S2
French's Shootingstar	<i>Dodecatheon frenchii</i>		S	S3
Downy Gentian	<i>Gentiana puberulenta</i>		LE	S1
Floating Pennywort	<i>Hydrocotyle ranunculoides</i>		LE	S1S2
Necklace Glade-cress	<i>Leavenworthia torulosa</i>		LT	S2
Perideridia	<i>Perideridia americana</i>		LT	S2
Nodding Rattlesnake-root	<i>Prenanthes crepidinea</i>		S	S3
Hair-like Mock Bishop-weed	<i>Ptilimnium capillaceum</i>		LT	S1S2
Prairie-dock	<i>Silphium pinnatifidum</i>		S	S3
Ozark Bunchflower	<i>Veratrum woodii</i>		LT	S2
Tennessee				
Western Hairy Rock-cress	<i>Arabis hirsuta</i>		LT	S1
Price's Potato-bean ⁵	<i>Apios priceana</i>	LT	LE	S3
Braun's Rockcress ⁵	<i>Arabis perstellata</i>	LE	LE	S1
Purple Milkweed	<i>Asclepias purpurascens</i>		S	S1
Tennessee Milk-vetch	<i>Astragalus tennesseensis</i>		S	S3
Sedge	<i>Carex hirtifolia</i>		S	S1S2
Blue-eyed Mary	<i>Collinsia verna</i>		LE	S1
Leafy prairie-clover ⁵	<i>Dalea foliosa</i>	LE	LE	S2S3
Beak Grass	<i>Diarrhena obovata</i>		S	S1
Yellow Trout-lily	<i>Erythronium rostratum</i>		S	S2
Spring Creek Bladderpod ⁵	<i>Lesquerella perforata</i>	LE	LE	S1
Fraser Loosestrife	<i>Lysimachia fraseri</i>		LE	S2
Short's Bladderpod ⁵	<i>Physaria globosa</i>	LE	LE	S2
Barbed Rattlesnake-root	<i>Prenanthes barbata</i>		S	S2

Common Name	Scientific Name	Federal Status ³	State Status ³	State Rank ⁴
White Water Buttercup	<i>Ranunculus aquatilis</i> var. <i>diffusus</i>		LE	S1
Blue Sage	<i>Salvia azurea</i> var. <i>grandiflora</i>		S	S3
Ovate Catchfly	<i>Silene ovata</i>		LE	S2
Southern Morning-glory	<i>Stylisma humistrata</i>		LT	S1
Horsesugar	<i>Symplocos tinctoria</i>		S	S2

¹ Source: TVA Natural Heritage Database, queried October 2020

² Includes Colbert, Lauderdale, and Morgan Counties, Alabama; Hardin, Lawrence, Montgomery, Sumner, Wayne, and Wilson Counties, Tennessee; and Muhlenberg and Todd Counties, Kentucky

³ Status Codes: LE = Listed Endangered; S = Listed Special Concern; LT = Listed Threatened

⁴ State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2)

⁵ Federally listed species occurring within the county where work would occur, but not within 5 miles of the project area

3.11.1.1 Paradise CT Plant Project Area, Offsite Natural Gas Upgrade, and Offsite TL Upgrades

The TVA Natural Heritage database indicated that there are eighteen records of Tennessee and Kentucky state-listed terrestrial animal species, one federally protected terrestrial animal species (bald eagle), and one federally listed terrestrial animal species (gray bat) within 3 miles of the Paradise CT plant project area and associated TL upgrades. Two additional federally listed terrestrial animal species (Indiana bat and northern long-eared bat) have also been reported from Sumner, Wilson, and Montgomery counties, Tennessee, and Muhlenberg and Todd counties, Kentucky (Table 3-13).

A brief description of species potentially occurring within the Paradise CT plant onsite area and the offsite project areas can be found below.

3.11.1.1.1 Amphibians

Bird-voiced treefrogs primarily inhabit swampy areas including large floodplain ponds, manmade ponds, and lakes that are near rivers or streams and in close proximity to forest (Powell et al. 2016; NatureServe 2020). The closest record of bird-voiced treefrog is approximately 870 feet from the Paradise Reservation. Suitable habitat for this species occurs at ponds and wetlands adjacent to the Paradise Reservation including those within Peabody Wildlife Management Area (WMA) and along existing onsite and offsite TLs. Some appropriate habitats may occur along the edge of the Green River.

Barking treefrogs are found in lowland wet woods and swampy areas (Powell et al. 2016). The closest record of this species is 1.6 miles from the proposed offsite fiber optic groundwire installation. Suitable habitat for this species does not occur in the Paradise CT plant project area but could occur on the forested edges of existing offsite TL ROWs within wetlands.

Streamside salamanders are found in the Inner Nashville Basin in low gradient streams that flow over exposed bedrock, many of which are ephemeral (Niemiller et al. 2006). This species has been documented in two streams immediately upstream of a ROW that may be used for vehicle access between two proposed offsite TL structure upgrades along

TL 5823. Despite heavy residential development in the area, it is likely that individuals of this species have been washed downstream during large rain events and could occur within offsite TL upgrade project areas.

3.11.1.1.2 Birds

Bank swallows nest in colonies where the birds burrow into steep sand and gravel banks creating cavity nests during the breeding season. The species utilizes open and partially open areas near flowing bodies of water (NatureServe 2020). A colony exceeding 100 nest burrows existed for multiple years in a coal refuse pile in the southeast portion of the Paradise Reservation, which is outside of the Paradise CT plant project area. However, this coal pile is no longer present, and the area has been reseeded and left to forest regeneration. Suitable nesting habitat occurs along the banks of the Green River.

Bell's vireo requires shrub/scrub, dense brush, willow thickets, or narrow early successional wooded areas with dense understories, such as those often found along small stream corridors (NatureServe 2020). Bell's vireos tend to prefer the above-mentioned habitats if they are scattered within more open grassland or agricultural landscapes versus forest dominated areas. Small blocks of grassland/shrub habitats surrounded by mature forests may be avoided by this species. This species has been recorded within the Paradise Reservation, and a small amount of suitable habitat for the Bell's vireo may still occur in that area. However, this area of potential Bell's vireo habitat is outside of the Paradise CT plant project area.

Common barn-owls hunt for small mammals in open areas, including agricultural fields, grasslands, and marshes (Nicholson 1997). They nest in hollow trees and in buildings where there is little human activity. The closest record of this species is approximately 2.12 miles away from proposed offsite TL upgrades. This species could inhabit forested areas in the Paradise CT plant project area and along existing onsite and offsite ROWs.

Common gallinules reside in wetland or riparian habitats including both freshwater and brackish marshes as well as the edges of lakes or ponds. They typically require areas with a mix of aquatic vegetation, including submerged, floating, and emergent (Cornell Lab of Ornithology 2019). Common gallinules have been recorded approximately 420 feet away from the Paradise Reservation within the Peabody WMA. There is no habitat for this species within the CT plant project area or in offsite TL project areas.

Great egrets often nest in heronries comprised of a mix of species. Heronries are located in trees around wetlands, reservoirs, and along rivers (Palmer-Ball Jr 1996). The closest record of this species is approximately 2.3 miles away from proposed project areas near the Cumberland River. Suitable nesting habitat for this species occurs along large rivers and wetlands within the CT plant project area and offsite TL project areas.

Henslow's sparrow utilizes pastures and native grasslands, with a preference for areas with tall grass species that have a residual layer of dead vegetation (Reinking et al. 2000). This bird species is a locally distributed summer resident across Kentucky and is known to occupy the Peabody WMA. Records of this species occur approximately 0.52 miles away from the Paradise CT plant project area. Suitable habitat for this species may occur within existing onsite and offsite TL project areas associated with the proposed Paradise CT plant.

The hooded merganser is a waterfowl species that utilizes both deep and shallow water habitats such as streams, rivers, and lakes. Tree cavities or nest boxes are required for

nesting and are often in close proximity to water (Cornell Lab of Ornithology 2019; NatureServe 2020). The closest known record of this species is approximately 1.6 miles away from the Paradise Reservation. Suitable nesting habitat for this species does not occur within the reservation; however, ample habitat is available along the Green River in Kentucky, within the waterfowl refuge portion of the Peabody WMA, and on Old Hickory Lake in Tennessee.

Least bittern is found in marshy habitats with herbaceous vegetation like rushes, sedges, and cattails. They nest along marshes, ponds, reservoirs, and waterfowl management areas (Palmer-Ball Jr 1996). Suitable nesting habitat likely occurs along offsite TL project areas associated with the Paradise CT plant.

Lark sparrows are found in open and semi-open habitats with sparse ground cover. They are more often found in altered habitats in recent decades, such as rural farmland (Palmer-Ball Jr 1996). The closest record of this species is 0.7 miles away from the proposed offsite compressor engine. Suitable nesting habitat likely occurs along existing onsite and offsite TL project areas associated with the Paradise CT plant.

Ospreys occupy riparian habitats alongside bodies of water such as rivers, lakes, and reservoirs. They build nests of sticks on a variety of man-made structures (e.g., TL structures, lighting towers) near water (NatureServe 2020). Two active osprey nests were documented within the Paradise CT plant project area during field review in August 2020, as shown in Figure 3-3. Both are within 660 feet of proposed construction activities. No additional nests were observed during field surveys of proposed offsite TL upgrades or during drone flyovers of the TL proposed for fiber optic groundwire installation (TL 6057).

Northern harriers are associated with large tracts of fallow fields and grasslands. Nesting of this species in Kentucky has only been reported in recent decades where they nested in thick grasslands (Palmer-Ball Jr 1996). The closest record of this species is 2.2 miles away from the proposed offsite compressor engine. Suitable foraging habitat for this species occurs over herbaceous habitats found on all of the onsite and offsite project areas. Suitable nesting habitat likely occurs along existing offsite TLs within the proposed upgrade project areas.

Sedge wrens nest throughout Kentucky and reside in wet grasslands and savanna, as well as moist areas where scattered bushes and shrubs are present. This species is highly sensitive to habitat conditions and will leave a potential breeding site if the site is too dry, wet, or overgrown (NatureServe 2020). The closest record of this species is approximately 0.24 miles away on the Peabody WMA. Due to their sensitivity, habitat for the sedge wren is not likely to occur in the highly disturbed areas of the Paradise CT plant project area. Additional habitat could occur along existing offsite TL ROW proposed upgrade project areas.

Bald eagles are protected under the Bald and Golden Eagle Protection Act (USFWS 2013). This species is associated with larger mature trees capable of supporting its massive nests. These are usually found near larger waterways where the eagles forage (USFWS 2007). Records document the occurrence of four bald eagle nests across Muhlenberg and Todd counties, Kentucky and Montgomery, Wilson, and Sumner counties, Tennessee. The closest of these is approximately 0.84 miles away from the Paradise Reservation. No bald eagle nests were observed during field reviews across the Paradise CT plant project area,

during TL upgrade surveys, or during drone flyovers of TL proposed for fiber optic groundwire installation (TL 6057).

3.11.1.1.3 Invertebrates

Whitewashed raddotus is a terrestrial snail that occurs in meadows and open glades. It is most often observed on the ground or on low vegetation during damp weather (NatureServe 2020). The closest record of this species is approximately 1.3 miles away from the TL proposed for fiber optic groundwire installation (TL 6057). Suitable habitat for this species exists along existing onsite and offsite ROWs associated with the Paradise CT plant.

3.11.1.1.4 Mammals

Gray bats roost in caves year-round and migrate between summer and winter roosts during spring and fall (Brady et al. 1982; Tuttle 1976a). Bats disperse over bodies of water at dusk where they forage for insects emerging from the surface of the water (Tuttle 1976b). Although they prefer caves, gray bats have been documented roosting in large numbers in buildings (Gunier and Elder 1971). Gray bats have been reported from a cave approximately 2.2 miles away from proposed upgrades along the TL proposed for fiber optic groundwire installation (TL 6057).

Indiana bats hibernate in caves in winter and use areas around them for swarming (mating) in the fall and staging in the spring, prior to migration back to summer habitat. During the summer, Indiana bats roost under the exfoliating bark of dead snags and living trees in mature forests with an open understory and a nearby source of water (Pruitt and TeWinkel 2007; Kurta et al. 2002). Although less common, Indiana bats have also been documented roosting in buildings (Butchkoski and Hassinger 2002). Indiana bats are known to change roost trees frequently throughout the season, while still maintaining site fidelity, returning to the same summer roosting areas in subsequent years (Pruitt and TeWinkel 2007). One acoustic recording presumably from an Indiana bat was documented approximately 3.3 miles from the Paradise CT plant project area in Muhlenberg County. Indiana bat hibernacula are known from Montgomery County, Tennessee, and Indiana bat summer maternity colonies are known from Wilson County, Tennessee. All hibernacula and maternity areas are greater than 10 miles away from project areas.

Northern long-eared bats predominantly overwinter 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 (typically greater than 3 inches in diameter). Roost selection by northern long-eared bat is similar to that of Indiana bat; however, northern long-eared bats are thought to be more opportunistic in roost site selection. This species also roosts 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 records of northern long-eared bats are from a cave approximately 4.2 miles away from the proposed offsite TL upgrades in Montgomery County, Tennessee. Other hibernacula are known from Sumner County, Tennessee. Summer roost trees for northern long-eared bats are known from Wilson County, Tennessee, and mist net surveys documented this species in Muhlenberg County, Kentucky. All of these other records are greater than 5 miles away from proposed project areas.

Six caves are known within 3 miles of the proposed TL upgrades associated with the Paradise CT plant. No caves or cave-like habitats were observed within the Paradise CT plant project area. Suitable foraging habitat for all three bat species occurs over and along forested areas and bodies of water across the proposed project areas. Field surveys in August 2020, which followed the 2020 USFWS Indiana Bat Summer Survey Guidelines (USFWS 2020a), determined that suitable summer roosting habitat for Indiana bat and northern long-eared bat occurs in some forested areas across the Paradise CT plant project area, though habitat quality ranges from low to high based on presence of suitable roosting exfoliating bark, cavities, and crevices; density/clutter of forest, and proximity to water (Figure 3-3). No suitable summer roosting habitat for Indiana bat or northern long-eared bat was observed during September and October 2020 field surveys along TL access roads that would require tree trimming to facilitate road improvements.

3.11.1.1.5 Reptiles

Common ribbon snakes are found along the edges of aquatic areas like swamps, ponds, marshes, rivers, and streams, where they frequently climb into low bushes that overhang water (Gibbons and Dorcas 2005). Suitable habitat for this species exists along the Green River and along water bodies in the existing onsite and offsite ROWs within the Paradise CT plant project area.

Eastern slender glass lizards are found in dry grasslands and open woodlands (Powell et al. 2016). The closest record of this species is approximately 1.1 miles away from the TL proposed for the fiber optic groundwire installation (TL 6057). Suitable habitat for this species exists along existing onsite and offsite ROWs within the Paradise CT plant project area.

3.11.1.1.6 Fish

The blackfin sucker occurs in medium rivers/ creeks with pool-riffle complexes over moderate gradients. Spawning occurs in shallow swift water (NatureServe 2020).

The blotchside logperch is known to inhabit large creeks and small to medium rivers with low turbidity. This species is typically found in areas of large gravel and small cobble substrates with moderate current (Etnier and Starnes 1993).

The blue sucker is currently state listed as threatened in Tennessee. This species occurs in larger rivers of the Gulf Coastal drainages from the Mobile Basin to the Rio Grande. It is found in larger streams of the Yazoo, Big Black, and the lower Mississippi South drainages in the Mississippi River Basin (Ross 2001). The blue sucker inhabits deep pools of large, free-flowing rivers with swift currents of up to 260 cm/s. Once common throughout its range, populations of blue suckers have drastically declined due to impoundments and increasing siltation of big rivers (Etnier and Starnes 1993).

The boulder darter inhabits fast rocky riffles of small to medium rivers. Adults are often associated with areas of boulder/ rubble substrate. Spawning occurs among boulders in flowing water (NatureServe 2020).

Chestnut lamprey adults live in medium and large rivers; larvae burrow in bottom of smaller tributaries in areas of moderate current and later move into more densely vegetated areas with a softer bottom. Adults also occur in large reservoirs. Eggs are laid in a nest in the river bottom; adults may cover eggs with stones (NatureServe 2020).

The coppercheek darter prefers medium rivers/creeks with clear, fast, rocky riffles. The species primarily occupies deep riffles, runs, and flowing pools in the main channel of streams with a mixture of gravel and cobble substrate. Threats to the species appear to be loss of habitat due to impoundment (NatureServe 2020).

The crown darter is often associated with submersed aquatic vegetation over gravel or rock substrates in sluggish medium/ small streams. Threats to the species appear to be poor agricultural and forestry practices (NatureServe 2020).

The egg-mimic darter typically occurs under overhanging banks in areas of low gradient. Preferred habitats have dense mats of exposed tree roots (NatureServe 2020).

The flame chub is an inhabitant of springs/spring runs. Spawning occurs from late January through May. Populations have declined with the continued alteration of spring habitats (Etnier and Starnes 1993).

The highfin carpsucker is the smallest of the carpsuckers, and it is the species that has been most adversely affected by environmental change. It prefers habitat consisting of areas of gravel substrate in clear medium to large rivers and is more susceptible to change by siltation and impoundment (Etnier and Starnes 1993).

The lake sturgeon prefers large lakes and rivers and spawns over rocky reefs. TWRA has released approximately 81,500 lake sturgeon into the French Broad, Holston, and Tennessee rivers downstream of Douglas and Cherokee reservoirs since 2000 as part of their reintroduction program (NatureServe 2020).

The longhead darter occurs sporadically in the upper Green and Barren river systems. This darter is most often found in swift flowing runs and riffles of clean upland streams and rivers over cobble substrates and is often associated with flow refuges created by boulders. Neither of the perennial streams crossed by the proposed delivery point contain suitable habitat within or adjacent to the proposed ROW, so it is unlikely that the longhead darter would occur within the project area. The major threat to the species is habitat degradation due to pollution, siltation, and stream alteration projects (NatureServe 2020).

The lollipop darter typically occurs under overhanging banks in areas of low gradient; preferred habitats have dense mats of exposed tree roots (NatureServe 2020).

The redband darter is listed as “In Need of Management” by TWRA. Though Etnier and Starnes (1993) describe the redband darter as occurring only in the Duck River system, the Caney Fork River system, and Stones Creek, the TWRA has recently collected specimens from headwaters of the Mill Creek drainage. This darter prefers pools and sluggish runs in spring fed streams of moderate gradient over limestone bedrock, gravel, and cobble substrates.

The saddled madtom prefers medium rivers/creeks with rocky riffles, runs, and flowing pools with clear water. Threats to this species appear to be habitat loss due to impoundments, channelization, removal of riparian vegetation, bridge construction, runoff from agricultural land, and range fragmentation (NatureServe 2020).

The scaly sand darter is listed as “In Need of Management” by TWRA. In Tennessee it was once common in western tributaries of the Lower Tennessee River prior to creation of the

Kentucky Reservoir, and it may also have occurred in the Forked Deer and Obion River systems. Currently it is known to occur only in the Hatchie River system, primarily in the mainstems of the Hatchie River and Spring Creek. This species prefers a shifting sand substrate with moderate current in medium to large streams (Etnier and Starnes 1993).

The slackwater darter prefers streams with gravel-bottomed pools in sluggish areas of creeks and small rivers. It has also been associated with dense filamentous algae in the upper Buffalo River. Spawning occurs in very shallow seepage water in fields and open woods (NatureServe 2020).

The slenderhead darter is commonly found in gravel shoal areas of medium to large rivers with moderate to swift current. The most likely threats to the species are siltation, impoundment, and channelization (Etnier and Starnes 1993).

The smallscale darter prefers medium rivers/creeks with high gradients, gravel, and coarse rubble (NatureServe 2020).

Snail darter can occur in gravel and sand runs of medium-sized rivers. Adults and spawning individuals inhabit sand and gravel shoals of moderately flowing, vegetated, large creeks and river. It is also found in deeper portions of rivers and reservoirs where current is present. Young occur in slackwater habitats, including the deeper portions of rivers and reservoirs (Etnier and Starnes 1993).

The sooty darter, formally known as dirty darter, is restricted to the Nashville Basin tributaries to the Cumberland River and lower Caney Fork River. It inhabits small, low gradient streams with limestone bedrock substrates. Adults prefer slabrock pools but are not confined to this habitat. Spawning occurs from April to May. Juveniles feed on midge larvae and microcrustaceans while adults feed on the same but utilize other aquatic insect immatures, isopods, and amphipods (Etnier and Starnes 1993).

Southern cavefish species is known only from cool (10-14° C), clear waters of cave streams, underground lakes, wells, and outlets of springs, over mixed gravel, sand, and mud substrates (NatureServe 2020).

The spottin chub inhabits clear upland rivers in swift currents over boulder substrates. Spawning occurs May through August (Etnier and Starnes 1993).

The stonecat occurs under rocks in riffles, runs, and rapids in warm medium creeks to small rivers (Etnier and Starnes 1993).

The Tennessee logperch prefers streams with predominate gravel and cobble substrates (NatureServe 2020).

3.11.1.1.7 Macroinvertebrates

The Alabama crayfish prefers medium sized rivers/creeks and can be found under rocks. Little is currently known about its life history (NatureServe 2020).

The Hardin crayfish prefers streams with substrate dominated by deposits of alluvia gravel. Threats to this species are mostly unknown, but they are likely sedimentation and agricultural runoff (NatureServe 2020).

3.11.1.1.8 Mussels

Birdwing pearl mussel is almost always found in riffle areas with stable, sand and gravel substrates in moderate to fast currents in small to medium-sized rivers (Parmalee and Bogan 1998).

Black sandshell is typically found in medium-sized to large rivers in locations with strong current and substrates of coarse sand and gravel with cobbles. Water depths for this species range from several inches to six feet or more. It can be found in sand, gravel, or silt (NatureServe 2020).

The butterfly mussel reaches its greatest abundance in large rivers in stretches with pronounced current and a substrate of coarse sand and gravel. It appears to have been successful in adapting to impoundment conditions in the Cumberland and Tennessee rivers, where it is locally common and can be found at depths of up to 20 feet (NatureServe 2020).

The clubshell can be found in the lower Tennessee River and the Cumberland River. It once occurred in the Clinch and Sequatchie rivers. In Tennessee, adults reach an average length of 65 mm. It inhabits medium-sized and large rivers with firm substrate of sand and gravel. Although once numerous, the clubshell has been nearly extirpated from most of the state due to loss of desirable habitat from impoundments. The host fish for the glochidia is unknown (Bogan and Parmalee 1983).

Cracking pearl mussel is abundant in sand, gravel, and cobble substrates in swift currents or in mud and sand in slower currents (NatureServe 2020).

Cumberland moccasinshell inhabits small streams, preferably in headwaters, in sand and gravel substrates. It is often found in cracks or under rocks (Parmalee and Bogan 1998).

Cumberlandian combshell is restricted to the Tennessee and Cumberland rivers. It inhabits headwater streams, including the Powell, Clinch, Holston, and Nolichucky. Adults average 50 mm but can reach over 80 mm in length. It prefers clear streams with rocky bottoms but has been found in sand and gravel bottoms of the Clinch River. The mussel is bradyctictic with several darter species being identified as host fish (Bogan and Parmalee 1983).

The deertoe mussel is a generalist in substrate choice and river size. It is more common in medium-sized rivers. Adults commonly reach sizes from 40-50 mm in length. It is bradyctictic, with sauger and freshwater drum being identified as the glochidia host (Parmalee and Bogan 1998).

The dromedary pearl mussel is known to occur in shoals and riffles. It is believed to be bradyctictic with no identified fish host (Parmalee and Bogan 1998).

The elktoe prefers small, shallow rivers with moderately fast current in a mixture of fine gravel and sand. However, it can occur in larger rivers with sand/gravel substrate (NatureServe 2020).

The fanshell occurs in the Ohio, Cumberland, and Tennessee River systems. Adults reach a maximum length of 70 mm. All viable populations are restricted to unimpounded stretches of the Clinch River on substrate of coarse sand and gravel in strong flowing waters. It is

bradytictic with the glochidia host unknown. However, goldfish have served as host under laboratory conditions (Parmalee and Bogan 1998).

Fine-rayed pigtoe occurs in the Tennessee River drainage from the Clinch and Powell rivers in southwestern Virginia to Muscle Shoals, Alabama. Large adults can reach 80 mm in length. It usually inhabits ford and shoal areas of rivers with moderate gradient. The fine-rayed pigtoe is tachytictic with several fish being shown under laboratory conditions to act as the glochidia host (Parmalee and Bogan 1998).

Kidneyshell is most commonly found in small (6-16 m wide) to medium-sized (15-20 m wide) rivers, and it is rarely found in large rivers (>30-50 m wide). The species is tolerant of a variety of habitat conditions, although rivers with moderately strong current and a substrate of coarse gravel and sand provide the most suitable habitat. It may be found at depths of less than three feet up to those as great as 18 to 24 feet on large rivers (reservoirs) such as the Tennessee and Cumberland rivers (NatureServe 2020).

Longsolid is found in medium to large rivers with strong current and gravel substrate (NatureServe 2020).

The mountain creekshell is found in gravel and sand substrates in riffles and edges of *Justicia* beds (NatureServe 2020).

Ohio pigtoe occurs in the Upper Mississippi River drainage to the St. Lawrence River drainage. Adults can average 80-90 mm in length, but very old specimens can reach 120 mm. It reaches greatest abundance and size in large rivers with solid substrate consisting of sand and gravel with strong current. Although it can be found at depths of 18-24 feet, it has not adapted well to impoundments. The species is trachytictic with bluegill, and rosefin shiners have been identified as the glochidia host (Parmalee and Bogan 1998).

The orangefoot pimpleback can be found primarily in big rivers. Individuals have been found at depths of 12 to 18 feet in sand and coarse gravel substrate. It is considered to be tachytictic, but host fish for glochidia is currently unknown (Parmalee and Bogan 1998).

The oyster mussel is found throughout the Tennessee and Cumberland river systems, and it prefers shallow riffles in fast current. Adults can reach 70 mm in length. The oyster mussel is bradytictic with several darters, and the banded sculpin has been identified as the glochidia host (Parmalee and Bogan 1998).

Painted creekshell is restricted to the Tennessee and Cumberland river drainages. Adults rarely exceed 80 mm in length. It prefers substrate of mixed sand and gravel in good current at depths of 3 feet or less. It is presumed to be bradytictic like other species in the same genus. The rock bass has been identified as the glochidia host for this species (Parmalee and Bogan 1998).

Pocketbook is much generalized in habitat preference, adapting well to both impoundment situations as well as free-flowing, shallow rivers. It may be found in big rivers (reservoirs) at depths of 15 to 20 feet and in small streams in less than two feet of water. Although usually found in moderate to strong current, it can survive in standing water. The most suitable substrate consists of a mixture of gravel and coarse sand mixed with some silt or mud (Parmalee and Bogan 1998).

The purple catspaw inhabits large river systems with sand and gravel substrates in runs and riffles (NatureServe 2020).

Purple lilliput has a wide distribution. It prefers mud, sand, and gravel substrate of small to medium-sized rivers. However, it can be found on shallow, rocky gravel points or sandbars in impoundments. Adults seldom exceed 35 mm in length. Females become gravid in May or June. The green sunfish and the longear sunfish have been identified as glochidia hosts (Parmalee and Bogan 1998).

Pyramid pigtoe prefers rivers with strong current and substrate composed of firm sand and gravel. It is believed to be tachytictic and the glochidia host is unknown (NatureServe 2020).

The ring pink is typically found in large rivers with gravel bars. The glochidia host is unknown (NatureServe 2020).

Rock pocketbook is found in mud and sand bottom pools in medium to large rivers in standing or slow flowing water. It is a species typical of large lowland streams with little or no flow and a substrate of mud or a mixture of mud and fine sand (NatureServe 2020).

Rough pigtoe can be found in medium to large rivers over substrate composed of firmly packed gravel and sand. The fish host is unknown (NatureServe 2020).

The round hickorynut occurs in the Tennessee, Cumberland, and Ohio river systems. Adults seldom exceed 60 mm in length. The species is bradytictic with glochidia present in June. It prefers medium to large rivers with sand and gravel substrate and moderate flow. Typically, it is found at depths less than 3 feet. The glochidia host fish is unknown (NatureServe 2020).

Round pigtoe is found in medium to large rivers in mixed mud, sand, and gravel. Parmalee and Bogan (1998) reported Tennessee occurrences most abundantly, and almost exclusively, in medium-sized and large rivers and in current on a firm substrate of coarse gravel and sand at depths of less than three feet to more than 20 feet.

The scaleshell prefers medium to large rivers with low to moderate gradients in a variety of stream habitats. Currently, it is more restricted to rivers with relatively good water quality (NatureServe 2020).

Sheepnose can be found in the Ohio, Cumberland, and Tennessee river systems and the upper Mississippi River north to Minnesota. Adults can reach up to 110-120 mm in length. The species prefers substrate of mixed coarse sand and gravel. It is tachytictic with most reproductive activity occurring in the summer. The glochidia host fish has been identified as sauger (Parmalee and Bogan 1998).

Slabside pearl mussel occurs in moderate to high gradient riffles in creeks to large rivers. It is generally found at depths <1 m, moderate to swift current velocities, and substrates from coarse sand to heterogenous assemblages of larger sized particles. The slabside pearl mussel is primarily a large stream to moderately sized river species, inhabiting sand, fine gravel, and cobble substrates in relatively shallow riffles and shoals with moderate current. This species requires flowing, well-oxygenated waters to thrive (NatureServe 2020).

The typical habitat for smooth rabbitsfoot is small to medium rivers with moderate to swift currents, and in smaller streams it inhabits gravel bars or gravel and cobble close to the fast current. Found in medium to large rivers in sand and gravel. It has been found in depths up to 3 meters (NatureServe 2020).

Snuffbox is found in riffles of small and medium creeks, in large rivers, and in shoals and wave-washed shores of lakes. They are suspension feeders, typically feeding on algae, bacteria, detritus, microscopic animals, and dissolved organic material (NatureServe 2020).

Spectaclecase has been documented in various types of substrate, including gravel, sand, and mud, in medium-sized to large rivers. Glochidia host are undetermined (NatureServe 2020).

Spike has a wide distribution range. Adults in impoundments can attain lengths of 120 mm. It is a generalist in regards to river size and depth. Most suitable habitat seems to be firm substrate of coarse sand and gravel in moderately strong current. The species is tachytictic. Reproductive activity occurs from mid-May to August. Several fish species have been identified as glochidia hosts (Parmalee and Bogan 1998).

Tennessee clubshell occurs in the Tennessee and Cumberland river drainages. Adults reach lengths of 70 mm, but old adults can reach 90 mm. It prefers substrate of coarse gravel and sand in small shallow creeks and rivers with good current. It is thought to be tachytictic. Several fish species have been shown to serve as glochidia hosts.

Tennessee pigtoe occurs in the Cumberland and Tennessee river systems. Adults may reach 90-95 mm in length. It is believed to be tachytictic. The host fish for the glochidia is unknown. Several sub-species range from headwater to big river habitat (Parmalee and Bogan 1998).

Wavy-rayed lampmussel occurs in the Great Lakes and Ohio-Mississippi drainages south to the Tennessee River system. Adults can reach up to 90-100 mm in length and are typically found in small to medium-sized rivers. It inhabits depths of 3 feet or less and is tolerant of habitat conditions unfavorable to many similar species. It prefers substrate of mud, sand, and gravel in moderate current and can become abundant locally. Its reproductive period is unknown. The believed glochidia host is smallmouth and largemouth bass (Parmalee and Bogan 1998).

3.11.1.2 Colbert CT Plant Project Area, Offsite Natural Gas Loop Line, and Offsite TL Upgrades

The TVA Natural Heritage database indicated there are ten records of Alabama and Tennessee state-listed terrestrial animal species, one federally protected terrestrial animal species (bald eagle), and one federally listed terrestrial animal species (gray bat) within 3 miles of the Colbert CT plant site and associated TL upgrades. Three additional federally listed terrestrial animal species (Indiana bat, northern long-eared bat, and red-cockaded woodpecker) have also been reported from Lawrence, Wayne, and Hardin counties, Tennessee; and Morgan, Colbert, and Lauderdale counties, Alabama (Table 3-13).

3.11.1.2.1 Amphibians

Hellbenders are found in larger, fast-flowing streams and rivers with large shelter rocks. Eggs are laid in depressions created beneath large rocks or submerged logs (Petranka

1998). The nearest known hellbender record occurs approximately 1.6 miles from the Colbert CT plant site and is possibly a historical record due to the age of the record. Pickwick, Wilson, and Wheeler reservoirs are all located on the Tennessee River, which is immediately adjacent to the Colbert CT plant project area. Records for hellbenders are known from these reservoirs. Cane Creek on the Colbert Reservation (See Figure 3-2) and other larger streams along existing ROWs with proposed upgrades may also offer suitable habitat for this species.

3.11.1.2.2 Birds

Bald eagles are protected under the Bald and Golden Eagle Protection Act (USFWS 2013). This species is associated with larger mature trees capable of supporting its massive nests. These are usually found near larger waterways where the eagles forage (USFWS 2007). Records document the occurrence of 11 bald eagle nests across Lawrence, Wayne, and Hardin counties, Tennessee and Morgan, Colbert, and Lauderdale counties, Alabama. The closest of these is approximately 0.45 mile away from the proposed TL upgrades. No bald eagle nests were observed during field reviews across the Colbert CT plant project area or during surveys of offsite TL project areas.

Cerulean warblers prefer large tracts of deciduous forest with numerous well-spaced, large trees. These areas are typically within mature, old-growth deciduous communities, particularly in mesic areas or floodplains (Nicholson 1997). The closest records of these species are approximately 1.2 miles away. Suitable habitat for these species does not occur within project areas.

Ospreys occupy riparian habitats alongside bodies of water such as rivers, lakes, and reservoirs. They build nests of sticks on a variety of man-made structures (e.g., TL structures, lighting towers) near water (NatureServe 2020). Two active osprey nests were documented within the Colbert CT plant project area during field review in August 2020, as shown in Figure 3-4. Both are within 660 feet of proposed construction activities. One additional nest was observed on a proposed TL upgrade structure on TL 5676.

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 areas. While field reviews in August 2020 determined that suitable nesting trees occur on the Colbert CT plant project area, this species does not occur there.

3.11.1.2.3 Invertebrates

Batrasymmodes spelaeus (a beetle), *Batrisodes jonesi* (a beetle), and *Rhadine caudata* (a ground beetle) are all cave obligate invertebrates tracked by the state of Alabama (NatureServe 2020). The nearest caves known to support these species are located over 0.5 miles from all project areas. Sixty-one caves are known within three miles of the project areas. The closest extant caves are known from along the Tennessee River shoreline, approximately 550 feet from the Colbert Reservation; however, no records of these species are known from these closest caves.

3.11.1.2.4 Mammals

Rafinesque's big-eared bats roost in hollow trees, abandoned buildings, under bridges, or in culverts, in or near wooded areas in summer. In winter, this species has been found in caves. This species is believed to be non-migratory, moving short distances between summer and winter roosting sites. Different parts of chosen roosts are often used all year. Rafinesque's big-eared bats emerge late in the evening to forage in mature forest in both upland and lowland areas along permanent water bodies, especially rivers (Harvey 1992; NatureServe 2020). Suitable summer roosting habitat occurs within the Colbert CT plant project area and offsite natural gas pipeline area. Suitable foraging habitat occurs over forested areas and bodies of water across the onsite and offsite project areas associated with the Colbert CT plant.

Tricolored bats hibernate in caves, mines, and rock crevices. In summer they roost in dead or live vegetation in live trees. They are associated with forested landscapes where they forage near trees and along waterways, especially riparian areas (Harvey 1992). A study showed that summer roosting trees selected in the Great Smoky Mountains National Park were often oak and yellow poplar (Carpenter et al. 2019). In middle Tennessee, tricolored bats were observed roosting within clumps of dead foliage hanging from branches of live trees. The dead foliage was typically comprised of hickory or oak leaves (D. Thames, TWRA, personal communication). The closest record of this species is from a cave along the Tennessee River immediately adjacent to the Colbert Reservation, at least 1,500 feet from the proposed CT plant project area. Suitable summer roosting habitat for this species occurs in forested areas throughout the onsite and offsite project areas associated with the Colbert CT plant. Suitable foraging habitat for this species occurs over bodies of water throughout the proposed project areas.

Gray bats roost in caves year-round and migrate between summer and winter roosts during spring and fall (Brady et al. 1982; Tuttle 1976a). Bats disperse over bodies of water at dusk where they forage for insects emerging from the surface of the water (Tuttle 1976b). Although they to prefer caves, gray bats have been documented roosting in large numbers in buildings (Gunier and Elder 1971). Gray bats have been reported from mist net captures approximately 1.2 miles away from the Colbert CT plant project area. Summer emergence surveys performed at the caves along the Tennessee River did not document gray bat use. Winter surveys of presumably the two largest of these caves did not report any gray bats. The closest known gray bat hibernaculum is approximately 0.3 miles away from proposed TL upgrades along TL 5617. Suitable foraging habitat for this species occurs over bodies of water throughout the project areas.

Indiana bats hibernate in caves in winter and use areas around them for swarming (mating) in the fall and staging in the spring, prior to migration back to summer habitat. During the summer, Indiana bats roost under the exfoliating bark of dead snags and living trees in mature forests with an open understory and a nearby source of water (Pruitt and TeWinkel 2007; Kurta et al. 2002). Although less common, Indiana bats have also been documented roosting in buildings (Butchkoski and Hassinger 2002). Indiana bats are known to change roost trees frequently throughout the season, while still maintaining site fidelity, returning to the same summer roosting areas in subsequent years (Pruitt and TeWinkel 2007). The closest known record of this species is a maternity colony from McNairy County, Tennessee approximately 9.7 miles from proposed offsite TL upgrades associated with the Colbert CT plant.

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 (typically greater than 3 inches in diameter). Roost selection by northern long-eared bat is similar to that of Indiana bat, however northern long-eared bats are thought to be more opportunistic in roost site selection. This species also roosts 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 northern long-eared bat is from a mist net survey approximately 7.5 miles away from the Colbert CT plant project area in Colbert County, Alabama.

Sixty-one caves are known within three miles of the Colbert Reservation, TLs proposed for improvement, and the new natural gas pipeline associated with the Colbert CT plant. None of these are known to be used by Indiana bats or northern long-eared bats. Suitable foraging habitat for both Indiana bat and northern long-eared bat species occurs over and along forested areas and bodies of water across the Colbert CT plant onsite and offsite project areas. Field surveys conducted in August 2020, which followed the 2020 USFWS Indiana Bat Summer Survey Guidelines (USFWS 2020a), determined that suitable summer roosting habitat for Indiana bat and northern long-eared bat occurs in some forested areas across the Colbert CT plant project area, including offsite areas associated with the natural gas pipeline upgrades. Habitat quality ranges from low to moderate based on presence of suitable exfoliating bark, cavities, and crevices; density/clutter of forest, and proximity to water. Bat habitat surveys were not performed for the offsite natural gas pipeline project areas south of CR 20. Therefore, to be conservative, it is assumed that the forested habitat there is suitable for summer roosting Indiana bat and northern long-eared bat. No suitable summer roosting habitat for Indiana bat or northern long-eared bat was observed during field surveys conducted in October 2020 along access roads that would require tree trimming to facilitate road improvements. In total, 13.0 acres of potentially suitable summer roosting habitat for Indiana bat and northern long-eared bat exists in the onsite and offsite project areas associated with the Colbert CT plant.

3.11.1.2.5 Reptiles

Alligator snapping turtles are almost entirely aquatic turtles. Only nesting females are known to leave the water. Alligator snapping turtles use large, deep bodies of water such as lakes, rivers, and deep sloughs. They are often found among submerged logs and root snags in areas with muddy substrate (Behler and King 1979; Buhlmann et al 2008). The closest record of alligator snapping turtle is approximately 1.8 miles away from TL upgrades associated with the Colbert CT. Pickwick, Wilson, and Wheeler reservoirs are all located on the Tennessee River, which is immediately adjacent to the Colbert CT plant project area. Cane Creek on the Colbert Reservation (Figure 3-2) and other larger streams along existing ROWs with proposed upgrades may also offer suitable habitat for this species.

Western pygmy rattlesnake occurs in a variety of habitats, but it is generally found where water is nearby, such as in river floodplains, swamps, marshes, and wet prairies. The species is less common in rocky upland habitats in pine forests. Diet consists of amphibians, reptiles, and small mammals (Powell et al. 2016). The closest record is approximately 1.6 miles from TL upgrades associated with the Colbert CT. Suitable habitat

for western pygmy rattlesnake was found throughout the onsite and offsite proposed project areas near wetlands and floodplains.

3.11.2 Environmental Consequences

3.11.2.1 Alternative A – No Action Alternative

Under Alternative A, changes to local plant communities and habitats resulting from natural ecological processes and human-related disturbance would continue to occur. These changes may benefit or negatively affect species present in the project areas, but the changes would be unrelated to the proposed project. Current communities of threatened or endangered animals and their habitats would not be affected.

3.11.2.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

Under Alternative B, habitat that could support threatened and endangered terrestrial animal species would be removed at both onsite CT plant project areas and in some offsite project areas along existing ROW. However, no impacts to threatened or endangered plants or aquatic species are anticipated because habitat for these species is not present.

3.11.2.2.1 Paradise CT Plant Project Area, Offsite Natural Gas Upgrade, and Offsite TL Upgrades

Twenty-two terrestrial animal species of conservation concern were addressed in this review based on records within 3 miles of the Paradise CT plant project area, existing offsite compressor station where a new internal combustion engine would be added, and associated offsite TL upgrades. All of the species have the potential to occur within portions of the project areas. However, the offsite compressor station is located on a previously developed paved and graveled site, and habitat for threatened and endangered species does not exist at this location.

Several species of reviewed birds use larger bodies of water for foraging and may select nesting sites along these water features, including bald eagle, great egret, osprey, hooded merganser, and bank swallow. Foraging habitat for each of these species occurs over large bodies of water such as the Green River near the Paradise CT plant project area and other large rivers crossed by offsite TL proposed for upgrades. BMPs would be used to avoid or minimize impacts (e.g., sedimentation) to these bodies of water. No forested habitat is proposed for removal along the edge of these larger bodies of water. While helicopters used to install the fiber optic line would likely disturb nesting birds in the immediate vicinity, the disturbance would be temporary and no known nesting sites for bald eagle, great egret, hooded merganser, or bank swallow occur within the project areas. In addition, proposed actions adhere to the National Bald Eagle Management Guidelines. Therefore, these species would not be significantly impacted by proposed actions. Two active osprey nests were documented on the Paradise CT plant project area during field review in August 2020. Both are within 660 feet of construction activities. If the timing of proposed actions within 660 feet of these nests cannot be modified to avoid nesting seasons, coordination with the USDA Wildlife Services would likely be necessary to ensure compliance under the EO 13186 [Responsibilities of Federal Agencies to Protect Migratory Birds].

Bird-voiced treefrog, barking treefrog, least bittern, and common gallinule are all found in wetland and riparian habitats. Similarly, common ribbon snakes are found in vegetation alongside these water features. Impacts to wetland habitats include 0.04 acres within the

Paradise CT plant project area and 0.03 acres within the offsite TL project areas. BMPs would be used in and around all other wetlands, thereby minimizing the impacts of these temporary TL upgrade activities. Breeding habitat for these species may occur along TLs in the project area where activities would be short in duration, isolated across the landscape, and BMPs would be used. Direct impacts to treefrog tadpoles could occur if mats are placed directly on top of egg clusters in a wetland. Direct impacts to ribbon snakes could occur if heavy machinery traversed over their underground or underwater burrows. While common gallinules also nest in wetlands, they are rare breeders in this area. Therefore, impacts to young of this species are less likely to occur. Similarly, least bittern nests in vegetation on the ground in wetlands. Eggs and nestlings are in the nest for only 35 days of the year. While the opportunity for impact is present, the likelihood of impacting nests of this species is low given the short duration and localized effects of the proposed actions. Adult birds of all of these species would flush if disturbed by construction activities. Due to the relatively small amount of habitat being permanently impacted and the use of BMPs across the remaining project areas, proposed actions would not impact the bird-voiced treefrog, barking treefrog, least bittern, common gallinule, and common ribbon snake.

Habitat for Bell's vireo and sedge wren exists throughout the proposed offsite TL project areas along the existing ROWs. Additionally, open grassland areas of the TL ROWs offer potential habitat for eastern slender glass lizard, hunting and nesting habitats for northern harrier, and hunting grounds for common-barn owl. Similarly, open meadows and grasslands also offer habitat for Henslow's sparrow, lark sparrow, and whitewashed rabbdotus. Direct impacts could occur to nesting birds, eastern slender glass lizards hiding under debris, and whitewashed rabbdotus that occur in the path of machinery or in areas where TL structures need to be placed or guy wires need to be installed. Nesting habitat for barn owl could occur in forested areas within the Paradise CT plant project area, including temporary use areas, laydown, and proposed warehouse areas, and along existing offsite TL ROWs. Only 9.5 acres of forested habitat is proposed for removal at the Paradise CT plant project area. Actions along existing offsite TL ROWs associated with the Paradise CT plant are limited to temporary disturbance by helicopter installation of fiber optic ground wire, and activities at eight structures and existing access roads along the 64.8 miles of TL to be upgraded. Overall, herbaceous habitat removal would be minimal and would occur in discrete locations across the landscape. Access to existing offsite TL structures would occur along existing access roads. Activities would occur over a short duration at each structure. There is a low likelihood that nests would be built on existing access roads. And while it is possible that new TL structure installation would directly impact nests, burrows, or slow-moving snails, these actions would only occur at small, discrete locations across the entire project area. Adults and fast-moving adults would flush if disturbed. Therefore, populations of Bell's vireo, sedge wren, eastern slender glass lizard, northern harrier, common-barn owl, Henslow's sparrow, lark sparrow, and whitewashed rabbdotus would not be impacted.

Streamside salamanders are known from two ephemeral/intermittent streams along TL 5823. Records of this species have been documented upstream of project areas and could occur between structures 76 and 77 and adjacent to structure 79. However, neither stream would be impacted by the proposed actions. Access roads to each of these structures are a sufficient distance away from streams such that streams would not be crossed or receive sediment inputs. Actions occurring at each of the structures would be limited (i.e., tower extension, conductor cut and slide). No ground disturbance is likely to occur except for the movement of vehicles at structures 77 and 79. The same would be true at structure 76 unless the slope gradient is too high, in which case a pad would be graded

for the cranes to park on during installation of the tower extension. If this occurs, BMPs would be used to ensure there would be no sediment inputs into the stream (the stream is 775 feet away from this structure).

No hibernacula for gray bat would be impacted by the proposed actions, and no winter hibernacula for Indiana bat or northern long-eared bat would be impacted by the proposed actions. Foraging habitat for all three species exists along rivers ponds, streams, and wetlands within the onsite and offsite project areas. Additional foraging habitat for Indiana bat and northern long-eared bat exists in and along forested areas in proposed project areas. Suitable summer roosting habitat for Indiana bat and northern long-eared bat was observed during August 2020 field surveys throughout the Paradise CT plant project area in forests. Habitat ranged from low to high suitability based on presence of trees with suitable roosting characteristics (exfoliating bark, cracks, crevices; See Figure 3-3). Up to 9.5 acres of forest could be removed in association with the proposed actions at the Paradise CT plant project area. Within those forested areas, up to 8.7 acres of potentially suitable summer roosting habitat for Indiana bat and northern long-eared bat could be removed.

A number of activities associated with the proposed project were addressed in TVA's programmatic consultation with the USFWS on routine actions and federally listed bats in accordance with ESA Section 7(a)(2) and completed in April 2018. For those activities with potential to affect bats, TVA committed to implementing specific conservation measures. These activities and associated conservation measures are identified on pages 5-7 of the TVA Bat Strategy Project Screening Form (Appendix C) and need to be reviewed/implemented as part of the proposed project. Due to the use of BMPs and application of identified conservation measures, TVA has determined that proposed actions are not likely to impact gray bat, Indiana bat, or northern long-eared bat.

Alternative B would not impact federally listed plants, designated critical habitat, or state-listed plants species because no suitable habitat for protected plant species occurs within the proposed project areas. All habitats within the Paradise CT plant onsite and offsite project areas were surveyed in August-October 2020 and none were found to support state or federally listed plant species. Overall, plant communities have been too disturbed by current and past land use to support protected plant species.

The Green River adjacent to the Paradise Reservation provides suitable habitat for federal and state-listed aquatic species. Construction activities associated with the Paradise CT plant would not occur within or immediately adjacent to the Green River, and construction activities would not directly impact the river or its species. Appropriate BMPs would be followed (TVA 2017b), and 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. Jacob's Creek (perennial) and the three intermittent streams identified within the Paradise CT plant project area (see Figure 3-1) do not provide suitable habitat for aquatic threatened and endangered species. Therefore, with implementation of BMPs, no direct or indirect impacts to threatened or endangered aquatic species are anticipated with construction of the Paradise CT plant.

Additionally, no suitable habitat for threatened or endangered aquatic species occurs within the one intermittent stream identified within the offsite TL project areas associated with the Paradise CT plant. BMPs would be used to avoid or minimize impacts (e.g., sedimentation) to rivers crossed by the existing ROW and access roads. Therefore, no impacts are anticipated to occur to aquatic species of conservation concern.

3.11.2.2.2 Colbert CT Plant Project Area, Offsite Natural Gas Loop Line, and Offsite TL Upgrades

Fifteen terrestrial animal species were addressed in this review based on records within 3 miles of the Colbert CT plant project area and associated offsite TL upgrades. Only some of these species have the potential to occur within portions of the project areas.

Remaining red-cockaded woodpecker populations only occur in managed areas with regular prescribed burns and trees with abundant nesting cavities. This species does not occur in proposed project areas and would not be impacted by proposed actions.

Caves immediately adjacent to the Colbert CT plant project area and near proposed offsite TL upgrades offer potentially suitable habitat for cave obligate beetles. However, no records of these species are known from those caves, and proposed actions would not impact the integrity of the caves. No impacts are anticipated to *Batriasymmodes spelaeus*, *Batrisodes jonesi*, and *Rhadine caudata*.

No direct impacts would occur to large rivers, oxbows, and fast flowing, larger streams, which provide habitat for hellbenders and alligator snapping turtles. With the use of BMPs, potential indirect impacts to streams and rivers would be minimized such that impacts to hellbender, alligator snapping turtles, and aquatic fish and mussel species and their habitats would be negligible.

Suitable habitat for western pygmy rattlesnake occurs across the project areas in woodlands and near wetland and floodplain habitats. Due to the heavily disturbed habitats and frequent activity at the Colbert CT plant project area, this species is more likely to occur along existing offsite TL ROWs. Direct impacts to western pygmy rattlesnake could occur if heavy machinery passed over their burrows or nests. Access to existing structures would occur along existing access roads, and activities would occur over a short duration at each structure. It is not likely that this species would build nests or burrows on existing access roads. While it is possible that new structure installation would directly impact nests or burrows, these actions would only occur at small, discreet locations across the entire project area. BMPs would be used in and around wetlands, thereby minimizing the impacts in these areas. Due to the relatively small amount of habitat being permanently impacted across the landscape, the short duration of the actions at the TLs, and the use of BMPs, proposed actions would not impact western pygmy rattlesnake.

Bald eagles and osprey use larger bodies of water for foraging and may select nesting sites along these water features. Foraging habitat for these species occurs over the Tennessee River and other large rivers crossed by offsite TLs with proposed upgrades. BMPs would be used to avoid or minimize impacts (e.g., sedimentation) to these bodies of water. No forested habitat along the edge of these larger bodies of water is proposed for removal. All known bald eagle nests are a sufficient distance from proposed actions such that they would not be impacted by proposed actions. Proposed actions adhere to the National Bald Eagle Management Guidelines. Two active osprey nests were documented on the Colbert CT plant project area during field review in August 2020 (Figure 3-4), and one additional nest was observed on an offsite TL structure with proposed upgrades on TL 5676 during field reviews in September 2020. All observed osprey nests were within 660 feet of proposed construction activities. If the timing of proposed actions within 660 feet of these nests cannot be modified to avoid nesting seasons, coordination with USDA-Wildlife Services would likely be necessary to ensure compliance under the EO 13186 [Responsibilities of Federal Agencies to Protect Migratory Birds].

No hibernacula for gray bat would be impacted by the proposed actions. No winter hibernacula for Indiana bat, northern long-eared bat, Rafinesque's big-eared bat, or tricolored bat would be impacted by the proposed actions. Foraging habitat for all of these species exists along rivers ponds, streams, and wetlands within the project areas. Additional foraging habitat for Indiana bat, northern long-eared bat, Rafinesque's big-eared bat, and tricolored bat exists in and along forested areas in the project area. Suitable summer roosting habitat for Indiana bat, northern long-eared bat, Rafinesque's big-eared bat, and tricolored bat was observed during August 2020 field surveys in the Colbert CT plant project area. Habitat ranged from low to moderate suitability based on presence of trees with suitable roosting characteristics (exfoliating bark, cracks, crevices; see Figure 3-4). Up to 5 acres of forest could be removed in association with the proposed actions at the Colbert CT plant project area. Of those forested areas, up to 0.5 acres of potentially suitable summer roosting habitat for Indiana bat and northern long-eared bat could be removed. Given the amount of forest present across the landscape, this proposed tree removal is relatively small (see Section 3.9 Vegetation). While removal of this small amount of potential roosting habitat does have the potential to directly impact a small number of summer roosting bats should tree removal occur during times of occupancy, is not expected to impact populations of Rafinesque's big-eared bat and tricolored bat.

A number of activities associated with the proposed project were addressed in TVA's programmatic consultation with the USFWS on routine actions and federally listed bats in accordance with ESA Section 7(a)(2) and completed in April 2018. For those activities with potential to affect bats, TVA committed to implementing specific conservation measures. These activities and associated conservation measures are identified on pages 5-7 of the TVA Bat Strategy Project Screening Form (Appendix C) and need to be reviewed/implemented as part of the proposed project. Due to the use of BMPs and application of identified conservation measures, TVA has determined that proposed actions are not likely to impact gray bat, Indiana bat, or northern long-eared bat.

Alternative B would not impact federally listed plants, designated critical habitat, or state-listed plants species because no suitable habitat for protected plant species occurs within the proposed project areas. All habitats within the Colbert CT plant onsite and offsite project areas were surveyed in August-October 2020 and none were found to support state or federally listed plant species. Overall, plant communities have been too disturbed by current and past land use to support protected plant species.

The Tennessee River adjacent to the Colbert Reservation provides suitable habitat for several aquatic threatened and endangered species. Construction of the Colbert CT plant and onsite components would not occur within or immediately adjacent to the Tennessee River, and construction activities would not directly impact the river or its species. Appropriate BMPs would be followed (TVA 2017b), and 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. Therefore, direct or indirect impacts to threatened or endangered aquatic species from construction of the Colbert CT plant and onsite components would be negligible under Alternative B.

A total of six perennial, one intermittent, and three ephemeral streams were identified within the offsite TL ROW project areas associated with the Colbert CT plant. Of these identified streams, only Brewer Branch and Factory Creek have the potential to provide suitable habitat for species listed in Tables 3-14 and 3-15. However, no activities are anticipated to occur within these streams. Furthermore, ground disturbance would be minimized, and all

work would be completed in accordance with BMPs. With proper implementation of BMPs, no direct or indirect impacts to aquatic threatened and endangered species is anticipated to occur.

3.12 Visual Resources

3.12.1 Affected Environment

This assessment provides a review and classification of the visual attributes of existing scenery, along with the anticipated attributes resulting from the proposed action. The classification criteria used in this analysis are adapted from a scenic management system developed by the U.S. Forest Service (USFS) and integrated with planning methods used by TVA (USFS 1995). Potential visual impacts to cultural and historic resources are not included in this analysis as they are assessed separately in Section 3.13.

The visual landscape of an area is formed by physical, biological, and man-made features that combine to influence both landscape identifiability and uniqueness. The scenic value of a particular landscape is evaluated based on several factors that include scenic attractiveness, scenic integrity, and visibility. Scenic attractiveness is a measure of scenic quality based on human perceptions of intrinsic beauty as expressed in the forms, colors, textures, and visual composition of each landscape. Scenic attractiveness is expressed as one of the following three categories: distinctive, common, or minimal. Scenic integrity is a measure of scenic importance based on the degree of visual unity and wholeness of the natural landscape character. The scenic integrity of a site is classified as high, moderate, low, or very low. The subjective perceptions of a landscape's aesthetic quality and sense of place are dependent on where and how it is viewed.

Views of the landscape are described in terms of what is seen in the foreground, middleground, and background distances. In the foreground, an area within 0.5 mile of the observer, details of objects are easily distinguished. In the middleground, from 0.5 mile to 4 miles from the observer, objects may be distinguishable, but their details are weak and tend to merge into larger patterns. In the distant part of the landscape, the background, details and colors of objects are not normally discernible unless they are especially large, standing alone, or have a substantial color contrast. In this assessment, the background is measured as 4 to 10 miles from the observer. Visual and aesthetic impacts associated with an action may occur as a result of the introduction of a feature that is not consistent with the existing viewshed. Consequently, the visual character of an existing site is an important factor in evaluating potential visual impacts.

For this analysis, the affected environment includes the areas within the Paradise and Colbert reservations that encompass both permanent and temporary impact areas and the proposed offsite improvements associated with construction of the plants at each site.

3.12.1.1 Paradise CT Plant Project Area, Offsite Natural Gas Upgrade, and Offsite TL Upgrades

The Paradise Reservation is located on the west side of the Green River, southeast of Central City and northeast of Drakesboro, in western Kentucky. Portions of the reservation are devoid of vegetation and much of it has been heavily disturbed by previous industrial activities. Mining operations have substantially altered the topography and appearance of much of the reservation. This, in combination with the large-scale industrial development associated with the existing CC plant and the retired coal-fired plant, provides a sharp visual contrast to the surrounding rural and natural landscape. Currently, the most dominant

visual components of the Paradise Reservation include two 600-foot-high stacks, one 800-foot-high stack, and three cooling towers over 435 feet high. Other major visual components of the site include the powerhouse buildings, the emission control buildings and ducts, the coal pile and coal handling facilities, the CC plant and mechanical draft cooling tower, and an extensive network of connecting high-voltage TLs. As the coal-fired units at Paradise have been retired, TVA is currently considering options to manage the disposition of the buildings and physical structures that are no longer needed. Options currently being considered include deconstruction and demolition of buildings that previously supported operation of the coal-fired plant. The results of this independent evaluation will be provided in a separate environmental review.

Based on the above characteristics, the scenic attractiveness of the affected environment at the Paradise Reservation is considered to be common to minimal, whereas the scenic integrity is considered to be low. The rating for scenic attractiveness is based on the ordinary or common visual quality of the landscape, which is often reduced to low in the foreground due to the absence of natural features in the industrial setting. The forms, colors, and textures in the affected environment are not considered to have distinctive visual quality. In the foreground and middleground, the scenic integrity has been lowered by the industrial nature of the reservation. However, in the background these alterations are not substantive enough to dominate the view of the landscape. The scenic class of a landscape is determined by combining the levels of scenic attractiveness, scenic integrity, and visibility and can be excellent, good, fair, or poor. Based on the criteria used for this analysis, the overall scenic class for the affected environment at Paradise is considered to be fair.

In a visual impact assessment, sensitive receptors generally include any scenic vistas, scenic highways, residential viewers, and public facilities such as churches, cemeteries, schools, parks, and recreational areas that are located in the project's viewshed. Viewers in the foreground of the proposed Paradise CT plant project area would generally be limited to employees and visitors to the Paradise Reservation, recreational boaters on the Green River, and users of the Paradise Boat Ramp located approximately 775 feet north of the project boundary. There are no residences or other sensitive visual receptors located in the foreground.

The new offsite natural gas compressor would be constructed at an existing compressor station approximately 18 miles west of the Paradise Reservation. The existing station is located in an area with an industrial character and minimal vegetation. The built environment, including storage tanks, warehouse buildings and associated structures, dominate the landscape. There are no sensitive visual receptors in the foreground of the compressor station, and views are restricted to transient motorists on SR 175, which passes to the southwest.

Two existing TLs would be upgraded to support development of the CT plant at Paradise. One is located in western Kentucky and the other is located in north central Tennessee. The TLs cross a variety of terrains ranging from relatively flat to steep, wooded ridges. The TL corridors combine natural elements, such as rolling fields and forested areas, with human development, including commercial and industrial properties, urban and suburban development, and cleared utility corridors, creating a somewhat disjointed visual landscape.

3.12.1.2 Colbert CT Plant Project Area, Offsite Natural Gas Loop Line, and Offsite TL Upgrades

The Colbert Reservation is located near the town of Tuscumbia in northwestern Alabama, along an impounded section of the Tennessee River. Land use in the vicinity is predominantly rural, with undeveloped forested areas and open fields of pasture or crops. However, this relatively natural landscape is fragmented and sharply contrasted by large scale industrial uses including the existing CT plant and the retired coal-fired plant on the Colbert Reservation, as well as the Barton Riverfront Industrial Park approximately 2 miles to the west and a large rock quarry approximately two miles to the east. Predominant focal points in the foreground of the project area are the six stacks and buildings associated with the retired coal-fired plant; however, these are currently in the process of being decommissioned and demolished. Other major visual components of the site that will remain following the demolition include the eight existing CT units and associated storage buildings, the 161-kV switchyard, and a network of high-voltage TLs (TVA 2016c). Like Paradise, the scenic attractiveness of the affected environment at the Colbert Reservation is considered to be common to minimal, based on the common visual quality and lack of natural features, while the scenic integrity is considered to be low due to industrial development. Based on the criteria used for this analysis, the overall scenic class for the affected environment at Colbert is considered to be fair.

Viewers in the foreground of the Colbert CT plant project area would predominantly consist of employees of and visitors to the Colbert Reservation and boaters on the Tennessee River. Visitors to portions of the Seven Mile Island State WMA, which encompasses the riverbank opposite the reservation as well as islands within the river, would also fall within the foreground of the CT plant project area. No residences or other sensitive visual receptors are located in the foreground.

The offsite natural gas lateral tie-in would be constructed south of the Colbert Reservation, crossing under a railroad, Old Lee Highway (CR 20), and US 72 before terminating at an existing above-ground piping/valve setting located in a wooded area south of the highway. The existing piping/valve setting is currently visible from one nearby residence and may also be briefly visible to passing motorists on the highway.

Four existing TLs would be upgraded to support development of the CT plant at Colbert. Two are located in south central Tennessee, while the other two are located in northern Alabama. Much like the TLs associated with the Paradise CT plant, these existing TL corridors cross a variety of terrains, combining natural elements with human development, resulting in a somewhat disjointed visual landscape.

3.12.2 Environmental Consequences

The potential impacts to the visual environment from a given action are assessed by evaluating the potential for changes in the scenic value class ratings based upon landscape scenic attractiveness, integrity, and visibility. Sensitivity of viewing points available to the general public, their viewing distances, and visibility of the proposed action are also considered during the analysis. These measures help identify changes in visual character based on commonly held perceptions of landscape beauty and the aesthetic sense of place. The extent and magnitude of visual changes that could result from the proposed alternatives were evaluated based on the process and criteria outlined in the scenic management system as part of the environmental review required under NEPA.

3.12.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not construct the CT plants at the Paradise or Colbert reservations, and landscape character and integrity would remain in its current state. Therefore, there would be no impact to visual resources.

3.12.2.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

Implementation of Alternative B would result in short-term visual impacts associated with construction activities in all project areas impacted by the proposed onsite and offsite actions. During the approximately two-year construction period, there would be increased visual discord from existing conditions due to an increase in personnel and equipment coupled with disturbances of laydown and staging areas. However, this would be contained within the immediate vicinity of the construction activities and would only last until all project activities have been completed and the disturbed areas have been seeded and restored through the use of TVA's standard BMPs (TVA 2017b). Because of their temporary nature, construction-related impacts to local visual resources are expected to be minor.

Long-term impacts resulting from the construction of the Paradise CT plant would include visible alterations to the existing landscape associated with the three new Paradise CT units (with stack heights of 131 feet), as well as the proposed 500-kV switchyard and the new transmission structures and overhead wires associated with the new re-configured 500-kV TL. While these features would add elements to the viewshed that are discordantly contrasting with the natural environment, these elements would be visually similar to other industrial structures seen in the current landscape, including the three CC units, mechanical draft cooling tower, and numerous high-voltage TLs. These elements contribute to the landscape's ability to absorb negative visual change and would minimize the visual impact of the proposed action. Furthermore, the Paradise CT plant facilities would have minimal public visibility, with unobstructed views generally limited to employees and visitors to the Paradise Reservation. The proposed facilities may also be visible in the foreground to boaters on the Green River and users of the Paradise Boat Ramp. However, forested buffers along the riverbank would somewhat obstruct the view from both recreational areas. Visitors to the adjacent Peabody WMA may also have views of these facilities, but at middleground distances, changes in the viewshed would be less perceptible and would merge with the existing plant infrastructure, becoming visually subordinate to the overall landscape character. The nearest residences and other visual receptors such as churches are located at distances of 1.5 miles or more and would not have views of the Paradise CT plant project area due to topography and intervening vegetation.

The new offsite natural gas compressor needed to provide the additional natural gas supply to the CTs at Paradise would be constructed at an existing compressor station approximately 18 miles west of the Paradise Reservation. As the compressor would be visually similar to other components of the existing facility and there are no sensitive visual receptors in close proximity to the compressor station, visual impacts associated with the construction and operation of the offsite natural gas compressor would be negligible.

Proposed TL upgrades associated with the Paradise CT plant would entail minor modifications to existing TLs and would not alter the existing aesthetic or visibility. Therefore, following completion of construction activities and vegetation restoration, there would be no notable impacts to visual resources in association with TL upgrades.

Onsite components and specifications for the proposed Colbert CT plant would be similar to those described for Paradise, with the exception of the 500-kV switchyard, which would not be constructed at Colbert. Similar to Paradise, the addition of CT plant equipment at Colbert would be visually compatible with the industrial structures seen in the current landscape, even with the planned demolition of the retired coal-fired plant features. Existing structures including the eight CT units, the switchyard, and numerous high-voltage TLs would remain and continue to contribute visual discord with the natural landscape, minimizing the visual impact of the new CT units and associated onsite components. As at Paradise, the Colbert CT plant facilities would be minimally visible to the public, with unobstructed views generally limited to employees and visitors to the Colbert Reservation, and to boaters on the Tennessee River. The proposed facilities may also be visible in the foreground to visitors of the Seven Mile Island State WMA, though vegetation on the riverbank and on the islands could provide a visual buffer. Residences on Pride Estates Road east of the reservation, and the Cane Creek Boat Ramp (see Figure 3-10 in Section 3.15) west of the reservation, are located in the middleground. However, it is unlikely that the Colbert CT plant facilities would be visible from either of these locations due to topography and the presence of dense vegetation.

Short-term visual impacts of a new natural gas lateral tie-in to supply the Colbert CT plant would occur through the stockpiling of pipe, trenching and directional drilling, and the assembly of the pipeline. These visual impacts would be localized and temporary until construction activities are complete and the ROW revegetated. In the long-term, the character of parts of the ROW corridor may be permanently altered through the clearing of trees from wooded areas. However, as the majority of the proposed pipeline runs adjacent to an existing cleared corridor associated with a roadway and driveway, little forested area would require clearing and visual impacts would be minor.

Visual impacts associated with offsite TL upgrades to support the Colbert CT plant would be the same as those described in association with the Paradise Reservation. There would be no notable long-term impacts to visual resources in association with TL upgrades.

The industrial elements and utility structures already in place within the project areas currently contribute visual discord with the landscape, contributing to the landscape's ability to absorb negative visual change. Therefore, while the forms, colors, and textures of the landscape that make up the scenic attractiveness would be somewhat affected by the construction of the CT plants and associated components, it would still remain common to minimal. Scenic integrity would remain low as visually disruptive elements and human alterations would continue to dominate the landscape. Based on the criteria used for this analysis, the scenic value class for the affected environment after the proposed modifications would remain fair. While the construction of the CT plants would contribute to minor differences in the visual environment, it would not change the overall scenic value class as the industrial character of the reservations would remain consistent. Therefore, overall visual impacts resulting from the implementation of the Alternative B would be minor.

3.13 Cultural and Historic Resources

3.13.1 Affected Environment

3.13.1.1 Regulatory Framework for Cultural Resources

Cultural resources or historic properties include prehistoric and historic archaeological sites, districts, buildings, structures, and objects as well as locations of important historic events. Federal agencies, including TVA, are required by the NHPA (54 USC 300101 et seq.) and by NEPA to consider the possible effects of their undertakings on historic properties. “Undertaking” means any project, activity, or program, and any of its elements, which has the potential to have an effect on a historic property and is under the direct or indirect jurisdiction of a federal agency or is licensed or assisted by a federal agency. An agency may fulfill its statutory obligations under NEPA by following the process outlined in the regulations implementing Section 106 of NHPA at 36 CFR Part 800. Additional cultural resource laws that protect historic resources include the Archaeological and Historic Preservation Act (54 USC 300101 et seq.), Archaeological Resources Protection Act (16 USC 470aa-470mm), and the Native American Graves Protection and Repatriation Act (25 USC 3001-3013).

Section 106 of the NHPA requires that federal agencies consider the potential effects of their actions on historic properties and to allow the Advisory Council on Historic Preservation an opportunity to comment on the action. Section 106 involves four steps: (1) initiate the process, (2) identify historic properties, (3) assess adverse effects, and (4) resolve adverse effects. This process is carried out in consultation with the State Historic Preservation Officer (SHPO) and other interested consulting parties, including federally recognized Indian tribes with an interest in the project area.

Cultural resources are considered historic properties if they are listed or eligible for listing in the National Register of Historic Places (NRHP). The NRHP eligibility of a resource is based on the Secretary of the Interior’s criteria for evaluation (36 CFR 60.4), which state that significant cultural resources possess integrity of location, design, setting, materials, workmanship, feeling, association, and:

- a. Are associated with events that have made a significant contribution to the broad patterns of our history; or
- b. Are associated with the lives of persons significant in our past; or
- c. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value; or
- d. Have yielded, or may yield, information (data) important in prehistory or history.

A project may have effects on a historic property that are not adverse, if those effects do not diminish the qualities of the property that identify it as eligible for listing on the NRHP. However, if the agency determines (in consultation) that the undertaking’s effect on a historic property within the area of potential effect (APE) would diminish any of the qualities that make the property eligible for the NRHP (based on the criteria for evaluation at 36 CFR Part 60.4 above), the effect is said to be adverse. Examples of adverse effects would be ground disturbing activity in an archaeological site or erecting structures within the

viewshed of a historic building in such a way as to diminish the structure's integrity of feeling or setting.

Agencies are required to consult with SHPOs, Indian tribes, and others throughout the Section 106 process and take their comments into consideration before deciding to initiate a project, and to document adverse effects to historic properties resulting from agency undertakings.

3.13.1.2 Area of Potential Effect (APE)

The APE is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties if such properties exist. When determining the APE for the proposed action, TVA took into consideration the types of activities proposed in various parts of the affected area. Five major types of activities would be carried out as part of the project: installation of new frame CT units at the Paradise and Colbert reservations; reconductoring approximately 14.4 miles of TL in Alabama; uprating three TLs in Tennessee; installing new fiber optic line along approximately 51 miles of the Paradise-Montgomery 500-kV TL (48 miles in Kentucky and 3 miles in Tennessee); and installing and/or upgrading a natural gas pipeline near the Colbert Reservation.

3.13.1.2.1 Installation of New Frame CT Units

The installation of new frame CTs at the Paradise and Colbert reservations would take place within previously disturbed areas. Besides the units, the proposed CT facilities also would include natural gas metering and handling systems; instrumentation and control systems; transformers; and administration and warehouse/maintenance buildings. At Colbert, a new gas line feed would be constructed from an existing main gas line to the new units. At Paradise, TVA would build a new switching station. At both plants, TVA would construct new transformer yards, build new TL feeds for the new units, and use two or more construction laydown areas. These construction activities have potential for ground disturbance. The installation of new units would also result in the introduction of new visual elements, which have the potential for visual effects on any historic architectural properties that may be in view of the new units within one-half mile. For new structures less than 200 feet in height, TVA considers visual effects beyond one-half mile to be non-significant. TVA included all parts of the affected areas at the Colbert CT and Paradise CT plant sites in the APE.

3.13.1.2.2 TL Reconductoring

TL reconductoring work would consist of reconductors of two TL segments totaling approximately 4.2 miles in the vicinity of Florence, Alabama, and one TL segment totaling 10.2 miles in the vicinity of Decatur, Alabama. Reconductoring involves removing the old conductor (high-voltage cables that carry the electricity) and pulling new conductor into place. One 72-foot-tall tower structure on TL 5670, near Florence, would receive a 10-foot extension. Designated pull points along the TL corridor would be used to set up cable reels of conductor for installation. The pull points would require use of a trailer-mounted cable reel. Therefore, TVA included the access routes for each of the potential pull points (total of 49 non-contiguous access routes) in the APE. These access routes consist of existing roads surfaced in dirt, gravel, or pavement. TVA would make no modifications to any of the roads and would keep vehicles on those roads during travel to and from the work locations. The TL reconductoring would not include any new visual elements and therefore does not

have potential for visual effects on any above-ground properties that may be in the viewshed.

3.13.1.2.3 TL Uprates

TL uprates associated with the proposed Paradise and Colbert CT plants would include replacing and/or modifying existing structures (poles or towers), conductor cuts and slides (to shorten the conductor between structures so that it sags less) and adding tower extensions. TVA would uprate three TLs in Tennessee (TL 5617, TL 5989, and TL 5823). Some uprate activities could be accomplished using light-duty equipment (such as pickup trucks or two-axle bucket trucks with no outriggers) positioned on existing access roads. TVA considers such activities to have very low potential for ground disturbance and did not include areas where such activities would occur in the APE. Other activities would require some ground disturbance—installation of new pole or tower structures and installation of tower extensions, which requires use of cranes. TVA included all work areas for new structure installations and tower extensions in the APE. As any equipment needed for the work would be moved to work areas along existing access routes, any access routes outside the TL ROW that are not surfaced in concrete, asphalt, or gravel were included in the APE. In order to account for the entire area that could be affected by ground disturbance, TVA included a fifty-foot radius surrounding each work area affected by structure installations or tower extensions in the APE. One work activity, the addition of a 16-foot extension to a 120-foot tower structure, has potential for visual effects on any historic architectural properties that may be present in the viewshed.

3.13.1.2.4 Fiber Optic Line Installation

TVA would install new fiber optic line on TL L6057. This TL extends from the Paradise Fossil Plant in Muhlenberg County, Kentucky, south to the Montgomery Substation near Clarksville in Montgomery County, Tennessee, for a distance of approximately 51 miles. This work would affect only a small number of structures or spans in each TL. The new fiber optic line may be installed by helicopter. Designated pull points along the TL corridor would be used to set up reels of fiber optic cable for installation. The pull points would require use of a trailer-mounted cable reel.

3.13.1.2.5 Natural Gas Pipeline Construction and/or Upgrades

The commercial natural gas company would construct a new compressor within an existing compressor station to support the Paradise CT. This action is consistent with item B1 in Appendix A of TVA's 2020 Programmatic Agreement (*Programmatic Agreement Among the Tennessee Valley Authority, the Advisory Council On Historic Preservation, and the State Historic Preservation Officers of Alabama Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia and Federally Recognized Indian Tribes, Regarding Undertakings Subject to Section 106 of the National Historic Preservation Act of 1966*). Item B1 in Appendix A excludes "Except for construction of new additions, all renovation, maintenance, or internal changes to an existing facility less than 50 years old and not meeting Criteria Consideration G, or properties greater than 50 years old and which have been previously determined (in consultation within the last 10 years) to be ineligible for the National Register or non-contributing buildings within a district or property listed in or eligible for the National Register." As such, the addition of the new compressor is exempt from full Section 106 review and consultation.

In order to provide the additional natural gas supply to the new CT units at Colbert, a new lateral tie into the main distribution pipeline would be constructed just south of the

intersection of Steam Plant Road and US 72. Easements with landowners south of US 72 and with TVA for land on the reservation would be amended to reflect the proposed pipeline installation. The proposed pipeline and station upgrades would be constructed and operated by a commercial supplier. Gas to fuel the new CT units would be provided by a new 20-inch underground pipeline. This pipeline would run parallel to an existing 10-inch lateral natural gas pipeline on the Colbert Reservation. The new pipeline facilities would also require upgrades to the existing onsite natural gas delivery station to include replacement of metering and pressure/flow regulating equipment as well as additional piping and valves.

3.13.1.2.6 Total Geographic Extent of the APE

TVA has determined that the APE should include the following areas:

- All areas at Colbert CT and Paradise CT plant project areas where ground disturbance related to the undertaking would take place;
- The total linear extent of the ROWs of all TLs affected by reconductoring;
- All areas within the ROW of the TLs affected by uprates where ground disturbing activities would take place (a 50-foot radius surrounding the work structure, plus equipment access to the work structure);
- The 150-foot-wide ROW of the Paradise-Montgomery 500-kV TL;
- Any off-ROW access routes for the TL reconductoring, uprates, and fiber optic installation that are not surfaced in asphalt, concrete, or gravel;
- All areas within the proposed natural gas pipeline corridor south of, and within, the Colbert Reservation; and
- The viewsheds within a 0.5-mile radius of any proposed activities that have potential for visual effects on above-ground historic properties.

In the discussion below, the APE is divided into three broad units: the portion in and around the Paradise CT plant project area; the portion in and around the Colbert CT plant project area (including the natural gas pipeline area); and the portion that consists of the TL ROWs and associated off-ROW access routes.

3.13.1.3 Paradise CT Plant Project Area, Offsite Natural Gas Upgrade, and Offsite TL Upgrades

3.13.1.3.1 Affected Resources in the Paradise CT Plant Project Area Portion of the APE

TVA has conducted six reviews under Section 106 of the NHPA within parts of the APE at the Paradise CT plant project area, in connection with various prior undertakings between 2013 and 2017 (Figure 3-5). TVA carried out these reviews in connection with several proposed actions, including: construction of a baghouse; construction of the Paradise CC; a TL feed to the new Paradise CC; barge roll-off area improvements; demolition of the coal wash facility; and CCR management (a complex project that included construction and operation of new dewatering facilities for CCR, construction and operation of a new CCR

landfill, and closure of wet ash impoundments, as described in TVA's Paradise CCR Management Operations EA [TVA 2017a]). All of these reviews began with a desktop review that included examination of historic and current topographic maps, current and historic satellite imagery, reports of previous investigations, TVA's technical reports on the Paradise Steam Plant Project (TVA 1964 and 1979), and historic photographs taken at ground level or from the air. Three of the reviews included an archaeological survey, and one included a survey of historic architectural properties. The archaeological surveys involved systematic shovel testing and visual examinations of exposed ground surfaces. Approximately 246 acres, or 52 percent, of the APE was included within these previous reviews.

No archaeological sites were recorded at the Paradise Reservation as a result of these investigations. In archaeological surveys, shovel testing provided evidence of past ground disturbance that has altered or removed the original soils and sediments. Such ground disturbance results in low (or no) probability for intact archaeological sites.

During each of these past reviews, TVA consulted with the Kentucky SHPO and federally recognized Indian tribes pursuant to 36 CFR Part 800. In each case, the SHPO concurred with TVA's finding of no effect, and none of the consulted tribes objected or identified resources of concern.

TVA also completed an archaeological survey of much of the proposed soil borrow site as part of previous projects at the Paradise Reservation. The survey identified no archaeological sites and documented a high level of disturbance in this area. TVA consulted with the KY SHPO and federally recognized Indian tribes regarding the survey. The SHPO agreed with TVA's finding and none of the consulted tribes objected or identified resources of concern. The project area is fully within areas that were subjected to open surface mining during the 1950s-1970s, as documented by USGS and other maps. Therefore, there is no potential for archaeological sites in the proposed soil borrow area.

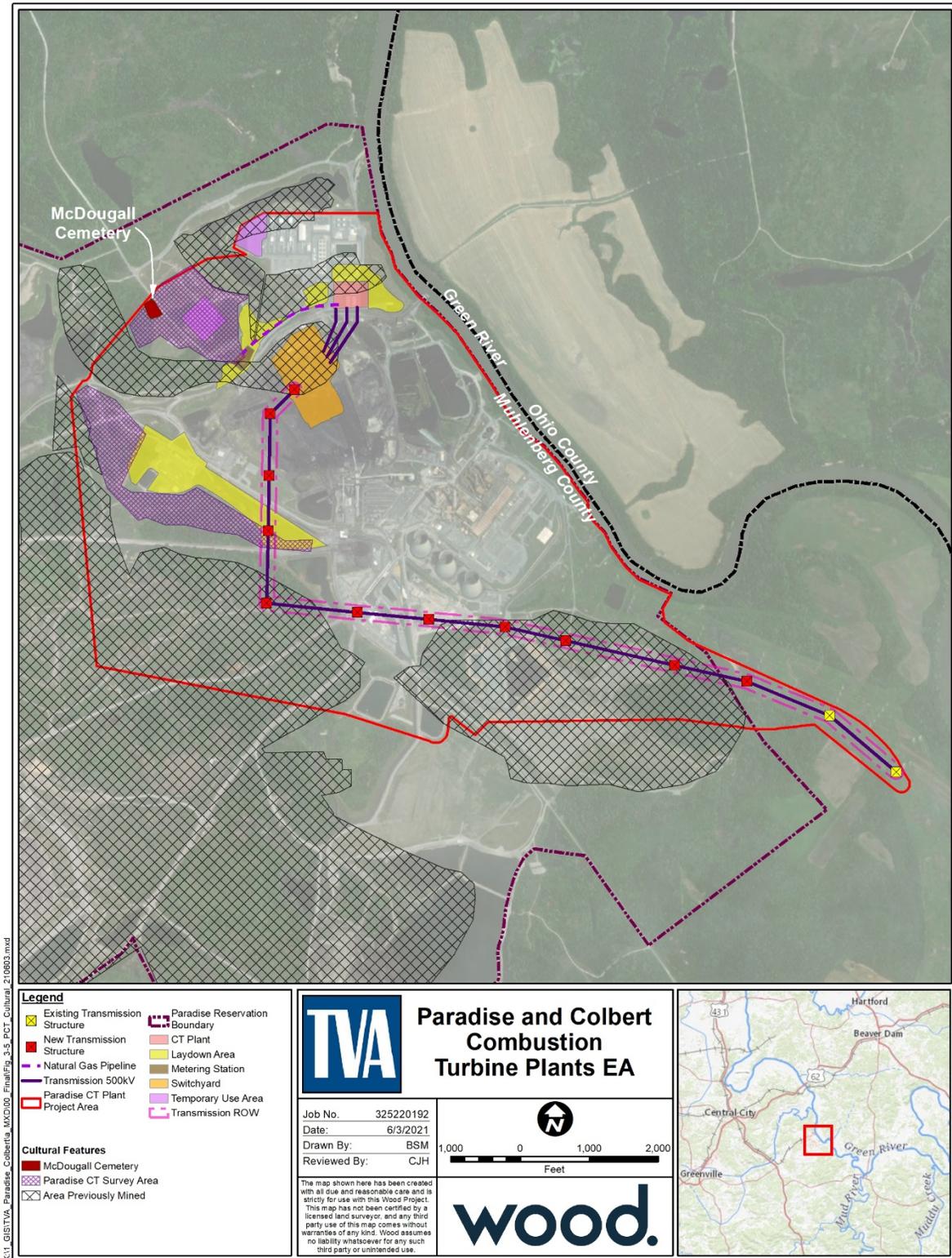


Figure 3-5. Cultural Resource Features Within the Paradise CT Plant Project Area

3.13.1.3.2 Areas in the Paradise CT Plant APE not Included in Previous Archaeological Investigations

More than half of the Paradise CT plant project area was not included within previous archaeological investigations. A large portion of this area lacks potential for undisturbed archaeological deposits due to ground disturbance from past coal mining. According to TVA (1964:19), the presence of coal was a major factor in the selection of this site for the Paradise steam plant:

“As soon as the location of the steam plant at Paradise had been settled, a contract for furnishing coal to the plant was executed with the Peabody Coal Company of St. Louis, Missouri. The contract calls for an unprecedented 65 million tons of coal to be delivered to the tractor hopper over a period of approximately 17 years.... All of the coal was to come from strip mines within a short distance of Paradise.... Sinclair Mine was opened adjacent to the project to supply coal directly from the strip pits...”

Figure 3-5 shows areas that were surface mined and sub-surface (auger) mined by the Peabody Coal Company, as well as historical surface mines, both within and outside the APE. With the exception of the Paradise Fossil Plant footprint, a very extensive portion of the Paradise Reservation has been affected by surface mining. Such mining removed all surficial sediments, and if any archaeological sites had been present in those sediments, the sites were destroyed.

Nearly all areas within the Paradise CT plant project area portion of the APE that have not been surveyed for archaeology, and were not affected by coal mining, have been affected in obvious ways by the construction of the fossil plant and ancillary facilities, including the powerhouse, the office building, the cooling water intake, ash storage areas, impoundments, coal storage, conveyors, various other structures, drives, and parking areas. Construction of these features is documented to some extent by engineering drawings and historic photographs, and by current satellite images of the APE (Figure 3-5). Construction of these facilities would have included excavation and grading, resulting in the destruction of any archaeological sites that may have been present prior to TVA’s acquisition of the land in the APE.

A comparatively small portion of the area within the Paradise CT plant project area portion of the APE has not been included in previous archaeological surveys and is not obviously affected by past construction or mining. This portion consists of two tracts totaling approximately 73.5 acres – a 33.5-acre tract east of Paradise CC plant and a 40-acre tract east of the former coal wash plant. TVA carried out an archaeological survey of these two tracts in order to identify archaeological sites that could be affected by the Paradise CT/Colbert CT project. The survey, which consisted of pedestrian survey and systematic shovel testing, identified no archaeological sites. The survey also identified a historic cemetery, the McDougall Cemetery, at the Paradise Reservation (See Figure 3-5). In December 2020, TVA consulted with the Kentucky SHPO and federally recognized Indian tribes regarding the results of this survey and TVA’s finding that there are no NRHP-listed or -eligible archaeological sites in this part of the APE (Appendix D). The Kentucky SHPO replied by letter dated January 12, 2021. Their comments indicate agreement that there are no archaeological sites in the Paradise CT plant portion of the APE. None of the consulted tribes disagreed with TVA’s finding or identified resources of concern.

In their January 12 letter, KY SHPO also requested TVA provide additional documentation concerning whether the cemetery is located in the APE and if so, whether the cemetery is eligible for the NRHP. In response, TVA conducted an additional analysis and found that the cemetery is located in the APE, as the construction of the 500-kV switchyard and frame CT units could result in new visual elements visible from some parts of the cemetery. Based on this additional analysis TVA recommended that the cemetery is ineligible for the NRHP as it is not part of a larger property that is listed or eligible. TVA presented the results in an addendum report which TVA provided to KY SHPO on April 6, 2021. In their response to this consultation, dated May 11, 2021, KY SHPO disagreed with this determination, and requested that TVA consider additional factors that could lend eligibility status to the cemetery. KY SHPO suggested that the McDougall Cemetery could be considered eligible for the NRHP under Criterion D (for potential research value), or under Criteria Consideration D as it pertains to Criteria A, B, and C.

In response to KY SHPO's comments, TVA conducted additional field investigation at the McDougall Cemetery, completed a GIS-based viewshed analysis to determine whether and to what extent the new CT unit stacks and switchyard structures would be visible from the cemetery, and added additional photographic documentation and information regarding the cemetery's integrity to the addendum report. TVA consulted again with KY SHPO by letter dated May 28, 2021 and presented this additional information. In this letter TVA acknowledged that a fuller consideration of the cemetery's potential eligibility was warranted. Based on the additional analysis and documentation TVA found that the cemetery is ineligible for the NRHP under Criterion D because excavation of the graves would provide little knowledge beyond what can be learned from existing documentation. TVA determined, further, that even if the cemetery were eligible under Criterion D, the undertaking would not diminish whatever archaeological significance the cemetery might have because it is outside the project footprint and will not be physically affected by TVA's actions. Thus, even assuming, for the sake of the argument, that the cemetery were eligible under Criterion D, TVA's undertaking would have no effect on the cemetery's potential eligibility under Criterion D.

TVA also determined that the cemetery is ineligible under Criteria Consideration D (for Criteria A, B, or C) due to a lack of integrity of setting, feeling, and association. Any historic significance the cemetery has derives from its association with the town of Paradise, which is entirely non-extant. Because the town was vacated and removed when the Peabody Coal Company acquired the Sinclair Mine in the late 1950s, the cemetery lacks integrity of association. The cemetery is located adjacent to two modern power plants, Paradise Fossil Plant (completed in 1962) and Paradise CC plant (completed in 2015); it has a full, unobstructed view of the latter as well as views of other infrastructure. The dominant features in this landscape are the facilities that are part of these plants: a cellular tower, a radio tower, the CC plant, the fossil plant smokestacks, multiple high-voltage transmission lines, TVA's marquee at the entrance to the facility, and reclaimed strip mines. Although there were small coal mines in this area before TVA's presence, the Peabody Coal company's massive coal extraction efforts here caused drastic changes to the landscape. Current topography and vegetation reflect modern mine reclamation and the operation of the Paradise Fossil Plant, and not the original landscape of the town of Paradise. None of the visual elements in the viewshed convey the cemetery's original setting, which was on the outskirts of a small town surrounded by a scenic, remote, rural landscape. The original natural and developed landscape of the cemetery's early period of use is simply non-extant. Thus, the cemetery lacks integrity of setting and feeling.

The cemetery also lacks integrity internally as it lacks any intact area relating to its early period of use. Old and new graves are interspersed throughout the cemetery, and new graves continue to be added in various places. The cemetery also contains at least two pet burials dating from the 21st century. These changes have resulted in a cemetery with a mixture of older and newer graves that lack strong patterning that could convey historic significance. The McDougall Cemetery gives the impression of a modern cemetery with isolated historic burials and clusters of historic gravesites, surrounded by a landscape dominated by the modern gas plant and associated structures, as well as reclaimed coal mines. Therefore, the McDougall Cemetery lacks integrity of setting, feeling, and association. For all of these reasons the McDougall Cemetery does not convey a level of historical significance that would make it eligible for the NRHP. Thus, TVA determines that this cemetery is ineligible for inclusion in the NRHP.

Nevertheless, TVA's analysis went further and assessed what the undertaking's potential visual effects on the McDougall Cemetery would be, were the cemetery to be determined eligible for inclusion in the NRHP. The viewshed analysis demonstrated that the tops of the exhaust stacks of the new CT units would be visible from the southern half of the cemetery. However, these new visual elements would not result in a significant change in this industrial landscape. Therefore, the undertaking would not further diminish the integrity of setting and feeling that has already been severely compromised by modern industrial features. Thus, even were the cemetery to be determined eligible for the NRHP, the project would have only a very minor visual effect on the cemetery. The undertaking would result in No Adverse Effect on this resource, were it to be determined eligible for the NRHP.

In their May 11, 2021 response to TVA's letter of April 6, 2021, KY SHPO also requested additional information from TVA regarding the project's potential effects on archaeological sites of undetermined NRHP eligibility and the NRHP-listed 15OH2 (Indian Knoll Site). In providing the revised addendum report (for McDougall Cemetery) to KY SHPO on May 28, TVA also provided clarification on these questions. As TVA's archaeological survey identified no intact deposits associated with archaeological sites 15MU83 and 15MU84 (both considered of undetermined NRHP eligibility) in the APE, TVA finds that the undertaking would not adversely affect either site. As the survey identified no intact archaeological deposits associated with site 15TO89 in the APE and TVA's actions affecting the site would be limited to driving equipment through the site on an existing dirt road, TVA finds that the undertaking would not adversely affect that site. As 15OH2 (Indian Knoll Site) is located approximately 0.5 miles from any ground disturbing actions associated with the undertaking, and the site was listed in the NRHP under Criterion D for its research potential, TVA finds that the undertaking would not affect that site.

TVA finds that the project footprint in Kentucky contains portions of three archaeological sites that are of undetermined eligibility, and that the Paradise CT plant project area portion of the APE contains one cemetery that is ineligible for the NRHP.

KY SHPO responded to TVA's revised findings (as presented in TVA's May 28, 2021 consultation letter) by letter received on June 25, 2021. In their response, KY SHPO maintains their disagreement with TVA regarding the potential NRHP eligibility of the McDougall Cemetery, but agrees that the undertaking would not result in any adverse effects on the cemetery. KY SHPO also agrees with TVA that the undertaking would not result in adverse effects on any archaeological sites in Kentucky.

3.13.1.3.3 Historic Architectural Assessments in the Paradise CT Plant Project Area Portion of the APE

TVA carried out two historic architectural reviews at the Paradise Reservation in 2013. The first was completed as part of TVA's obligations under NHPA Section 106 for a then-proposed installation of a baghouse (a baghouse is an emissions control structure that removes fly ash from a coal burning generating plant's exhaust stack). The APE for the baghouse project included a half-mile radius surrounding the powerhouse, an area that includes much (but not all) of the viewshed of the Paradise CT plant project area portion of the APE. TVA consulted the GIS database of architectural resources at the Kentucky Heritage Council (KHC) in Frankfort, and this indicated that there are no previously unrecorded historic architectural properties within that project's APE. The architectural survey resulted in the identification of one previously unrecorded architectural resource, Paradise Fossil Plant (MG-146). Based on the results of that survey, TVA determined that the Paradise Fossil Plant was ineligible for listing on the NRHP due to its lack of architectural distinction and to a loss of integrity of design, materials, and feeling resulting from a large number of modifications that TVA completed after the plant began operations in the 1960s. TVA consulted with the Kentucky SHPO, who concurred with TVA's eligibility determination. However, Kentucky SHPO also recommended that TVA re-assess the potential NRHP eligibility of the Paradise Fossil Plant in 2020, as structures added to the plant in ca. 1970 could have gained historic significance by that date.

Also, in 2013, TVA conducted a desktop review of historic architectural resources within a half-mile radius surrounding the proposed CC/CT plant. The review area covers a large part of the current Paradise CT plant project area portion of the APE. Based on the preliminary site check at the KHC, no historic architectural resources had been recorded within the APE. TVA identified no extant structures that would be 50 years old or older, other than Paradise Fossil Plant. Therefore, TVA found that no historic architectural resources listed in or eligible for listing in the NRHP were located within the half-mile viewshed of the then-proposed CC/CT plant.

TVA conducted a second architectural assessment of Paradise Fossil Plant in 2020, as part of TVA's identification efforts under Section 106 of the NHPA in connection with the proposed decommissioning and deconstruction of the plant. Based on this more recent assessment, TVA found again that the plant is ineligible for the NRHP. TVA consulted with the Kentucky SHPO regarding this finding and the SHPO agreed. Based on these various assessments, there are no historic architectural properties listed in, or eligible for listing in, the NRHP within the Paradise CT plant project area portion of the APE.

In their May 11 consultation letter regarding the current undertaking, KY SHPO requested additional information regarding the undertaking's potential to affect the NRHP-eligible Airdrie Iron Furnace, Paradise Fossil Plant, and historic transmission lines and gas turbine units that could be eligible for inclusion in the NRHP. In providing the revised addendum report to KY SHPO on May 28, 2021, TVA also provided clarification on these questions. The Airdrie Iron Furnace is located further than 0.5 miles from the location of the above-ground features that TVA would construct as part of the undertaking, and is therefore outside the APE. The Paradise Fossil Plant is ineligible for the NRHP, as TVA and KY SHPO agreed during consultation for unrelated undertakings in 2020 and 2013. TVA also clarified that the undertaking would not include the removal of any historic transmission lines in Kentucky, nor would it include removing any gas turbine units. KY SHPO acknowledged these findings and agreed in their letter received by TVA on June 25, 2021.

3.13.1.4 Colbert CT Plant Project Area, Offsite Natural Gas Loop Line, and Offsite TL Upgrades

3.13.1.4.1 Affected Resources in the Colbert CT Plant Project Area Portion of the APE

Approximately 365 acres of the total affected area of 390 acres at the Colbert CT plant project area portion of the APE have been included in prior NHPA Section 106 reviews (Figure 3-6). TVA carried out these reviews in connection with several proposed actions, including: the Colbert Steam Plant Scrubber Project; construction of a microwave tower; seismic remediation of the bottom ash impoundment; installation of ammonia removal equipment; upgrades to the Colbert-Stateline TL; closure of the coal yard; Colbert Fossil Plant decommissioning; and a geotechnical investigation of the Cane Creek area. The reviews included examination of historic and current topographic maps, current and historic satellite imagery, reports of previous investigations, TVA's technical report on the Colbert Steam Plant Project (TVA 1963), and historic photographs taken at ground level or from the air. Some of these reviews also included archaeological surveys, the most comprehensive of which was a survey TVA performed in 2016 in connection with the proposed Colbert Fossil Plant decommissioning project. That survey included nearly all accessible areas within the fossil plant that were not clearly disturbed by construction or fossil plant operations. None of the archaeological surveys at the Colbert Reservation have identified archaeological sites in areas where the Colbert CT/Paradise CT project would involve ground disturbing actions.

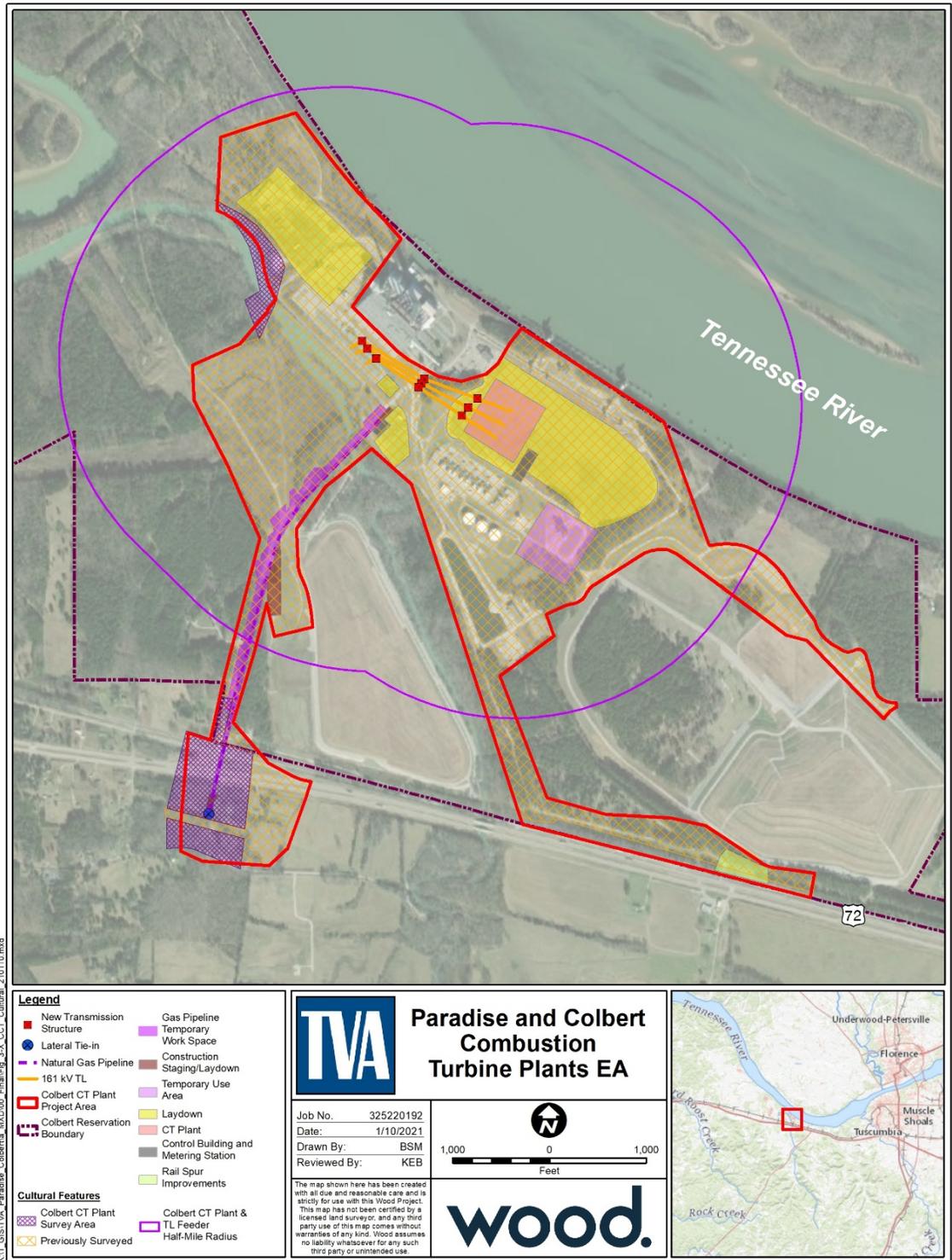


Figure 3-6. Cultural Resource Features at the Colbert CT Plant Project Area

3.13.1.4.2 Archaeological Investigations in the Colbert CT Plant Project Area Portion of the APE

TVA estimates that a minimum of 138 acres within the 390-acre review area at the Colbert CT plant project area has been affected by earth-moving activity, including construction of plant facilities, impoundments, and US 72, as well as the construction and use of the coal storage area. All such areas lack potential for intact archaeological sites due to the disturbance. Some of the previous archaeological reviews included areas that were affected by construction.

Background research revealed that 15 previously recorded archaeological sites are located within the CT Footprint (1CT16, 1CT20, 1CT21, 1CT22, 1CT75, 1CT77, 1CT78, 1CT113, 1CT116, 1CT437, 1CT625, 1CT626, 1CT630, 1CT631, 1CT632), and six previously recorded sites are located in parts of the TL corridors that would be affected by potentially ground-disturbing work (1MG778, 1MG1038, 1LU639, 1CT332, 1CT333, and 1CT334). Based on previous investigations two of these sites (1CT16 and 1CT77) are non-extant, having been destroyed by construction; two (1MG1038 and 1CT626) are ineligible for the NRHP; one (1MG778) is eligible; and 16 are considered either potentially eligible or of undetermined NRHP status. Of the 11 previously recorded archaeological sites within the Colbert Reservation portion of the APE, only one (1CT437) is located in an area where the project would involve any ground-disturbing work.

A comparatively small amount of area within the Colbert CT plant project area portion of the APE (approximately 28 acres) has not been included in previous Section 106 reviews and does not appear to have been significantly affected by past ground disturbing activities. This area consists of a ca. 7-acre area on both sides of Cane Creek northwest of the switchyard and southwest of the warehouse area that lies just north of the powerhouse; and approximately 15 acres surrounding and south of the intersection of Colbert Steam Plant Road and US 72. Some of this 15-acre area lies south of US 72 on private land, where changes to the existing natural gas pipeline would be required. TVA carried out an archaeological survey of these 28 acres. The survey consisted of a pedestrian survey and systematic shovel testing and also included a revisit of one previously recorded archaeological site, 40CT437, a twentieth-century historic site with structural remains. Based on the site's lack of research potential, TVA finds that 40CT437 is ineligible for inclusion in the NRHP. Of the remaining 10 previously recorded sites in the Colbert Reservation that are extant and considered either potentially eligible for the NRHP or of undetermined NRHP status, none is located in an area where TVA plans ground-disturbing work. No additional archaeological sites were identified by the survey in the Colbert CT plant project area portion of the APE. TVA is consulting with the Alabama SHPO and federally recognized Indian tribes regarding the results of this survey and TVA's finding that there are no NRHP-listed or NRHP-eligible archaeological sites in this part of the APE (Appendix D).

3.13.1.4.3 Historic Architectural Assessments in the Colbert CT Plant Project Area Portion of the APE

In 2016 TVA completed an architectural assessment of the Colbert Fossil Plant in connection with the proposed decommissioning of the plant. Based on the assessment, TVA determined that the Colbert Fossil Plant is ineligible for inclusion in the NRHP due to a lack of historic integrity. TVA consulted with the Alabama SHPO, who concurred with TVA's determination.

When assessing the potential for visual effects on historic architectural properties resulting from the proposed installation of new CT units, TVA created a half-mile buffer surrounding the proposed new Colbert CT power block (where the new units would be installed) and TL feeder line. This half-mile buffer does not extend outside of the Colbert Reservation boundary except where it extends over the Tennessee River. TVA considers visual effects from the construction of facilities lower than 200 feet to be minimal beyond one-half mile. Thus, significant visual effects would be limited to the Colbert Fossil Plant and the existing CT plant. Colbert Fossil Plant is ineligible for the NRHP due to a lack of historic integrity, and the CT plant is ineligible as it does not meet the minimum age threshold of 50 years. Therefore, there are no NRHP-listed or NRHP-eligible historic architectural properties within the Colbert CT plant project area portion of the APE.

3.13.1.5 Offsite TL Upgrades

3.13.1.5.1 Affected Resources in the Offsite TL Upgrade Portion of the APE

A few areas in the TL upgrade portion of the APE (for TLs that are considered in this EA) have been included in previous archaeological surveys. These surveys have identified eight archaeological sites that are located in the project areas (Table 3-17). Three of the sites are listed as undetermined or as potentially eligible for the NRHP, and five are ineligible.

Table 3-17. Areas Within the TL Upgrade Portion of the APE that were Included in Previous Archaeological Surveys, and Findings

Affected TL (CT Plant)	Portion Previously Surveyed	Survey Year	Findings
TL 6057 (Paradise)	50-foot radius surrounding nine work structures (footprint) and viewshed within half-mile radius; 7.3 miles of associated off-ROW access roads, all as part of Paradise-Montgomery uprate project	2018	No archaeological sites and no above-ground properties in APE.
TL 5617 (Colbert)	5.4-mile Colbert-Mt. Pleasant Tap to Loretto segment	1997	Six archaeological sites, of which two recommended potentially eligible for NRHP.
TL 5989 (Colbert)	100-foot radius surrounding three towers as part of a tower lighting project	2018	One archaeological site that is potentially eligible for the NRHP.
TL 5676 (Colbert)	Large survey of the Muscle Shoals Reservation that included approximately 1.6 miles of Tap Str 6-Florence TL ROW	1993	One archaeological site in ROW. Site is disturbed and likely ineligible for the NRHP.
TL 5670 (Colbert)	0.34-mile section included in a survey of the Calpine-Solutia TL	2002	None.

3.13.1.5.2 Areas in the TL Upgrade Portion of the APE not Included in Previous Archaeological Investigations

TVA carried out an archaeological survey of all areas in the TL upgrade portion of the APE that were not included in previous archaeological surveys, in order to identify archaeological sites that could be impacted by the proposed CT project. The survey included the entire length of each TL where reconductor work would be carried out, as well as associated off-ROW access routes. For TLs where upgrade work is planned, TVA included a 50-foot radius surrounding each of the work structures where ground-disturbing work (such as installation of new poles and work requiring cranes) would occur, and the associated access routes. This survey included revisits of the locations of all six previously recorded archaeological sites located in this part of the APE (1MG778, 1MG1038, 1LU639, 1CT332, 1CT333, and 1CT334). None of these sites was relocated, and it appears that the portions of these sites within the APE are no longer extant. The survey identified five archaeological sites, as shown in Table 3-18. TVA has determined that four of these sites lack research potential and are ineligible for inclusion in the NRHP. One site, located in the ROW of TL 5617 in Tennessee, is potentially eligible for inclusion in the NRHP.

Table 3-18. Archaeological Survey Results of TL Segments not Included in Previous Archaeological Surveys

TL (CT Plant)	State	Identified Archaeological Sites
TL 5670 (Colbert)	Alabama	None
TL 5676 (Colbert)	Alabama	None
TL 5617 (Colbert)	Tennessee	Four ineligible sites, one potentially eligible site
TL 5823 (Paradise)	Tennessee	None
TL 5989 (Colbert)	Tennessee	None
TL 6057 (Paradise)	Tennessee and Kentucky	Three sites of undetermined eligibility

3.13.1.5.3 Historic Architectural Properties in the TL Upgrade Portion of the APE

In Alabama, the only proposed modification to any TL structure is addition of a 10-foot extension to one structure (Structure 134 of TL 5676). This represents a less than 10 percent increase in height, which falls below TVA’s threshold for visual effects, as stipulated by Appendix B (Section D, item 2) of TVA’s Section 106 Programmatic Agreement executed in January 2020. TL 5676 consists of seven structures, of which five date to 1924 and are associated with Wilson Hydroelectric Project (listed in the NRHP). No modifications would be made to any of those structures. Therefore, none of the proposed TL upgrades in Alabama has potential for visual effects.

None of the proposed modifications to the Paradise-Montgomery 500-kV TL would result in increases in height beyond the height of existing TL structures, or in the addition of new structures. Therefore, none of the TL work in Kentucky has potential for visual effects.

In Tennessee, the only action related to this undertaking that has potential for visual effects on above-ground properties would be the addition of a 16-foot extension to Structure 76 on the on TL 5823. The tower is 74 feet tall, and the extension would result in a 22 percent increase in height. TVA carried out a desktop review of the half-mile radius surrounding this structure in order to identify any historic architectural properties. The review included the following sources: the Tennessee Historical Commission Online viewer; the NRHP; the 1956 and 2010 editions of the USGS Laguardo, TN 7.5-minute topographic quadrangle; current satellite imagery provided by Bing; Google Street View; and TVA's Integrated Cultural Database.

There are no NRHP listings within one-half mile of Structure 76. Six houses and eight barns are shown within the half-mile radius on the 1956 topographic quadrangle. Only two of the houses, and three of the barns, appear to be extant based on recent satellite imagery. The THC Online Viewer lists two structures in this review area, and these correspond with the two extant houses: SU-24 (900 Lock 4 Road), and SU-1001 (1033 Lock 4 Road). Based on current satellite imagery, SU-24 appears to be extensively modified and is located in a small lot in a modern subdivision. Maps, satellite images, and Google Street View all indicate that views to Structure 76 from this property are blocked by vegetation and other structures. SU-1001 is located approximately 0.21 miles west/northwest of Structure 76, at the southern edge of a modern subdivision. The TL tower does appear to be in view from SU-1001 currently, although the views are partially blocked by a line of trees. Google Street View indicates SU-1001 has been modified, and the THC Online Viewer lists the construction date as 1880 and describes it as "ext. altered dwelling w/ original entrance." The three extant barns are in proximity and are potentially associated with the house. The setting of this property has been extensively altered by the construction of a modern subdivision. The property is surrounded on three sides by modern homes and streets. TVA has not assessed the NRHP eligibility of this property. However, given that its integrity of setting has been altered, TVA finds that the tower extension would not further diminish its integrity, and therefore, that the undertaking would not result in an adverse effect, were this property to be found eligible for the NRHP.

Potentially Historic TLs

TVA staff consulted TVA's Transmission Line index for information regarding the construction dates, structure types, and number of replacement structures for each of the affected TLs, in order to determine whether any would meet criteria of historic significance. Two of the TLs that would be reconducted in Alabama meet the minimum age criterion for consideration as potential historic properties: TL 5670, constructed in 1936, and TL 5676, constructed in 1924. TL 5676 was built in 2001. Thirty-four (62 percent) of the original structures in TL 5670 are extant; the remainder were replaced with a modern type of structure between 1952 and 1970. TVA considers the replacement of 20 percent or more of the original structures in a historic TL as compromising the integrity of design, materials, and feeling of the historic TL. Based on this threshold, TL 5676 is ineligible for the NRHP. As mentioned above, the only proposed modification to any of the structures is the addition of a 10-foot extension to one structure (Structure 134, which is one of the original A-frame structures). TL 5676 consists of seven structures, of which five date to 1924 and are associated with Wilson Hydroelectric Project (listed in the NRHP). No modifications would be made to any of those structures.

All of the affected TLs in Tennessee and Kentucky were built by TVA between 1948 and 1968 using steel lattice-type towers, as shown in Table 3-19. The oldest of these (TL 5823)

lacks historic integrity, as nearly all of the original structures have been replaced. All of the structures in these lines are of types that TVA still uses today. TVA does not consider these structures to have historic significance because these types of structures are ubiquitous throughout the US and are still being made today. Therefore, TVA does not consider any of the affected TLs to be eligible for inclusion in the NRHP.

Table 3-19. Age and Composition of Affected TLs in Tennessee and Kentucky

TL	Affected section	Construction Date	Structure type	Original structures remaining
TL 5617	Structures 117-152A	1954	Steel towers	94%
TL 5989	Structures 9A, 9B, 9C, 9D, and A-D	1960	Steel towers (6) and steel poles (2)	75%
TL 5823	Structures 72-97 and A-F	1948	Steel towers	6%
TL 6057*	Structures 1-237 (in Kentucky) and 238-248 (in Tennessee)	1968	Steel towers	100%

*Including the entire ca. 51-mile TL extending from Paradise CT plant to the Montgomery, TN Substation

3.13.2 Environmental Consequences

3.13.2.1 Alternative A – No Action Alternative

As Alternative A would result neither in ground-disturbing actions nor in construction of new features with visual effects, TVA has found that this alternative does not have potential for effects on historic properties.

3.13.2.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

The project footprint in Kentucky contains no NRHP-listed or –eligible archaeological sites and the undertaking’s APE contains no NRHP-listed or –eligible historic architectural properties. Three archaeological sites of undetermined eligibility are located in the project footprint in Kentucky (in off-ROW access routes to be used in the fiber optic installation). As no intact archaeological deposits associated with any of the three sites are located in the project footprint, TVA’s activities would not result in any adverse effects on these sites. Although the McDougall Cemetery is located within the Paradise Reservation portion of the APE, TVA has determined that the cemetery is ineligible for inclusion in the NRHP due to a lack of integrity. Furthermore, TVA has no plans for any ground disturbing activities within or adjacent to this cemetery. TVA finds further that even if the McDougall Cemetery were to be determined eligible for the NRHP, the undertaking would result in only minor visual additions to the surroundings and would not further diminish the integrity of setting and feeling, which has already been severely compromised by past mining and construction. Therefore, TVA finds that the Paradise and Colbert CT plants project would result in no adverse effects on historic properties in Kentucky.

In Tennessee, one inventoried above-ground property is located within view of a proposed 16-foot tower extension. TVA finds that adding the extension would not result in an adverse effect on this property, were the property to be found eligible for inclusion in the NRHP. TVA also finds that all four of the affected TLs are ineligible for inclusion in the NRHP.

The project footprint in Tennessee contains five archaeological sites. TVA finds that four of these sites (40MT1152, 40LR212, 40LR213, and 40LR214) are ineligible, and one (40WY231) is potentially eligible, for inclusion in the NRHP. TVA proposed to avoid project effects on 40WY231 by creating a buffer and using wetland mats in the access route where the site is located. TVA finds that with this condition on the undertaking, the Paradise and Colbert CT Plants project would result in no effects on historic properties in Tennessee.

The project footprint in Alabama contains 10 archaeological sites that are potentially eligible for inclusion in the NRHP, or of undetermined/unassessed eligibility. All of these sites are located in areas where TVA plans no project-related activities. The archaeological survey identified one site, 1CT437, which previously had an undetermined eligibility status. Based on the current survey, TVA has determined this site is not eligible for the NRHP. No NRHP-listed or –eligible above-ground properties are located in the viewshed of activities that could have visual effects. While the undertaking would result in a physical change (tower extension) to one transmission structure in TL L5670 (built 1936), TVA recommends that this TL, while meeting the minimum age threshold for eligibility, lacks integrity and is not eligible for the NRHP. Therefore, TVA finds that the Paradise and Colbert CT plants project would result in no effects on historic properties in Alabama.

TVA has consulted with the Alabama, Kentucky, and Tennessee SHPOs and with federally recognized Indian tribes within whose areas of interest the APE falls (Appendix D). The SHPOs have each concurred with TVA's findings for the portions of the project in their respective states. None of the consulted Indian tribes objected to the undertaking or identified resources of concern.

3.14 Transportation

3.14.1 Affected Environment

3.14.1.1 Paradise CT Plant Site Project Area, Offsite Natural Gas Upgrade, and Offsite TL Upgrades

The transportation network surrounding the Paradise Reservation contains federal, state, and county roads and bridges, rail, and barge facilities on the Green River. As shown in Figure 3-7, nearby, major highways include the Wendell H. Ford Western Kentucky Parkway (WKP) and US 62 (to the north); US 431 (to the west); and the William H. Natcher Parkway (to the east). The WKP is a four-lane divided highway approximately 5.5 miles north of Paradise. The reservation is served by one CSX rail line to the west of the site. Rail access originates from the CSX Transportation mainline at Central City located approximately 8 miles northeast of the reservation.

Traffic generated by current operations at Paradise is composed of a mix of cars and light duty trucks (two-axle delivery trucks), medium duty trucks (larger two-axle and three-axle trucks) and heavy-duty trucks (three- to five-axle trucks and tractor trailers). Public road access is available to the Paradise Reservation via State Road (SR) 176, CR 1008, and Riverside Road. SR 176, a two-lane highway that extends from US 431 in Drakesboro approximately six miles east to CR 1008, is the primary roadway to the Paradise Reservation. SR 70 (Rochester Road), a two-lane paved road, is located approximately 4.5 miles south of Paradise and intersects with Riverside Road, which accesses the reservation from the south. The Rockport Paradise Road (CR 1011) runs north along the Green River from its connection point with SR 176 northwest of the Paradise Reservation to the WKP. Roadways in the vicinity of the Paradise CT plant project area are shown on

Figure 3-7. The Annual Average Daily Traffic (AADT) on the roadways near the Paradise Reservation are shown in Table 3-20. As indicated by recent traffic counts, US 431 north of SR 176 is the most heavily traveled highway in the area. AADTs for 2016 through 2017 include traffic resulting from operation of units 1 and 2 at the Paradise Fossil Plant, which were retired in 2017. Current traffic for roads in the vicinity of the reservation would be lower following retirement of the fossil plant unit 3 in February 2020. The greatest decreases in traffic would be on SR 176 and CR 1011.

Table 3-20. Annual Average Daily Traffic on Roads in the Vicinity of the Paradise CT Plant Site

Roadway	Year	AADT
US 431 north of SR 176 (Station 256)	2019	5,440
US 431 south of SR 176 (Station 252)	2018	4,471
SR 176 east of U.S. Highway 431 (Station 253)	2019	1,345
SR 176 east of Goose Lake (Station 043)	2017	1,605
SR 176 west of U.S. Highway 431 (Station 258)	2018	1,724
SR 70 east of U.S. Highway 431 (Station 251)	2019	1,446
Rockport Paradise Road south of WKP Station (036)	2016	290

Source: Kentucky Transportation Cabinet 2020

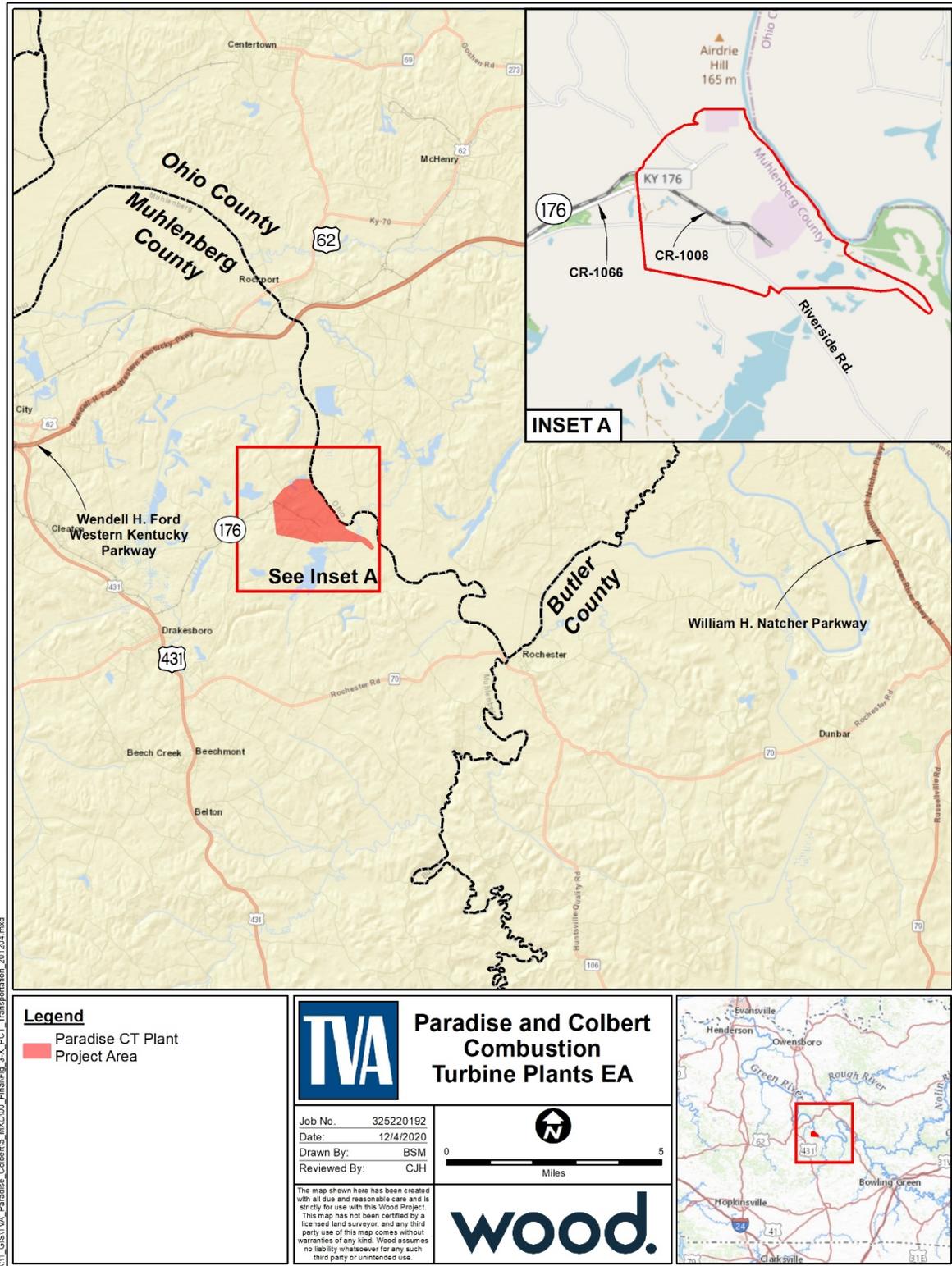


Figure 3-7. Roadways in the Vicinity of the Paradise Reservation

In order to provide natural gas pipeline service to the Paradise CT plant, upgrades to an existing compressor station are required. The compressor station is located approximately 18 miles west of the Paradise CT plant project area just southeast of SR 70 and SR 175. The station is located in a rural area with access via SR 70.

Upgrades to two offsite TLs are also included as part of the Paradise CT plant project – TL 6057 and TL 5823. TL 6057 is primarily located in Kentucky and extends 52 miles south from the Paradise Reservation, terminating in Northwest Tennessee. The portion of TL 5823 being upgraded extends approximately 13 miles west and south of TVA’s Gallatin Reservation in Tennessee. Roadway access to these TLs consists of a combination of state and county roads, with direct access provided by existing access roads from public roadways.

3.14.1.2 Colbert CT Plant Site Project Area, Offsite Natural Gas Loop Line, and Offsite TL Upgrades

The Colbert Reservation is located about 9 miles west of Tuscumbia, Alabama. The existing transportation infrastructure near the reservation includes federal, state, and county roads as well as railway for land access and river access via barge through the system of locks along the Tennessee River.

As shown in Figure 3-8, the nearest major highway to the Colbert Reservation is US 72 which provides regional east/west access and connects Decatur, Alabama and Memphis, Tennessee. US 72 is a four-lane divided highway that passes approximately 0.8 miles south of the Colbert Reservation. SR 247 is a two-lane highway that provides a north/south connection to Red Bay, Alabama from US 72. CR 20 (Old Lee Highway) is a two-lane highway that runs parallel with US 72 to the north for approximately 8 miles and provides access to local facilities along the river. Direct access from and to the Colbert Reservation is from Colbert Steam Plant Road, which connects with CR 20 and US 72. The two-lane Colbert Steam Plant Road has an at grade railroad crossing near CR 20 that is not signalized but has crossing gates. The intersection of CR 20 and Colbert Steam Plant Road has stop signs at each approach. Eastbound and westbound turn lanes to US 72 are provided from Colbert Steam Plant Road. In addition, a 350-foot left turning lane is provided on eastbound US 72 to Colbert Steam Plant Road. The project area for the proposed offsite natural gas upgrade associated with the Colbert CT plant is located on private property directly across US 72 from the intersection with Colbert Steam Plant Road. Access to this site would be provided from US 72.

Recent AADTs on roadways near the Colbert Reservation are shown in Table 3-21. As indicated by these counts, US 72 is the most heavily traveled highway in the area. The low traffic counts for CR 20 (Old Lee Highway) and Colbert Steam Plant Road indicate that both roadways serve local traffic, particularly traffic to the Colbert Reservation.

Table 3-21. Annual Average Daily Traffic on Roads in the Vicinity of the Colbert CT Plant Site

Roadway	Year	AADT
US 72 east of Colbert Steam Plant Road (Station 804)	2019	12,057
US 72 West of Garner Lane (Station 627)	2019	10,334
Colbert Steam Plant Road at US 72 (Station 1322)	2019	370
CR 20 at Colbert Steam Plant Road (Station 3804)	2019	300

Source: Alabama Department of Transportation 2020

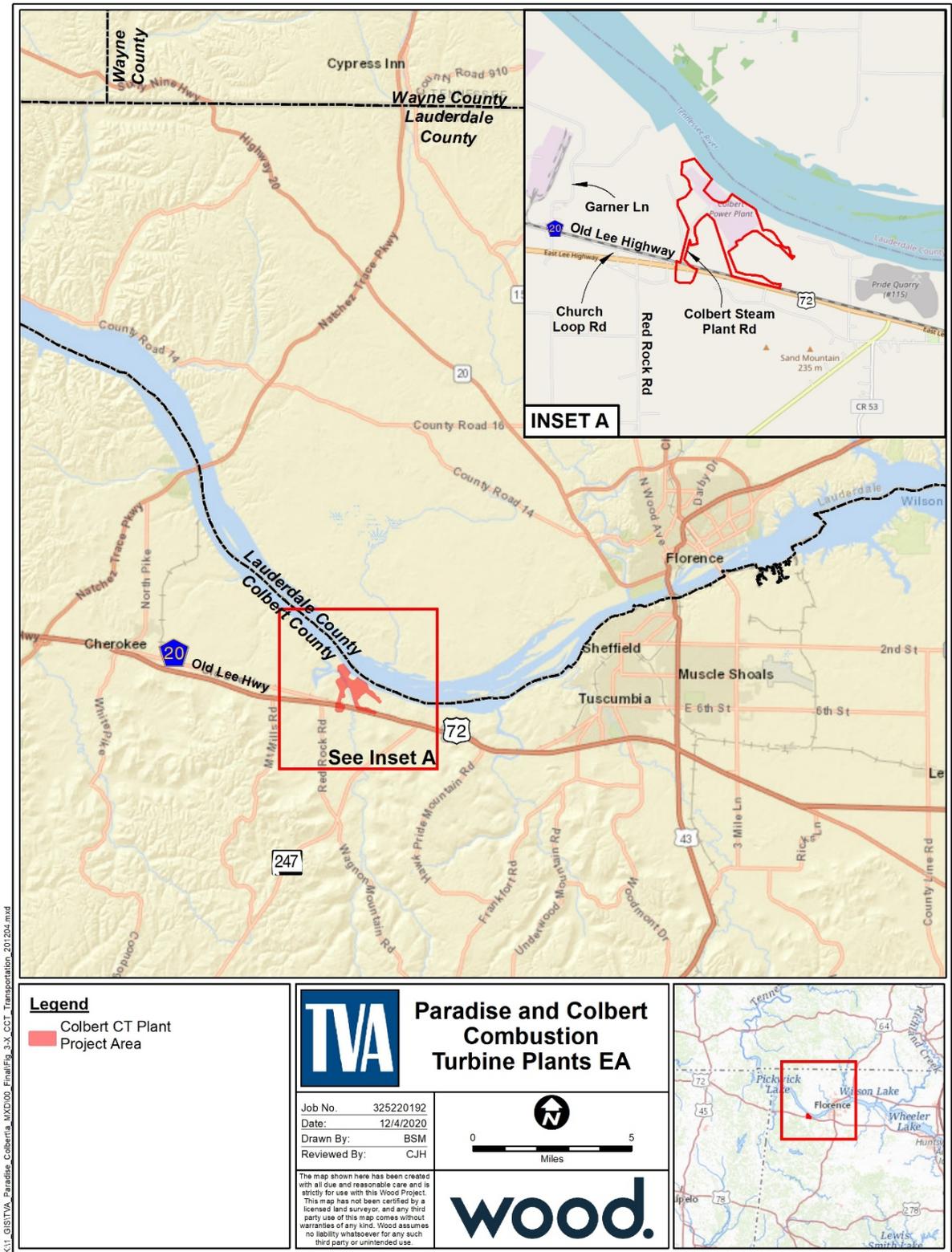


Figure 3-8. Roadways in the Vicinity of the Colbert Reservation

Upgrades to four offsite TLs are also included as part of the Colbert CT plant project – TL 5989, TL 5617, TL 5676, and TL 5670. TL 5989 and TL 5617, approximately 2 miles and 13 miles in length, respectively, are both located in Tennessee near the Alabama and Mississippi state lines. TL 5676 and TL 5670, approximately 3 miles and 10 miles in length, respectively, are located in northwestern Alabama. Roadway access to all of these TLs consists of a combination of state and county roads, with direct access provided by existing access roads from public roadways.

3.14.2 Environmental Consequences

3.14.2.1 Alternative A – No Action Alternative

Under Alternative A, there would be no impact to transportation as there would be no changes or plant additions at the Paradise and Colbert Reservations. Highway traffic levels would remain similar to current levels.

3.14.2.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

Construction

Under Alternative B, onsite construction activities for the proposed CT plant at the Paradise Reservation would result in increased traffic on local and state roadways in the vicinity of the site due to commuting of construction workers and delivery of materials and equipment for the project. Construction activities would last approximately two years, with work occurring during daytime hours, typically on weekdays but potentially up to seven days a week. Construction employment is expected to ramp up from a low of approximately 25 workers to approximately 180 workers during peak construction in month 16 of the project. Transportation impacts associated with construction are based on the peak construction workforce.

During peak construction at the Paradise CT plant site there would be measurable traffic increases on roadways in the vicinity of the Paradise Reservation, primarily in traffic traveling along US 431, SR 176, and CR 1011, with most north/south traffic traveling on US 431. Traffic increases would likely be more noticeable on the county roads accessing the reservation including CR 1011 and Riverside Road and at the intersection of US 431 and SR 176. Based on the estimated peak construction workforce of 180 workers and assuming one worker per vehicle, construction worker traffic could potentially result in an increase of up to 13.6 percent over the current AADT on SR 176 east of US 431. Construction traffic could also result in a potential increase of 4.1 percent on US 431 south of SR 176 and 3.4 percent on US 431 north of SR 176 during both morning and evening commutes. As construction workers are likely to come from different origins north and south of the intersection of US 431 and SR 176, these increases would be lower as traffic would be dispersed between the two directions. These increases would occur during a three- to six-month peak construction period and represent a relatively small increase in AADT on public roadways within the vicinity of the Paradise Reservation, which currently experiences low traffic volumes. Due to the temporary nature of construction activities on low volume roadways, transportation impacts from construction activities on area roadways would be minor. Traffic on public roadways would return to preconstruction levels after construction is complete.

Additional truck traffic would also occur in the area during construction due to material and equipment deliveries to the site. However, as this increase would primarily occur during the mobilization and demobilization phases, impacts to the surrounding transportation network are not anticipated. It is anticipated that most project components would be delivered by truck; however, larger project equipment would be delivered to the site by rail. Minor rail modifications would be made onsite if necessary.

Proposed upgrades to the existing compressor station are relatively minor. As such, construction traffic would be minimal and short term and would not impact traffic on roadways surrounding the facility.

The offsite TL upgrades associated with the Paradise CT plant would not impact regional or local transportation networks as the upgrade work involves temporary short-term construction with small crews of workers at specific sites along each TL corridor.

The construction schedule and workforce anticipated at the Colbert CT plant site would be similar to that described for the Paradise CT plant. Based on the estimated peak construction workforce and assuming one worker per vehicle, construction worker traffic could potentially result in a minimal traffic increase on US 72 of up to 2% over the current AADT near the Colbert Reservation. As construction workers are likely to come from both the east and west on US 72, these increases would be lower and not noticeable. However, construction workforce traffic could also result in an increase of up to 49% on Colbert Steam Plant Road over the current AADT. As construction activities peak at the Colbert CT plant site, noticeable increases in traffic traveling through the intersections of Colbert Steam Plant Road with US 72 and CR 20 are likely to occur during morning and evening commutes. Due to these increases in traffic, drivers may experience delays or congestion during peak hour traffic periods, especially on southbound Colbert Steam Plant Road during the evening commute for traffic making left turns to eastbound US 72. Additional congestion could occur at this intersection due to delays from rail traffic at the Norfolk Southern rail crossing of Colbert Steam Plant Road. TVA would work with local and state officials, as appropriate, to manage and alleviate such impacts, including the possible use of staggered work shifts and encouragement of carpooling to minimize traffic delay at these local intersections. Due to the temporary nature of construction activities for the proposed Colbert CT plant and the offsite natural gas pipeline upgrade, and implementation of appropriate traffic controls if necessary, the impacts on traffic traveling on US 72 in the vicinity of the Colbert Reservation and Colbert Steam Plant Road would be minor. Traffic on these roadways would return to preconstruction levels after construction is complete.

Additional truck traffic would also occur in the area during construction due to material and equipment deliveries to the site. Most project components would be delivered by truck; however, larger components would be delivered by rail. Minor rail modifications would be made onsite if necessary.

The offsite TL upgrades associated with the Colbert CT plant would not impact regional or local transportation networks as the upgrade work involves temporary short-term construction with small crews of workers at specific sites along each TL corridor.

Operation

Operation of the proposed CT plants at Paradise and Colbert are expected to require four to six workers at each site resulting in a negligible increase in workforce traffic and no impacts to roadways in the project area.

3.15 Natural Areas, Parks and Recreation

3.15.1 Affected Environment

Natural areas include ecologically significant sites, national or state forests, wilderness areas, scenic areas, WMAs, greenways, trails, NRI streams, and wild and scenic rivers. Managed areas include lands held in public ownership that are managed by an entity (e.g., TVA, USDA, USFS, State of Tennessee) to protect and maintain certain ecological and/or recreational features. Ecologically significant sites are either tracts of privately-owned land that are recognized by resource biologists as having significant environmental resources or identified tracts on TVA lands that are ecologically significant but not specifically managed by TVA's Natural Areas program. NRI streams are free-flowing segments of rivers recognized by the National Park Service (NPS) as possessing remarkable natural or cultural values. Parks and developed recreation facilities include open areas, boat ramps, community centers, swimming pools, and other public recreation areas.

This section addresses natural areas and parks and recreation facilities that are on, in the immediate vicinity (within a 0.5-mile radius) of, or within the region (within a 5-mile radius) of the Paradise and Colbert CT plant project areas, as well as those that are in the immediate vicinity of associated offsite actions including TL upgrades.

3.15.1.1 Paradise CT Plant Project Area and Offsite Natural Gas Upgrade

Natural areas, parks, and developed recreation areas within the region of the Paradise CT plant project area are listed in Table 3-22 and illustrated on Figure 3-9.

Table 3-22. Natural Areas, Parks and Recreation Facilities in a 5-mile Radius of the Paradise CT Plant Project Area

Natural Area or Park	Managing Entity	Use
Peabody WMA	KDFWR	Wildlife habitat, small & large game hunting
Paradise Boat Ramp	TVA	Public boat ramp
Rochester Boat Ramp	KDFWR	Public boat ramp
Rockport Boat Ramp	KDFWR	Public boat ramp

Source: TVA 2020e; KDFWR 2020a

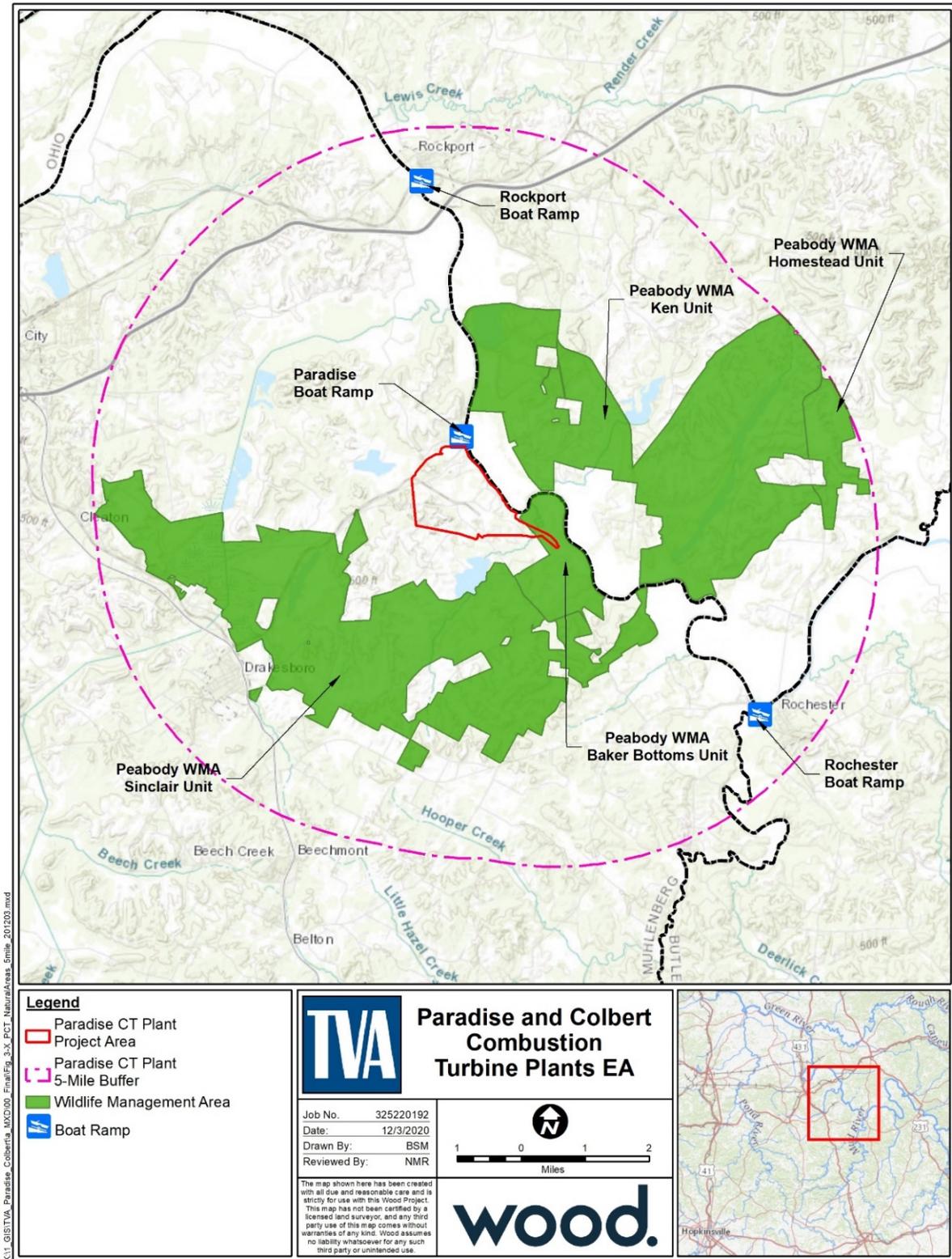


Figure 3-9. Natural Areas, Parks and Recreation Facilities in a 5-mile Radius of the Paradise CT Plant Project Area

A review of data from the TVA Natural Heritage database and the KDFWR indicates that the easternmost portion of the Paradise CT plant project area, which extends past the TVA reservation, is located on the Baker Bottoms Unit of the Peabody WMA. The WMA is broken up into eight individual units – three of which are adjacent to the Paradise Reservation. The Baker Bottoms Unit of the WMA is located southeast adjacent to the reservation and contains large ROW corridors for existing TLs originating from the Paradise facilities. The Sinclair Unit of the Peabody WMA abuts the reservation to the south and west, and the main access road to the plant (SR 176) passes through the Sinclair Unit. The Ken Unit is located on the opposite side of the Green River, east of the Paradise Reservation. The Homestead Unit of the WMA is also located within a 5-mile radius, approximately 4.5 miles northeast of proposed Paradise CT plant project area. The Peabody WMA has rough terrain primarily comprised of reclaimed coal-mined land with swampland, numerous excavated ridges, and water-filled strip mine pits. Lands within the WMA are owned by both private landowners and the KDFWR. Private lands within the WMA are managed by KDFWR under lease agreements with the private landowners. The main public uses are fishing and hunting for deer, turkey, waterfowl, and small game; however, the WMA is also utilized for bird watching and other passive recreation (KDFWR 2020b).

The Paradise Boat Ramp, which provides public access to the Green River, is located near the northern boundary of the Paradise Reservation, approximately 775 feet north of the proposed CT site boundary. This boat ramp is accessible from State Route 176 on the Paradise Reservation and from Rockport-Paradise Road to the north. Two additional Green River access points are also located within a five-mile radius of the CT plant project area – the Rochester Boat Ramp located approximately four miles southeast of the project boundary and the Rockport Boat Ramp located approximately 4.2 miles north-northwest of the project boundary.

Apart from these designated natural and recreational areas, water-based recreation activities on the Green River adjacent to the Paradise Reservation include general pleasure boating, boat fishing, and water sports activities such as water skiing.

The new engine needed to provide the additional natural gas supply to the CTs at Paradise would be constructed at an existing compressor station approximately 18 miles west of the Paradise Reservation. The Vogue Unit of the Peabody WMA, another of the eight individual WMA units, is located southeast adjacent to this existing facility on the opposite side of KY-175. There are no other natural areas, parks, or developed recreation facilities within a 0.5-mile radius of the existing facility.

3.15.1.2 Colbert CT Plant Project Area and Offsite Natural Gas Loop Line

Natural areas, parks, and developed recreation areas within a five-mile radius of the Colbert CT plant project area, which encompasses the location of the offsite gas tie-in, are listed in Table 3-23 and illustrated on Figure 3-10.

Table 3-23. Natural Areas, Parks and Recreation Facilities in a 5-mile Radius of the Colbert CT Plant Project Area

Natural Area or Park	Managing Entity	Use
Alabama Cavefish Critical Habitat	USFWS	Endangered species habitat
Cane Creek Recreation Area and Boat Ramp	Colbert County, AL	Public boat ramp and bank fishing, camping
Coffee Bluff TVA Habitat Protection Area	TVA	Habitat protection
Freedom Hills WMA	ADCNR	Wildlife habitat, small & large game hunting
Key Cave Aquifer Hazard Area	N/A	Aquifer protection/recharge
Key Cave National Wildlife Refuge	USFWS	Endangered species habitat, waterfowl and small game hunting
Pride Landing Boat Ramp	ADCNR	Public boat ramp
Seven Mile Island WMA	ADCNR	Wildlife habitat, small & large game hunting
Tennessee River/Wilson Dam Non-Essential Experimental Population Area	USFWS	Reintroduction of protected species populations

Source: TVA 2020e

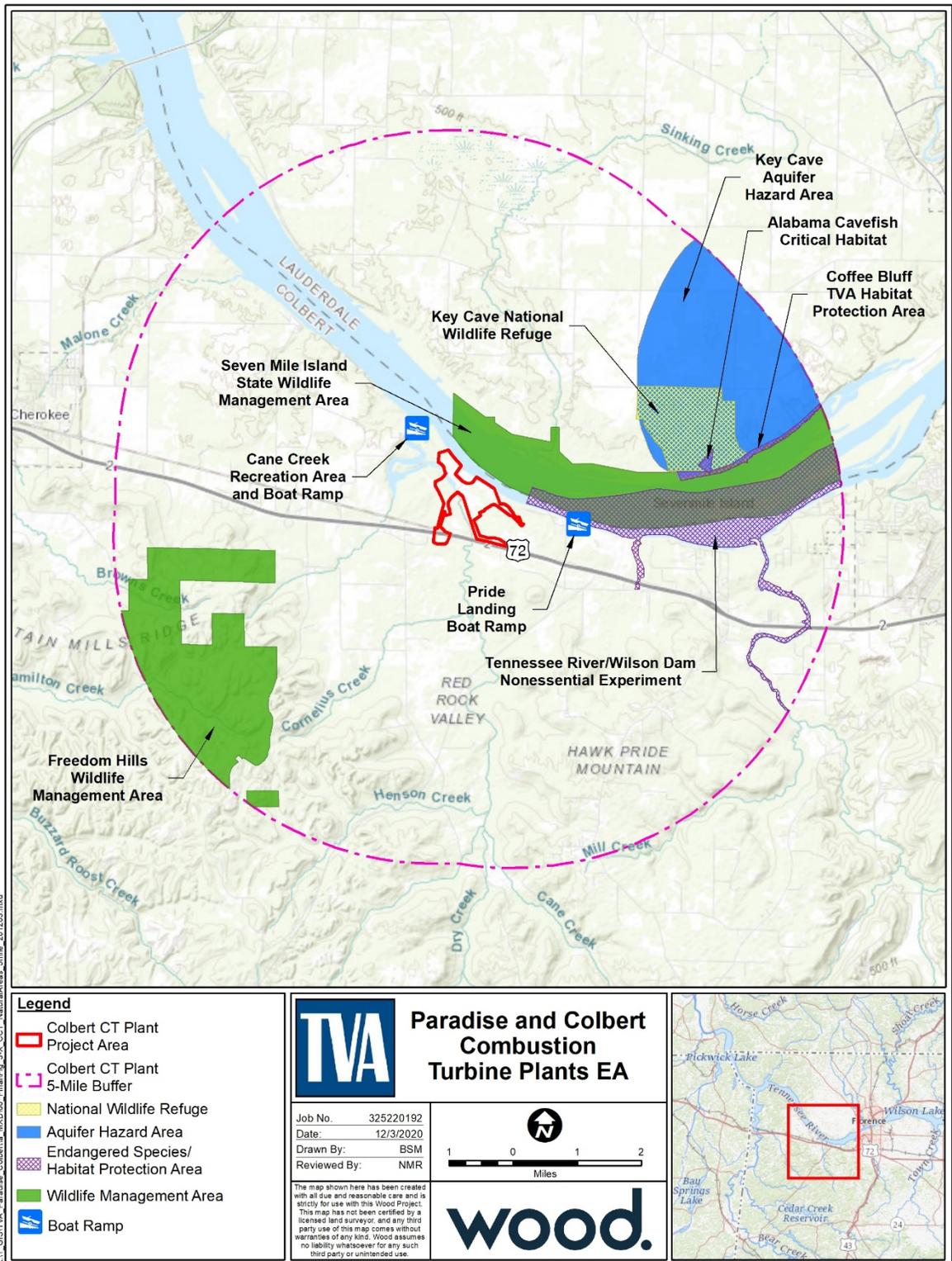


Figure 3-10. Natural Areas, Parks and Recreation Facilities in 5-mile Radius of the Colbert CT Plant Project Area

There are no parks or recreation areas located within the footprint of the Colbert CT plant project area. The Seven Mile Island WMA is located adjacent to the Colbert Reservation, encompassing islands within the Tennessee River and the shoreline opposite the reservation. Comprised of 4,685 acres, the Seven Mile Island WMA is managed by the ADCNR for waterfowl and small game hunting.

The Tennessee River/Wilson Dam Non-Essential Experimental Population Area, located just upstream of the Colbert Reservation, was designated by the USFWS in 2001 for the reintroduction of 16 federally listed mussel species and one aquatic snail species. The designated area consists of the Tennessee River between Wilson Dam and the backwaters of Pickwick Reservoir, and it also extends 5 miles upstream of all tributaries that enter Wilson Dam tailwaters.

The Key Cave Aquifer Hazard Area, located approximately 2.3 miles northeast of the Colbert CT plant project area, consists of approximately 2,300 acres of hardwood forests, croplands, and sinkholes surrounding Key Cave that acts as an aquifer recharge area. The area's sinkholes are an integral component of groundwater recharge to the caves. Within this large area is Key Cave National Wildlife Refuge, managed by USFWS in cooperation with TVA. This refuge consists of 1,047 acres of land and contains designated critical habitat for the federally listed Alabama cavefish. Recreational opportunities on these lands include wildlife observation, hiking, photography, and hunting. Entry into caves for research is by permit only.

Along the southern boundary of the Key Cave Aquifer Hazard Area, and approximately 2.6 miles from the CT plant project area, the Coffee Bluff TVA Habitat Protection Area consists of approximately 250 acres of land along Pickwick Reservoir featuring bluffs, waterfalls, caves, ravines, scenic views, and a variety of plant life and wildlife.

The Freedom Hills WMA is located approximately 2.6 miles southwest of the Colbert CT plant project area and consists of approximately 34,500 acres, managed by the ADCNR for small and large game hunting. The WMA also offers a public shooting and archery range, as well as primitive camping.

In addition to these parks and natural areas, two developed recreation sites are located near the CT plant project area. Cane Creek Recreation Area is situated on the Colbert Reservation property and is located approximately 2,610 feet northwest of the Colbert CT plant project area. 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 0.9 miles upstream CT plant project area. This area includes a paved ramp and is managed by the ADCNR.

Local residents also fish from the bank in the outfall area south of the Colbert switchyard, which is within the boundaries of the Colbert CT plant project area. This area is accessible to the general public, though not advertised as a public recreation area. It is estimated that approximately six to 12 people fish from this bank on average per day and that several of these are repeat visitors (TVA 2016a). In addition, water-based recreation activities on the Tennessee River adjacent to the Colbert Reservation include general pleasure boating, fishing and water sports activities.

3.15.1.3 Offsite TL Upgrades

Upgrades to existing TL segments are proposed in association with the development of both the Paradise and Colbert CT plant project areas. Natural areas, parks, and developed recreation areas intersected by or immediately adjacent to (within 0.5 mile) these existing TL corridors are listed in Table 3-24.

Table 3-24. Natural Areas, Parks and Recreation Facilities in 0.5-mile Radius of Offsite TL Corridors to be Upgraded

Natural Area or Park	Managing Entity	Use	TL Segment	Associated CT Plant
Old Hickory Reservoir Reservation	USACE	Recreation on lake and shoreline property	TL 5823	Paradise
Old Hickory State WMA	TWRA	Wildlife habitat, small and large game hunting	TL 5823	Paradise
Peabody WMA	KDFWR	Wildlife habitat, small & large game hunting	TL 6057	Paradise
Holly Creek Cave Preserve	Southeastern Cave Conservancy	Cave and habitat protection	TL 5617	Colbert
Muscle Shoals National Recreation Trail	TVA	Pedestrian/bike trail	TL 5676	Colbert
Muscle Shoals Reservation	TVA	Recreation, navigation and flood protection	TL 5676	Colbert
Pickwick Landing State Park	TDEC	Recreation on lake and shoreline property	TL 5989	Colbert
River Heritage Park	City of Florence, AL	City park	TL 5676	Colbert
Shoal Creek Nonessential Experimental Population	USFWS	Reintroduction of protected species populations	TL 5617	Colbert
Veterans Park	City of Florence, AL	City park with sports complex	TL 5676	Colbert
Wheeler National Wildlife Refuge	USFWS	Endangered species habitat, hiking, wildlife observation, and hunting	TL 5670	Colbert
Wheeler Reservoir Reservation	TVA	Recreation, navigation and flood protection	TL 5670	Colbert
Wilson Dam Tailwater Restricted Mussel Harvest Area	ADCNR	Freshwater mussel protection	TL 5676	Colbert

Source: TVA 2020e; City of Florence, AL 2020

3.15.2 Environmental Consequences

3.15.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not construct the proposed CT plants at the Paradise or Colbert reservations. Therefore, there would be no impacts to natural areas, parks, or recreational resources associated with this alternative.

3.15.2.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

Under Alternative B, some of the proposed TL upgrades within the Paradise CT plant project area, including new transmission structures within the proposed re-configured 500-kV TL, would occur within the Baker Bottoms Unit of the Peabody WMA. While construction activities would occur primarily within the existing TL ROW, portions of the WMA closest to construction activities and equipment would experience temporary increases in noise, air emissions, and fugitive dust. However, these impacts would be minimized through the use of standard BMPs, and construction schedules in this area would be coordinated with the KDFWR site manager contact to minimize impacts to hunting activities. In addition, in order to meet buffer requirements along the modified 500-kV TL to the proposed Paradise CT plant, approximately 0.01 acre of additional ROW easement within the WMA is anticipated to be acquired from KDFWR. This easement, which is adjacent to the existing TL ROW corridor within the WMA, would be purchased by TVA, giving them the right to clear the ROW and to construct, operate, and maintain the TL. The fee simple ownership of the land within the ROW would remain with KDFWR, and many activities and land uses, such as wildlife management and hunting, could continue to occur on the property. Due to the short-term nature of construction activities and the minimal amount of new ROW acquisition which would not affect current uses of the property, impacts to the Baker Bottoms Unit of the Peabody WMA would be minor.

Additionally, users of the Paradise Boat Ramp and recreationists on the Green River adjacent to the Paradise CT plant project area may experience increased noise during the approximately 2-year construction period. Increased construction workforce traffic may also have an indirect effect on users of the Sinclair Unit of the Peabody WMA and the Paradise Boat Ramp, both of which are accessed from SR 176. However, these construction impacts would be short term and unlikely to interfere with use or enjoyment of these facilities. As such, impacts would be minor.

The Vogue Unit of the Peabody WMA is located adjacent to the existing offsite compressor station, approximately 500 feet from the proposed location of the new compressor. As construction will be contained within the existing developed station footprint, construction impacts would be limited to temporary increases in noise in the vicinity of the existing compressor station, which may result in a temporary disruption of nearby hunting activities within the WMA. However, as construction impacts would be short-term and localized, and operational noise would be within the current operation of the compressor station, impacts to users of the Peabody WMA would be minor.

Proposed offsite TL upgrades associated with the Paradise CT plant could result in increased noise, fugitive dust, and increased erosion and sedimentation at parks and natural areas crossed by and immediately adjacent to the existing TL ROW corridors (listed in Table 3-24) during the construction period. However, these impacts would be minimized through the implementation of BMPs designed to minimize fugitive dust and manage storm water runoff. Additionally, because of the sequence of construction activities, construction impacts at a given point along the TL would be short term. For these reasons, impacts to natural areas and parks associated with the TL modifications would be temporary and minor.

While there are opportunities for recreational bank fishing in an outfall area located within the Colbert CT plant project area, access to this location would not be hindered during

either construction or operation of the CT plant. Users of this site, as well as the nearby Cane Creek Recreation Area and Boat Ramp, the Seven Mile Island WMA, and recreationists on the Tennessee River, may be impacted by increased noise during the construction period. However, these construction impacts would be minor, as they would be short-term and unlikely to interfere with use or enjoyment of these facilities. There are no natural areas, parks, or recreation facilities within a mile of the proposed natural gas lateral tie-in south of the Colbert Reservation, and there would be no impacts at the remaining parks and natural areas in the region due to distance.

Impacts to natural areas, parks, and recreation associated with offsite TL upgrades to support the Colbert CT plant would be the same as those described in association with the Paradise CT plant, and thus would be temporary and minor.

3.16 Noise

3.16.1 Affected Environment

Noise is unwanted or unwelcome sound usually caused by human activity and added to the natural acoustic setting of a locale. It is further defined as sound that disrupts normal activities or diminishes the quality of the environment. Community response to noise is dependent on the intensity of the sound source, its duration, the proximity of noise-sensitive land uses, and the time of day the noise occurs. For instance, higher sensitivities to noise would be expected during the quieter overnight periods at noise sensitive receptors such as residences. Other sensitive receptors include developed sites where frequent human use occurs, such as churches and schools.

Sound 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) which filters out sound in frequencies above and below human hearing. A noise level change of 3 dBA or less is barely perceptible to average human hearing. However, a 5 dBA change in noise level is clearly noticeable. The noise level associated with a 10 dBA change is perceived as being twice as loud; whereas the noise level associated with a 20 dBA change is considered to be four times as loud and would therefore represent a “dramatic change” in loudness.

To account for sound fluctuations, environmental noise is commonly described in terms of the equivalent sound level. The equivalent sound level is the constant noise level that conveys the same noise energy as the actual varying instantaneous sounds over a given period. Fluctuating levels of continuous, background, and/or intermittent noise heard over a specific period are averaged as if they had been a steady sound. The day-night sound level (L_{dn}), expressed in dBA, is the 24-hour average noise level with a 10-dBA correction penalty for the hours between 10 p.m. and 7 a.m. to account for the increased sensitivity of people to noises that occur at night. Typical background day-night noise levels for rural areas are anticipated to range between an L_{dn} of 35 and 50 dB, whereas higher-density residential and urban areas background noise levels range from 43 dB to 72 dB (EPA 1974). Common indoor and outdoor noise levels are listed in Table 3-25.

The perceived loudness or intensity between a noise source and a receptor may change because of distance, topography, vegetation, water bodies, and structures. The closer a receptor is to a noise source the louder the noise seems; for every doubling of distance from a source the intensity drops by about 6 dBA over land and about 5 dBA over water.

Topography, vegetation, and structures can change noise intensity through reflection, absorption, or deflection. Reflection tends to increase the intensity, while absorption and deflection tend to decrease the intensity.

There are no federal, state, or locally established quantitative noise-level regulations specifying environmental noise limits for either the Paradise or Colbert CT project areas or the surrounding areas. However, the EPA noise guideline recommends outdoor noise levels not exceed an L_{dn} of 55 dBA, which is sufficient to protect the public from the effect of broadband environmental noise in typical outdoor and residential areas. These levels are not regulatory goals but are “intentionally conservative to protect the most sensitive portion of the American population” with “an additional margin of safety” (EPA 1974). The U.S. Department of Housing and Urban Development (HUD) considers an L_{dn} of 65 dBA or less to be compatible with residential areas (HUD 1985).

Table 3-25. Common Indoor and Outdoor Noise Levels

Common Outdoor Noises	Sound Pressure Levels (dB)	Common Indoor Noises
	110	Rock Band at 5 m (16.4 ft)
Jet Flyover at 300 m (984.3 ft)		
	100	Inside Subway Train (New York)
Gas Lawn Mower at 1 m (3.3 ft)		
	90	Food Blender at 1 m (3.3 ft) Garbage Disposal at 1 m (3.3 ft)
Diesel Truck at 15 m (49.2 ft)		
	80	Shouting at 1 m (3.3 ft)
Gas Lawn Mower at 30 m (98.4 ft)		
	70	Vacuum Cleaner at 3 m (9.8 ft)
Commercial Area		
	60	Normal Speech at 1 m (3.3 ft) Large Business Office
Quiet Urban Daytime		
	50	Dishwasher Next Room
Quiet Urban Nighttime Quiet Suburban Nighttime		
	40	Small Theater, Large Conference Room Library
Quiet Rural Nighttime		
	30	Bedroom at Night Concert Hall (Background)
	20	Broadcast and Recording Studio
	10	
	0	Threshold of Hearing

Source: Arizona DOT 2008

3.16.1.1 Sources of Noise

Primary sources of noise at both the Paradise and Colbert CT project areas are related to the operations of the components of the natural gas plants already in place at these facilities. The existing three-unit CC plant at Paradise and the eight-unit CT plant at Colbert generate localized noise through operation of gas and/or steam turbines, generators, mechanical draft cooling towers, and other ancillary equipment. Historically, coal unloading and operation of the coal-fired fossil plant units were dominant noise-generating activities at both sites. However, both coal-fired fossil plants have been retired and noise emissions have reduced accordingly.

The offsite TL upgrades associated with the proposed CT plants at the Paradise and Colbert reservations traverse a variety of land uses including industrial, commercial, urban, suburban, and rural areas. In general, noise levels are high around airports, industrial facilities, construction areas, and major transportation corridors such as highways and railways. Typical background day/night noise levels for rural areas range between 35 and 50 dB whereas background noise levels for higher-density residential and urban areas range from 43 dB to 72 dB (EPA 1974).

3.16.1.2 Noise Receptors

Sensitive noise receptors include residences or other developed sites where frequent human use occurs, such as churches, parks, and schools. The Paradise CT plant project area is located more than 3 miles from the nearest populated area, the town of Drakesboro, and the closest residences are located more than 1.5 miles from the Paradise CT plant project area. Users of nearby recreational areas, including the Peabody WMA which abuts the reservation to the east and contains the easternmost portion of the Paradise CT plant project area, and the Paradise Boat Ramp, located approximately 775 feet north of the Paradise CT plant project area, are the only sensitive noise receptors located within a one-mile radius.

The area surrounding the Colbert CT plant project area consists predominantly of undeveloped rural properties; however, there are residences to the south, along Old Lee Highway and US 72, as well as to the east of the reservation, along the Tennessee River. Dense forested areas and topography separate these residential areas from the existing CT plant site and the retired fossil plant, blocking the line of site and helping to attenuate noise. Other sensitive noise receptors include users of the Cane Creek Recreation Area and Boat Ramp, located 2,610 feet northwest of the Colbert CT plant site, and the Seven Mile Island State WMA which encompasses the shoreline on the opposite bank of the Tennessee River.

3.16.2 Environmental Consequences

3.16.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not construct the proposed CT plants at the Paradise or Colbert reservations. Therefore, there would be no impacts to noise receptors resulting from the proposed action under this alternative and ambient noise levels would remain similar to current conditions.

3.16.2.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

Under Alternative B, onsite construction activities for the proposed CT plant at Paradise would result in increased noise levels adjacent to the construction site due to operation of construction equipment onsite and along roadways used by construction-related vehicles. Construction activities would last approximately two years, with work occurring during daytime hours, typically on weekdays but up to seven days a week, or during evening hours, should the schedule need to be accelerated. During the construction phase, noise would be generated by a variety of construction equipment including trucks, truck-mounted augers and drills, excavators, tracked cranes, and bulldozers. Typical noise levels from this construction equipment are expected to be 85 dBA or less at a distance of 50 feet from the construction site (FHWA 2016).

A portion of the proposed re-configured 500-kV TL within the Paradise CT plant project area would occur within the Peabody WMA. Therefore, users of the WMA could experience noise levels approaching 85 dBA in the immediate vicinity of construction activities. However, construction associated with the TL upgrade would be short-term, and the noise would dissipate at locations within the WMA that are removed from the construction activities. The only other sensitive noise receptor near the Paradise CT plant project area is the Paradise Boat Ramp public access point located approximately 775 feet to the north. Based on straight line noise attenuation, it is estimated that maximum noise levels from construction equipment would attenuate to 61.2 dBA at this recreational site. While this is somewhat higher than the recommended EPA outdoor noise guideline of 55 dBA, construction noise would be temporary and unlikely to interfere with use or enjoyment of this facility. Additionally, noise levels would likely be lower in the field as objects and topography would cause further noise attenuation. Construction noise would be negligible at any residences or other sensitive noise receptors as they are located at distances of more than 1.5 miles.

There is also a potential for indirect noise impacts associated with an increase in traffic related to workforce vehicle traffic. Roadway traffic noise is not usually a serious problem for people who live more than 500 feet from heavily traveled freeways or more than 100 to 200 feet from lightly traveled roads (FHWA 2011). Due to the nature of the decibel scale and the attenuating effects of noise with distance, a doubling of traffic volume would result in an approximately 3 dBA increase in noise level, which would not normally be a perceptible noise increase (FHWA 2011). TVA estimates that the peak workforce needed during the estimated two-year construction period at Paradise would consist of approximately 180 personnel per day. Assuming one person per commuting vehicle, there would be a maximum daily morning inbound traffic volume of approximately 180 vehicles and a daily outbound traffic volume of approximately 180 vehicles each working day. As workforce traffic noise would only occur twice per day as workers are entering and leaving the project site and would result from a relatively low number of personal vehicles dispersed among the surrounding roadways (not near doubling existing traffic volumes), noise impacts from construction workforce traffic at Paradise would be minor.

During operation of the proposed Paradise CT plant, noise levels for each piece of equipment would not exceed 85 dBA at a distance of 3 feet. Based on straight line noise attenuation, it is estimated that noise levels from the CT plant would attenuate to 29.6 dBA at the Paradise Boat Ramp and 17.1 dBA at the Peabody WMA, well under the recommended EPA noise guideline of 55 dBA. As with construction noise, operational noise

from the Paradise CT plant would be imperceptible at residences or any other sensitive receptors due to distance.

The new offsite natural gas compressor needed to provide the additional natural gas supply to the CTs at Paradise would be constructed at an existing compressor station approximately 18 miles west of the Paradise Reservation. The results of an acoustical analysis by the commercial supplier indicate that the potential increase in noise levels due to the proposed modifications at the station would be less than 1 dBA greater than existing levels at the nearest sensitive noise receptors, which are located more than a mile from the existing facility. Additionally, the estimated cumulative noise attributable to the station would remain below 55 dBA at these same receptors (Texas Gas Transmission, LLC 2020). Therefore, as operational noise would not be discernably different than existing levels at the facility, and there are no sensitive noise receptors within a mile of the existing compressor station, noise impacts associated with the construction and operation of the additional offsite natural gas compressor would be negligible.

Proposed TL upgrades associated with the Paradise CT plant would require the use of standard TL maintenance equipment including bulldozers, bucket trucks, boom trucks, forklifts, and helicopters. Use of this equipment may result in a considerable increase over existing background noise levels, especially for those residents and other sensitive receptors located immediately adjacent to the existing ROW. However, construction activities would be limited to daylight hours and would utilize equipment consistent with existing maintenance practices (i.e., line inspection and vegetation maintenance by helicopter). Additionally, because of the sequence of construction activities, construction noise at a given point along the TL would be short term. For these reasons, noise-related impacts of TL modifications would be temporary and minor.

The construction schedule and equipment utilized for the proposed Colbert CT plant would be the same as described for the CTs at Paradise. The closest sensitive noise receptor that could be impacted by onsite construction within the Colbert plant site is a residence located approximately 525 feet south of the boundary, near the potential rail spur improvement area. Based on straight line noise attenuation, it is estimated that noise levels from construction equipment would attenuate to 64.6 dBA or less at this residence, and 61.0 dBA or less at residences located east of the reservation, along the Tennessee River. These maximum noise levels are higher than the recommended EPA noise guideline of 55 dBA, but lower than the HUD recommended guideline of 65 dBA for residential properties. Maximum construction noise levels at nearby recreational sites would range from 50.7 dBA at the Cane Creek Recreation Area and Boat Ramp to 60.7 dBA at the Seven Mile Island WMA. However, construction noise would be intermittent and would occur primarily during daylight hours during the two-year construction period. Therefore, noise impacts related to construction activities would be minor and temporary.

Additionally, like Paradise noise impacts from construction workforce traffic at Colbert, peaking at approximately 180 personnel, would be minor. Overall, noise impacts from CT plant construction would be temporary and minor.

Like the Paradise CTs, operational noise levels for each piece of equipment at the Colbert CT plant would not exceed 85 dBA at a distance of 3 feet. Based on straight line noise attenuation, it is estimated that maximum noise levels from the CT plant would attenuate to 21.9 dBA at the nearest residence and 31.4 dBA or lower at nearby recreational facilities. As these noise levels are well under the recommended EPA noise guideline of 55 dBA,

operational noise impacts would be negligible and would not impact surrounding communities.

The construction of a new natural gas lateral tie into the main distribution pipeline to supply the Colbert CT plant may result in notable but temporary noise increases for nearby receptors during the construction period. There are four residences located within 600 feet of the proposed construction area south of US 72 that would likely experience the greatest impacts. However, these noise impacts would be limited to daylight hours and would be short term in nature. Noise impacts associated with offsite TL upgrades to support the Colbert CT plant would be the same as those described in association with the Paradise CT plant. Therefore, all offsite noise impacts associated with the Colbert CT plant would be temporary and minor.

3.17 Solid and Hazardous Waste

3.17.1 Affected Environment

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

RCRA regulations define what constitutes a hazardous waste and establishes a “cradle to grave” system for management and disposal of hazardous wastes. Subtitle C of RCRA includes separate, less stringent regulations for certain potentially hazardous wastes. Used oil, for example, is regulated as hazardous waste if it is disposed of, but it is separately regulated if it is recycled. Specific requirements are provided under RCRA for generators, transporters, processors, and burners of used oil that are recycled. Universal wastes are a subset of hazardous wastes that are widely generated. Universal wastes include batteries, lamps and high intensity lights, and mercury thermostats. Universal wastes may be managed in accordance with the RCRA requirements for hazardous wastes or by special, less stringent provisions.

Solid waste consists of a broad range of materials that include refuse, sanitary wastes, contaminated environmental media, scrap metals, nonhazardous wastewater treatment plant sludge, nonhazardous air pollution control wastes, various nonhazardous industrial waste, and other materials (solid, liquid, or contained gaseous substances). Solid waste is regulated by the EPA and RCRA Subtitle D. Each state is required to ensure the federal regulations for solid waste are met and may implement more stringent requirements.

Special waste is a solid waste, other than a hazardous waste, that requires special handling and management to protect public health or the environment. In some states, special wastes may include sludges, bulky wastes, pesticide wastes, industrial wastes, combustion wastes, friable asbestos and certain hazardous wastes exempted from RCRA Subtitle C requirements. Any of these wastes, if generated, would be disposed as required by state and federal regulations.

The most recent Biennial Report available on the EPA RCRA Information website identifies the Paradise Fossil Plant/Combined Cycle Plant as a Large Quantity Generator of hazardous waste and the Colbert Fossil Plant as a Small Quantity Generator of hazardous wastes (EPA 2020b and 2020c). Large quantity generators generate more than 1,000 kilograms of hazardous waste per month, or more than 1 kilogram per month of toxic or acutely toxic hazardous waste. In contrast small quantity generators generate between 100 kilograms and 1,000 kilograms per month of hazardous waste (EPA 2020d). It is anticipated that the designation for the Paradise Fossil Plant will change due to the recent shutdown of Paradise coal-fired Unit 3.

Historically, CCRs were the primary solid waste produced at the coal-fired units at the Paradise and Colbert reservations. However, as these units have been retired, the amount of solid waste generated at the reservations has decreased. The unique solid waste concerns for gas- and oil-fired plants are the byproducts from emission controls. The solid waste produced from these controls is dependent upon the specific control technology implemented and is not anticipated to be considerable (Brown et al. 2017). Other hazardous wastes currently generated at these sites include waste paint, waste paint solvents, paper insulated lead cable, debris from sandblasting and scraping paint chips, solvent rags used to clean equipment, and liquid-filled fuses (TVA 2019b).

Maintenance of the existing TL ROWs and natural gas pipeline ROWs may generate solid waste such as vegetative wastes (limbs, tree trunks, and resulting mulch) and domestic solid waste (trash, refuse). Small amounts of hazardous waste generated during the maintenance of the equipment including waste oils, coolant/anti-freeze, chemical waste from cleaning operations, parts washer liquids, and other waste petroleum products. Use of herbicides would result in waste containers, unused herbicide products, outdated herbicides, and other vegetation control chemicals requiring proper disposal (TVA 2019d).

3.17.2 Environmental Consequences

3.17.2.1 Alternative A – No Action Alternative

Under the Alternative A, TVA would continue to generate solid and hazardous wastes from its current operations. These wastes would be managed in accordance with current TVA procedures and state and federal regulations. Therefore, no impacts to solid waste and hazardous waste generation are anticipated.

3.17.2.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

Construction of the CT plant at Paradise would generate non-hazardous solid waste, including concrete, land clearing and stabilizing debris, metals, plastic, wood, packing materials, scrap metals, and non-hazardous used oil and lubricants. All non-hazardous waste from construction activities would be disposed of in accordance with applicable regulations and TVA's procedures, which include recycling where possible.

Construction activities would result in a potential increase in generation of hazardous waste. Various hazardous wastes, such as waste paints, coating and adhesive wastes, and spent solvents, could be produced during construction. These wastes would be temporarily stored in properly managed hazardous waste storage areas onsite. Appropriate spill prevention, containment, and disposal requirements for hazardous wastes would be implemented to protect construction and plant workers, the public, and the environment. A

permitted hazardous waste disposal facility would be used for ultimate disposal of the wastes.

Installation of the new combustion engine at the offsite compressor station would occur on a previously developed paved and graveled site. Minor quantities of solid and hazardous waste associated with installation would be handled in accordance with established federal and state regulations. Similarly, given the limited magnitude of the proposed offsite TL upgrades associated with the Paradise CT plant, only minor amounts of solid and hazardous waste would be produced during upgrade activities. Onsite and offsite construction activities associated with the construction of the CT plant at the Colbert Reservation and the offsite TL upgrades would be similar to those described for construction of the CT plant at the Paradise Reservation. Because CT plants produce very small quantities of solid waste during normal operation, the generation of solid and hazardous waste during operations would be similar to the current waste generation rates. Operation of the new engine at the offsite compressor station to support the CT plant at Paradise would require installation of two new aboveground storage tanks for lubricating oil. The commercial gas company and its contractors will implement measures identified in their established Spill Prevention and Response Procedures Plan to prevent and contain accidental spills of any material, and to ensure that inadvertent spills of fuels, lubricants, coolants, or solvents are contained, cleaned up, and disposed of in an appropriate manner. Therefore, operation of the offsite compressor station would not result in releases of hazardous and solid waste.

With respect to hazardous waste generator categories, depending on the volume produced and/or amount accumulated/stored in a calendar month, there are various requirements pertaining to hazardous waste management. Such requirements include but are not limited to waste identification and notification, satellite accumulation areas, container storage requirements, preparedness and prevention measures, used oil management, universal waste management, recordkeeping and reporting, personnel training, and emergency response requirements. Solid and hazardous wastes generated during construction and operation of the CT plants at Paradise and Colbert would be managed in accordance with established procedures and applicable regulations. Therefore, no significant impacts are anticipated as a result of the solid waste and hazardous waste generation from the Paradise and Colbert CT plant project.

3.18 Socioeconomics and Environmental Justice

3.18.1 Affected Environment

The study areas for socioeconomic and environmental justice analysis are defined as any census block group that falls within a 5-mile radius of the proposed Paradise or Colbert CT plant project areas. The Paradise CT plant study area includes portions of Muhlenberg, Ohio, and Butler counties in western Kentucky. The offsite natural gas compressor would also be located in Muhlenberg County, but outside the designated 5-mile radius. Therefore, demographic data for the single block group encompassing the compressor station is also included in the following analysis. The Colbert CT plant study area, which encompasses the offsite natural gas lateral tie-in south of the reservation, includes portions of Colbert and Lauderdale counties in northwestern Alabama. Comparisons at multiple spatial scales provide a more detailed characterization of populations that may be affected by the proposed actions, including any environmental justice populations (e.g., minority and low-income). Demographic and economic characteristics of populations within the study areas

were assessed using the 2014-2018 American Community Survey 5-year estimates provided by the U.S. Census Bureau (USCB) (USCB 2020a).

Two existing TLs would be upgraded to support development of the CT plant at Paradise, while four existing TLs would be upgraded to support CT plant development at Colbert. These six TL segments span Muhlenberg and Todd counties in Kentucky; Montgomery, Sumner, Wilson, Hardin, Wayne, and Lawrence counties in Tennessee; and Lauderdale, Colbert, and Morgan counties in Alabama. Due to the nature of the proposed upgrades, which would be limited to existing TL ROW, demographic data was not assessed along each TL segment at the block group level. However, the presence of minority and low-income populations along the TL segments was assessed using the EPA's EJSCREEN tool, as detailed in Section 3.18.1.3.

3.18.1.1 Demographic and Economic Conditions

Demographic and economic characteristics of the Paradise and Colbert CT plant study areas and of the secondary reference geographies are summarized in Table 3-26.

The block groups that make up the Paradise CT plant study area have a combined resident population of 9,283, which accounts for just 0.2 percent of the total population of the state of Kentucky. The study area is very rural and population centers are limited to the small towns of Drakesboro, Rochester, and Rockport. Since 2010, the study area has experienced a slightly higher growth rate (with a population increase of 3.1 percent) than the overall population changes experienced at the county and state levels. Almost 96 percent of the Paradise study area population is white; correspondingly, minority populations are relatively small. Minority percentages in the study area are generally comparable to those of the surrounding counties and are somewhat lower than those of the state of Kentucky (Table 3-26).

The average median household income in the block groups that make up the Paradise CT plant study area is \$42,409, which is in line with the median household income reported for the surrounding counties (ranging from \$40,061 to \$43,110) but lower than that of the state of Kentucky (\$48,392) (Table 3-26). The percentage of the study area population falling below the poverty level (19.1 percent) is also relatively consistent with the comparison geographies, where 17.4 to 20.5 percent of the population lives below the poverty level. The total civilian labor force within the block groups that make up the Paradise CT plant study area is 4,285, with the unemployment rate at 11.1 percent. This unemployment rate is noted to be higher relative to the unemployment rates of Muhlenberg, Ohio, and Butler counties (ranging from 6.0 to 9.1 percent), and the state of Kentucky (6.1 percent) (Table 3-26).

Table 3-26. Demographic and Socioeconomic Characteristics of CT Plant Study Areas and Reference Geographies

	Paradise CT Plant Study Area (Block Groups within 5-Mile Radius)	Muhlenberg County, Kentucky	Ohio County, Kentucky	Butler County, Kentucky	State of Kentucky	Colbert CT Plant Study Area (Block Groups within 5-Mile Radius)	Colbert County, Alabama	Lauderdale County, Alabama	State of Alabama
Population^{1,2}									
Population, 2018 estimate	9,283	31,081	24,071	12,745	4,440,204	12,768	54,495	92,585	4,864,680
Population, 2010	9,001	31,499	23,842	12,690	4,339,367	12,647	54,428	92,709	4,779,736
Percent Change 2010-2018	3.1%	-1.3%	1.0%	0.4%	2.3%	1.0%	0.1%	-0.1%	1.8%
Persons under 18 years, 2018	21.7%	20.5%	24.5%	22.3%	22.8%	22.2%	21.3%	20.0%	22.6%
Persons 65 years and over, 2018	16.5%	18.2%	17.7%	17.7%	15.6%	20.2%	19.3%	19.3%	16.1%
Racial Characteristics¹									
Not Hispanic or Latino									
White alone, 2018 (a)	95.8%	92.1%	94.4%	94.9%	84.8%	85.5%	78.7%	84.8%	65.7%
Black or African American, 2018 (a)	2.2%	4.6%	0.9%	0.3%	7.9%	8.1%	15.7%	9.9%	26.4%
American Indian and Alaska Native, 2018 (a)	0.4%	0.2%	0.0%	0.2%	0.2%	0.2%	0.7%	0.5%	0.5%
Asian, 2018 (a)	0.1%	0.6%	0.3%	0.2%	1.4%	0.6%	0.4%	0.7%	1.3%
Native Hawaiian and Other Pacific Islander, 2018 (a)	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%	0.1%	0.1%	0.0%
Some Other Race alone, 2018 (a)	0.2%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.2%
Two or More Races, 2018	1.1%	0.9%	1.0%	1.2%	2.0%	1.6%	1.9%	1.4%	1.7%
Hispanic or Latino, 2018	0.2%	1.5%	3.4%	3.2%	3.6%	3.8%	2.5%	2.6%	4.2%
Income and Employment¹									
Median household income, 2018	\$ 42,409	\$ 43,110	\$ 42,826	\$ 40,061	\$ 48,392	\$ 49,415	\$ 47,558	\$ 46,265	\$ 48,486
Persons below poverty level, 2018	19.1%	17.4%	20.5%	19.4%	17.9%	15.1%	16.3%	15.2%	17.5%
Persons below low-income threshold, 2018 (b)	45.6%	41.6%	44.1%	45.4%	37.7%	38.0%	36.8%	37.3%	37.8%
Civilian Labor Force, 2018	4,285	12,921	10,594	5,404	2,087,800	5,272	23,833	42,397	2,224,606
Percent Employed, 2018	88.9%	91.1%	90.9%	94.0%	93.9%	90.8%	94.1%	94.7%	93.4%
Percent Unemployed, 2018	11.1%	8.9%	9.1%	6.0%	6.1%	9.2%	5.9%	5.3%	6.6%

(a) Includes persons reporting only one race.

(b) Low-income threshold is defined as two times the poverty level

Sources: ¹USCB 2020a; ²USCB 2011

The offsite existing compressor station where a compressor would be constructed to provide additional natural gas supply to the CTs at Paradise is located in a rural area of Muhlenberg County, outside the 5-mile study area radius. The block group that encompasses the compressor station has a resident population of 752, though there are no residences within one mile of the compressor station. There is no minority population in this block group, as 100 percent of the population identifies as white. The median household income in the block group is \$48,542, which is higher than that of Muhlenberg County and comparable to the state of Kentucky. Only 10.6 percent of the population of the compressor station block group falls below the poverty level, and the unemployment rate (5.6 percent) is somewhat lower than in the county and the state.

The block groups that make up the Colbert CT plant study area are also predominantly rural and have a combined resident population of 12,768, accounting for approximately 0.3 percent of the total population of the state of Alabama. Most residential development is located toward the eastern end of the study area, near the city of Tusculumbia, or along US 72 which runs south of the Colbert Reservation. Since 2010, the study area has experienced a population increase of approximately 1.0 percent, slightly lower than the growth rate of Alabama as a whole (1.8 percent), but greater than that of Colbert and Lauderdale counties, which essentially stayed the same. Approximately 86 percent of the Colbert study area population is white, with Black or African American comprising the largest minority population, followed by Hispanic or Latino. Minority percentages in the study area are generally slightly lower than those of the surrounding counties and the state of Alabama (Table 3-26).

The average median household income in the block groups that make up the Colbert CT plant study area is \$49,415, which is slightly higher than the median household income reported for the surrounding counties and the state (ranging from \$46,265 to \$48,486) (Table 3-26). Correspondingly, the percentage of the study area population falling below the poverty level (15.1 percent) is on the low end of the spectrum when compared to the larger geographies, where 15.2 to 17.5 percent of the population lives below the poverty level. The total civilian labor force within the block groups that make up the Colbert CT plant study area is 5,272, with the unemployment rate at 9.2 percent. This unemployment rate is noted to be higher relative to the unemployment rates of Colbert and Lauderdale counties (5.9 and 5.3 percent, respectively), and the state of Alabama (6.6 percent) (Table 3-26).

3.18.1.2 Community Facilities and Services

Community facilities and services include public or publicly funded facilities such as police protection and other emergency services (ambulance/fire protection), schools, hospitals and other health care facilities, libraries, day care centers, churches, and community centers. To identify facilities and emergency services that could be potentially impacted by proposed project activities, the study area is identified as the service area of various providers, where applicable, or the area within a 5-mile radius of each project boundary.

Based on a review of aerial imagery and online information including the U.S. Geological Survey (USGS) Geographic Names Information System database (USGS 2020a), community facilities and services available within a 5-mile radius of the Paradise CT plant project area include nine churches, 11 cemeteries, two post offices, and an elementary school. The project area is also served by the Drakesboro Fire Department and the Rochester Volunteer Fire Department. No community facilities are located in close proximity (within 0.5 mile) of the Paradise Reservation.

Community facilities and services available within a 5-mile radius of the Colbert CT plant project area include 12 churches and 20 cemeteries. Two of these churches and one cemetery are located within 0.5 mile of the Colbert Reservation. Additional services, including schools, health care facilities, and emergency services, are located at distances slightly greater than 5 miles, in the cities of Cherokee to the west and Tuscumbia to the east.

3.18.1.3 Environmental Justice

On February 11, 1994, President Clinton signed EO 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. EO 12898 mandates some federal-executive agencies to consider environmental justice as part of the NEPA. Environmental justice has been defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income (EPA 2018) and ensures that minority and low-income populations do not bear disproportionately high and adverse human health or environmental effects from federal programs, policies, and activities. Although TVA is not one of the agencies identified in this order, TVA routinely considers environmental justice impacts as part of the project decision-making process.

Guidance for addressing environmental justice is provided by the CEQ Environmental Justice Guidance under NEPA (CEQ 1997). The CEQ defines minority as any race and ethnicity, as classified by the USCB, that is: Black or African American; American Indian or Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; some other race (not mentioned above); two or more races; or a race whose ethnicity is Hispanic or Latino (CEQ 1997).

Identification of minority populations requires analysis of individual race and ethnicity classifications as well as comparisons of all minority populations in the region. Minority populations exist if either of the following conditions is met:

- The minority population of the impacted area exceeds 50 percent of the total population.
- The ratio of minority population is meaningfully greater (i.e., greater than or equal to 20 percent) than the minority population percentage in the general population or other appropriate unit of geographic analysis (CEQ 1997).

The nationwide poverty level is determined annually by the USCB and varies by the size of family and number of related children under 18 years of age. The 2019 USCB Poverty Threshold for an individual is an annual income of \$13,300, and for a family of four it is an annual household income of \$26,370 (USCB 2020b). For the purposes of this assessment, low-income individuals are those whose annual household income is less than two times the poverty level. More encompassing than the base poverty level, this low-income threshold, also used by the EPA in their delineation of low-income populations, is an appropriate measure for environmental justice consideration because current poverty thresholds are often too low to adequately capture the populations adversely affected by low-income levels, especially in high-cost areas (EPA 2017). According to EPA, the effects of income on baseline health and other aspects of susceptibility are not limited to those below the poverty thresholds. For example, populations having an income level from one to two times the poverty level also have worse health overall than those with higher incomes

(Centers for Disease Control and Prevention 2011). A low-income environmental justice population exists if either of the following two conditions is met:

- The low-income population exceeds 50 percent of the total population.
- The ratio of low-income population significantly exceeds (i.e., by greater than or equal to 20 percent) that of the general population or other appropriate geographic areas of analysis.

Based on a preliminary review of the EPA's EJSCREEN tool, the proposed CT plant project areas are not located in areas with high concentrations of environmental justice populations; in particular, minority populations make up relatively small percentages of the total population in each study area. A more detailed evaluation was completed using the 2014-2018 American Community Survey data to identify whether any specific block groups within the vicinity of the proposed CT plant project areas exceed environmental justice thresholds. Figure 3-11 identifies the block groups within the Paradise and Colbert CT plant study areas that meet the specified criteria as environmental justice minority populations or low-income populations.

Total minority populations (i.e., all non-white and Hispanic or Latino racial groups combined) comprise approximately 15 percent of the population of Kentucky and approximately 5 to 8 percent of the population in the three counties encompassing the Paradise CT plant study area. The study area as a whole has a total minority percentage of 4.2 percent, with percentages for individual block groups ranging from 0 to 13.2 percent of the population. Thus, none of the block groups within the Paradise CT plant study area have minority populations that either exceed 50 percent of the total population or significantly exceed the minority percentage of any of the reference geographies. Therefore, they do not meet the criterion for consideration as minority population groups subject to environmental justice considerations.

The percentage of the population of Kentucky living below the low-income threshold is approximately 38 percent, while Muhlenberg, Ohio, and Butler County percentages are slightly higher, ranging from 41.6 to 45.4 percent. Approximately 46 percent of people living within the Paradise CT plant study area are considered low-income, with percentages for individual block groups ranging from 14.7 to 56.9 percent of the population. Three of the Paradise CT plant study area block groups have low-income populations that either exceed 50 percent of the total population or significantly exceed the low-income percentage of one or more of the reference geographies. Figure 3-11 identifies these block groups determined to meet the criterion for consideration as low-income population groups subject to environmental justice considerations.

There are no minority populations in the block group that encompasses the offsite compressor station associated with the Paradise CT plant development, as 100 percent of the population identifies as white. Approximately 25 percent of people living within the block group are considered low income. As this percentage does not exceed 50 percent of the total population and is lower than the low-income percentages of the reference geographies, the compressor station block group does not meet the criterion for consideration as either a minority or low-income population group subject to environmental justice considerations.

The study area surrounding the Paradise CT plant is rural and sparsely populated. As specific demographic information is not available below the block group level, TVA initiated

input from TVA public relations personnel and current and former plant employees to evaluate the potential for the presence of small communities that may be subject to environmental justice considerations within the area. No communities were identified.

Total minority populations comprise approximately 34 percent of the population of Alabama, 21 percent of the population in Colbert County, and 15 percent of the population in Lauderdale County. The Colbert CT plant study area as a whole has a total minority percentage of 14.5 percent, with percentages for individual block groups ranging from 3.5 to 28.9 percent of the population. As none of the block groups within the Colbert CT plant study area have minority populations that either exceed 50 percent of the total population or significantly exceed the minority percentage of any of the reference geographies, they do not meet the criterion for consideration as minority population groups. However, because specific demographic information is not available below the block group level, there may be smaller, minority populations that are not identified via this method of analysis. For example, the Red Rock/Barton community, located southwest of the plant in the vicinity of US 72 and Red Rock Road, is a predominantly Black community that has engaged with TVA in the past regarding activities at the Colbert Fossil Plant. Based on the proximity of this community to the plant, it has been included in TVA's analysis as a sensitive minority and/or low-income population subject to environmental justice considerations. In addition, TVA conducted additional investigation to determine if any other smaller communities that may require special consideration were present. No additional communities were identified.

The percentage of the population of Alabama living below the low-income threshold is approximately 38 percent, while both Colbert and Lauderdale counties have low-income percentages of approximately 37 percent. In line with these reference geographies, 48 percent of people living within the Colbert CT plant study area are considered low income, with percentages for individual block groups ranging from 9.4 to 55.7 percent of the population. Just one of the Colbert CT plant study area block groups has a low-income population that either exceeds 50 percent of the total population or significantly exceeds the low-income percentage of one or more of the reference geographies. Figure 3-11 identifies the block group determined to meet the criterion for consideration as a low-income population group.

Based on a review of the EJSCREEN tool, communities encompassing the six offsite TL segments that would be upgraded in association with the Paradise and Colbert CT plants are a mixture of block groups; some of which meet the criteria for consideration as minority and/or low-income populations and others do not. The TL corridors span both rural and urban/suburban areas. Minority populations tend to be highest in larger cities and population centers, while low-income populations are more evenly dispersed, found in both rural and urban areas.

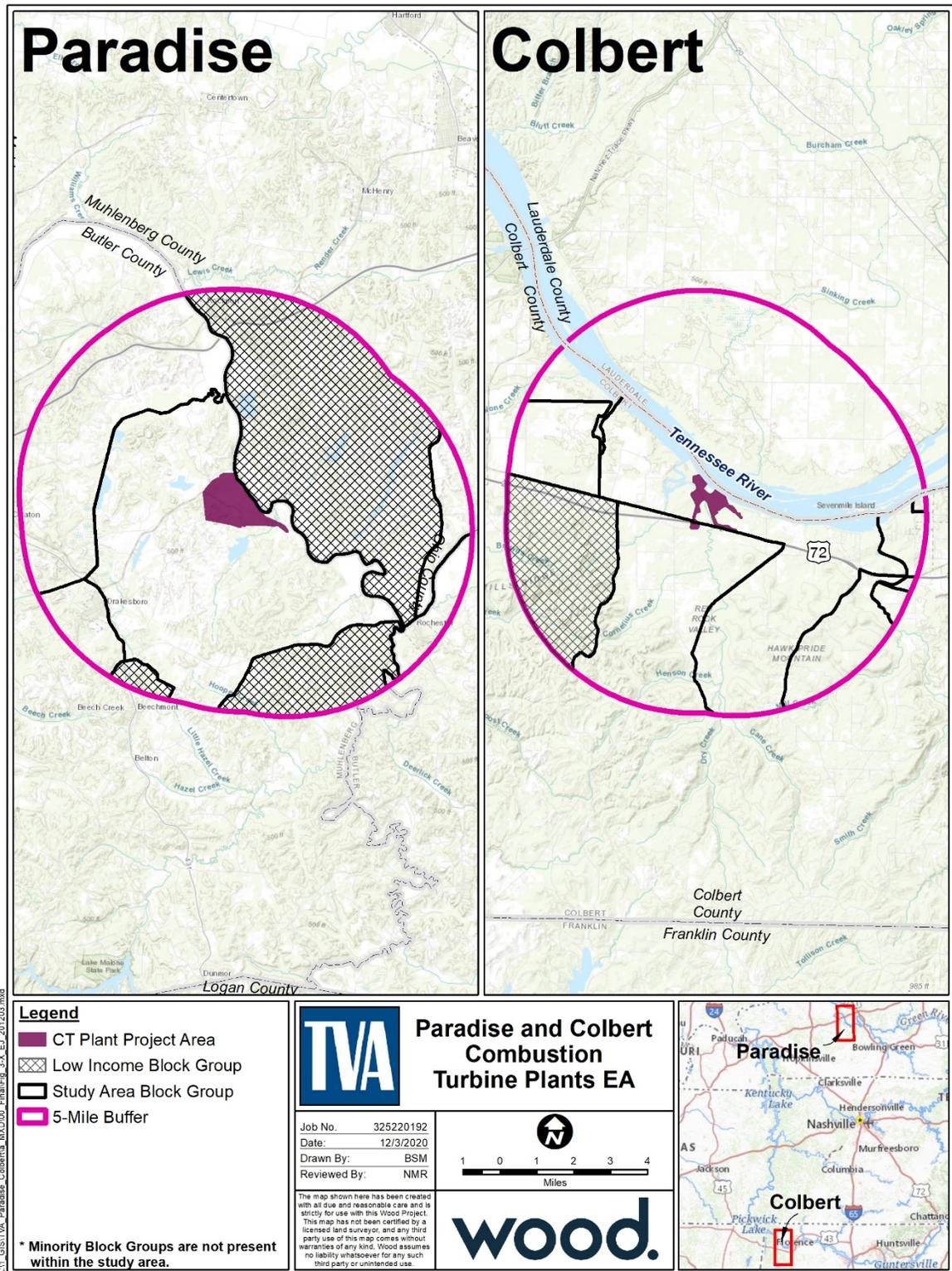


Figure 3-11. Environmental Justice Populations Within the Paradise and Colbert CT Plant Study Areas

3.18.2 Environmental Consequences

3.18.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not construct the proposed CT plants at the Paradise or Colbert reservations. Therefore, there would be no change in local demographics, economic conditions, or community services, and there would be no impacts to environmental justice populations associated with the proposed actions.

3.18.2.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

3.18.2.2.1 Demographic and Economic Impacts

As described in Chapter 2, construction of the CT plant at Paradise would take approximately two years and would require a temporary workforce of approximately 180 people at the peak of construction. Workers could be drawn from the labor force that currently resides within the surrounding counties and specialty workers and laborers not available within the area would be expected to temporarily relocate or commute to the project area for the duration of the construction period. However, given that the maximum number of workers needed for construction at Paradise would equate to just 7.6 percent of the unemployed civilian workforce in Muhlenberg, Ohio, and Butler counties, it is likely that most of the workers could be drawn from the existing labor force. This, in combination with the short construction timeframe, indicates that construction activities would not result in any permanent population increase in the region.

Construction activities associated with the Paradise CT plant would entail a temporary increase in employment and associated payrolls which would result in a minor short-term direct positive impact to employment in the region. Indirect impacts related to the purchases of materials and supplies, and the multiplier effect of increased spending in the local economy would be beneficial, but minor, given the short construction period.

The proposed upgrades to the offsite compressor station would be minor and would be completed by the existing workforce of the commercial supplier. Therefore, there would be no impacts to local demographics and employment.

Following construction, permanent staffing associated with the operation of the CT plant at Paradise is expected to require four to six personnel. Due to the small number of new staff that would be integrated into the existing workforce, long-term impacts to employment would be minimal.

Onsite construction activities associated with the proposed Colbert CT plant would be similar to those at Paradise, requiring a peak workforce of approximately 180 personnel over the approximately two-year construction period. As the maximum number of workers needed at Colbert would equate to 4.9 percent of the unemployed civilian workforce in Colbert and Lauderdale counties, it is expected that most workers could be drawn from the labor force that currently resides within the surrounding counties. Therefore, impacts to local demographics and employment associated with construction activities would be beneficial and minor. Following construction, operation of the CT plant at Colbert would also require approximately four to six additional personnel, resulting in minimal long-term employment impacts. Temporary economic benefits associated with construction would be the same as those noted for Paradise, as capital costs are estimated to be similar.

In addition, construction of a new offsite natural gas lateral tie into the main distribution pipeline south of the Colbert CT plant site would require the acquisition or amendment of ROW easements from owners of two parcels impacted by the proposed pipeline installation. A commercial supplier would purchase an easement from the landowner, giving the supplier the right to construct, operate, and maintain the pipeline across the property owner's land. Current landowners would be compensated for the value of such rights. Given the relatively minor acquisitions, the direct and indirect local economic effect from the purchase easements would be minor relative to the total regional economy.

Offsite TL modifications, associated with the proposed Paradise CT plant, would entail the use of small mobile crews comprised of contractors and/or full-time TVA staff. Due to the linear nature of the TLs, the construction workforce would be transient as work progresses along the TL segments. There would be no notable effects on local demographics or employment due to the relatively small workforce needed for offsite TL modifications and the short-term presence of work crews in any given location.

3.18.2.2.2 Community Facilities and Services

Direct impacts to community facilities occur when a community facility is displaced or access to the facility is altered. Construction of the proposed CT plants and supporting onsite components at Paradise and Colbert would not result in the displacement of any community facilities nor impede access to the facilities. The natural gas compressor needed to support the CT plant at Paradise would be constructed at an existing compressor station. The offsite natural gas pipeline and lateral tie-in for Colbert would not involve the displacement or alteration of access for any community facilities. Similarly, offsite TL modifications associated with both of the proposed CT plants would take place within the existing ROW corridor and, therefore, there would be no direct impacts to community facilities or services under Alternative B.

Indirect impacts occur when a proposed action or project results in a population increase that would generate greater demands for services and/or affect the delivery of such services. In the event of an emergency at either the Paradise or Colbert CT plant sites, local law enforcement, fire, and/or EMS response would likely be required. However, given the relative magnitude of the proposed CT plants and TVA's adherence to stringent workplace health and safety regulations, implementation of the Alternative B would not result in appreciable increases in emergency incidents and thus would not have a notable impact on the demand for emergency services in the area. As neither the offsite natural gas upgrades associated with each of the proposed plants, nor the TL modifications and maintenance would result in notable impacts to local demographics, increased demands for services such as schools, churches, and healthcare facilities are not anticipated.

3.18.2.2.3 Environmental Justice

As indicated in Figure 3-11, three block groups within the Paradise CT plant study area meet the criteria for consideration as low-income populations under EO 12898, the closest of which is located across the Green River to the northeast. However, onsite actions would be limited to specific activities located within the boundary of the proposed CT plant project area, at distances of 1.5 miles or more from the closest residences. Due to distance, there would be no direct impacts to the surrounding communities or environmental justice populations associated with the construction of the CT plant. Environmental justice communities identified within the study area may experience impacts from noise and dust associated with increased workforce traffic on local roads during the construction period,

but this would be temporary and minor as the workforce would disperse at distances further from the reservation. In addition, this impact would not be disproportionate as impacts would be consistent across all communities (i.e., environmental justice and non-environmental justice) along the local roadways.

As described in Section 3.1 (Air Quality), operation of the CT units at Paradise would result in a net decrease of emissions of regulated pollutants and local emissions of air pollutants that would be below the NAAQS, which are designated to protect public health and welfare. Minor impacts to air quality associated with operation of the CT units would be borne primarily by the population within the study area, consisting of the census block groups within a 5-mile radius of the proposed CT plant. As shown in Figure 3-11, the study area population consists of both communities that meet the criteria for consideration as environmental justice communities, and those that do not, dispersed at various distances from the proposed CT plant site. In addition, as noted in Table 3-26, only 4.2 percent of the Paradise study area population belongs to a minority group and 45.6 percent of the population considered low-income. Thus, the vast majority of the study area population is non-minority, and more than half are above the low-income threshold. Therefore, while operation of the CT plant would result in localized emissions that would be dispersed throughout the study area, the impact of those emissions would not be disproportionate on any of the communities in the study area and those emissions also would not have significant adverse air quality impacts on communities within the study area.

The new offsite natural gas compressor needed to provide the additional natural gas supply to the CTs at Paradise would be constructed at an existing compressor station approximately 18 miles west of the Paradise Reservation. As operation of the new compressor would be consistent with operation of the existing facility, and there is no residential land use within one mile of the existing compressor station, there would be no impact to local communities or environmental justice populations.

Based on a review of EJSCREEN, communities encompassing the proposed TL upgrades associated with the Paradise CT plant are a mixture of those that meet the criteria for consideration as minority and/or low-income populations, and those that do not. Impacts to communities adjacent to the existing TL ROW may experience temporary impacts such as noise and fugitive dust while modifications are being completed. However, these impacts would be temporary and minor and would not be disproportionate as impacts would be consistent across all communities (i.e., environmental justice and non-environmental justice) along the TL segments.

One block group within the Colbert CT plant study area, identified in Figure 3-11, meets the criteria for consideration as a low-income population. In addition, a sensitive minority and/or low-income population subject to environmental justice considerations was identified in the Red Rock/Barton community, located in the block group directly south of the plant, in the vicinity of the US 72 and Red Rock Road intersection. As described above, there would be no direct impacts to either of these communities in association with construction of the CT plant, due to distance from the proposed plant site.

The Red Rock/Barton community, located southwest of the plant in the vicinity of US 72 and Red Rock Road, is a sensitive minority and/or low-income population subject to environmental justice considerations. Based on the proximity of this community to the Colbert Fossil plant, members of the community may experience traffic delays during the morning and evening commute. However, as described in Section 3.14.2, traffic delays

within the vicinity of the plant would be minimized by the use of appropriate traffic controls and would be minor. Construction workforce traffic at Colbert would peak at approximately 180 personnel and indirect noise impacts associated with an increase in traffic related to workforce vehicle traffic may be experienced by sensitive noise receptors along affected roadways. Based on the proximity of this community to the Colbert Fossil plant, members of the community may experience increased traffic noise during morning and evening commutes during the construction period. However, these impacts would be temporary and minor and would not be disproportionate as impacts would be consistent across all communities (i.e., environmental justice and non-environmental justice) along affected roadways.

Air emissions associated with the operation of the CT plant at Colbert would be in compliance with PSD requirements, which ensure there is no significant impact to or deterioration of air quality due to the proposed project. Minor localized impacts to air quality associated with operation of the CT plant at Colbert would be experienced in the study area, consisting of the population groups within a 5-mile radius of the proposed CT plant. As noted in Table 3-26, 14.5 percent of the Colbert study area population belongs to a minority group and 38.0 percent of the population are considered low-income. Air quality impacts would be minor and would be dispersed throughout the study area population groups, many of which do not meet the criteria to be an environmental justice community. Impacts of the air emissions on the minority and low income populations would not be disproportionate and those emissions also would not have significant adverse air quality effects on communities within the study area.

As described throughout this EA, operation of the proposed CT plant would not have a significant impact on solid and hazardous waste generation or public health and safety. Therefore operation of the CT plants would not result in a disproportionate impact to environmental justice communities in the vicinity of the proposed Paradise or Colbert CT plants project area. The construction of a new natural gas lateral tie-in to the main distribution pipeline, just south of the Colbert Reservation, may also result in localized impacts to nearby residences during the construction period from increased workforce traffic on local roads and noise and dust generated during the construction period. However, this impact would be temporary, minor, and limited to a small number of residences outside the identified low-income block groups.

As a review of EJSCREEN indicated that the communities encompassing the proposed TL upgrades associated with the Colbert CT plant consist of both environmental justice and non-environmental justice populations, impacts associated with offsite TL upgrades would be the same as those described in association with the Paradise CT plant. Therefore, offsite impacts associated with the Colbert CT plant would have no disproportionate adverse impacts on environmental justice populations.

3.19 Public Health and Safety

3.19.1 Affected Environment

Workplace health and safety regulations are designed to eliminate personal injuries and illnesses from occurring in the workplace. These laws may comprise both federal and state statutes. The Occupational Safety and Health Act of 1970 (OSHA) (Title 29 CFR Part 1910) (29 CFR 1910) is the main statute protecting the health and safety of workers in the workplaces. A related statute, 29 CFR 1926, contains health and safety regulations specific to the construction industry. The Kentucky-specific regulations adopted by the Kentucky

Occupational Safety and Health (OSH) Standards Board or the Kentucky Labor Cabinet supersede federal OSHA standards. The Kentucky OSH Program, under the statutory authority of KRS Chapter 338 (338.011 to 338.991) and through a state plan approved by the U.S. Department of Labor, OSHA, maintains authority for enforcement, standards promulgation, onsite consultation, and training services related to job safety and health. The official regulations (803 KAR 2:015 through 2:505 (containing both general industry and construction industry) are maintained by the Legislative Research Commission. The state of Alabama does not have a state OSHA plan; however, workers are protected under the federal OSHA. Additionally, the Pipeline Inspection, Protection, Enforcement, and Safety Act of 2006 contains health and safety regulations to confirm the commitment to the Integrity Management Program (IMP) and other programs enacted in the 2002 legislation (Pipeline Safety Improvement Act of 2002) for natural gas pipelines.

TVA has a robust safety conscious culture that is focused on awareness and understanding of workplace hazards, prevention, intervention, and active integration of BMPs to avoid and minimize hazards. General guidelines for workplace safety that are communicated to work crews include the following:

- Pre-Job Brief – allows the worker to think through a job and use that knowledge to make the job as safe as possible
- Two-Minute Rule (situational awareness) – take time before starting a job to familiarize yourself with the work environment and to identify conditions that were not identified during the pre-job brief
- Stop When Unsure – when confronted with a situation that creates a question and what to do is uncertain, stop and get help
- Self-Check – use of “STAR” acronym to promote self-check awareness: Stop and focus, Think what will happen with right or wrong action, Act correctly, Review that the results are as expected
- Procedure Use and Adherence – allows for proper application of procedures and work packages based on expected activities
- Flagging and Operational Barriers – key to ensure control of the work zones and avoidance of exposure to work hazards by public
- Three-Way Communication – essential for all job tasks to ensure they are completed safely and productively.

The routine operations and maintenance activities at the Paradise and Colbert Plants reflect a safety conscious culture and are performed consistent with OSHA and applicable state standards and requirements and specific TVA guidance. TVA’s Safety Standard Programs and Processes would be strictly adhered to during the proposed actions. The safety programs and processes are designed to identify actions required for the control of hazards in all activities, operations, and programs. It also establishes responsibilities for implementing OSHA and state requirements.

It is TVA’s policy that contractors have a site-specific health and safety plan in place prior to conducting construction activities at TVA properties. The contractor site-specific health and safety plans address the hazards and controls as well as contractor coordination for various construction tasks. A health and safety plan would also be required for workers responsible for operations after construction is complete.

Health hazards are also associated with emissions and discharges from the facility as well as accidental spills/releases at the plant and/or along the pipelines. An emergency response plan developed to address these potential discharges is discussed with local emergency management agencies. These programs are audited by TVA no less than once every three years and by EPA periodically. These mitigative measures are used to ensure protection of human health which includes the workplace, public, and the environment.

Additionally, wastes generated by operations at Paradise and Colbert can pose a health hazard. Wastes including solid wastes, hazardous waste, liquid wastes, discharges, and air emissions are managed in accordance with applicable federal, state, and local laws and regulations and all applicable permit requirements. Furthermore, waste reduction practices are employed including recycling and waste minimization. TVA is committed to complying with all applicable regulations, permitting, and monitoring requirements.

TLs, like all other types of electrical wiring, generate both electric and magnetic fields (EMFs). The voltage on the conductors of a TL generates an electric field that occupies the space between the conductors and other conducting objects such as the ground, TL structures, or vegetation. A magnetic field is generated by the current (i.e., the movement of electrons) in the conductors. The strength of the magnetic field depends on the current, the design of the line, and the distance from the line. Most of this energy is dissipated on the ROW, and the residual very low amount is reduced to background levels near the ROW or energized equipment.

Magnetic fields can induce currents in conducting objects. Electric fields can create static charges in ungrounded, conducting materials. The strength of the induced current or charge under a TL varies with: (1) the strength of the electric or magnetic field, (2) the size and shape of the conducting object, and (3) whether the conducting object is grounded. Induced currents and charges can cause shocks under certain conditions by making contact with objects in an electric or magnetic field.

The existing offsite TLs have been designed to minimize the potential for such shocks. This is done, in part, by maintaining sufficient clearance between the conductors and objects on the ground. Stationary conducting objects, such as metal fences, pipelines, and highway guardrails that are near enough to the TL to develop a charge (typically these are objects located within the ROW) would be grounded by TVA to prevent them from being a source of shocks.

3.19.2 Environmental Consequences

3.19.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would continue to apply the safety-conscious culture and activities currently performed in accordance with applicable standards or specific TVA guidance. TVA would continue to address and manage reduction or elimination of occupational hazards through implementation of safety practices, training, and control measures. Through its safety programs, TVA fosters a culture of safety-minded employees, extending to activities which are conducted offsite and, as such, impacts would be minimal.

3.19.2.2 Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert

Construction and operation of the CT units at the Paradise and Colbert reservations, natural gas supply upgrades, offsite natural gas compressor engine associated with the Paradise

CT unit, and TL upgrades would be performed consistent with standards as established by OSHA and state requirements as well as BMPs and TVA safety plans and procedures. During construction, customary industrial safety standards as well as the establishment of appropriate BMPs and job site safety plans would describe how job safety would be maintained during the project. These BMPs and site safety plans address the implementation of procedures to ensure that equipment guards, housekeeping, and personal protective equipment are in place; the establishment of programs and procedures for right-to-know, hearing conservation, equipment operations, excavations, grading, and other activities; the performance of employee safety orientations and regular safety inspections; and the development of a plan of action for the correction of any identified hazards. Construction debris and wastes would be managed in accordance with federal, state, and local requirements.

A commercial gas supplier would be constructing the 20-inch diameter underground natural gas pipeline at Colbert. A portion of the pipeline would be constructed using HDD. Contractors will continuously monitor operations during HDD activities at Colbert. The contractor would have readily available and strategically placed containment equipment to contain inadvertent releases of drilling fluid to waterbodies. Further, the inspector(s) would ensure that each individual involved in drilling operations is familiar with the locations of all spill containment equipment and the specific procedures for handling potential drilling fluid releases. Implementation of these measures would ensure that no unusual site safety risks would be expected from construction activities.

The operation of the proposed CT units at both the Paradise and Colbert reservations would adhere to TVA guidance and be consistent with standards established by OSHA and applicable state requirements. TVA would implement health and safety practices that would address and manage the reduction or elimination of occupational and public health hazards. Through its safety programs, TVA fosters a culture of safety-minded employees, extending to activities which are conducted offsite and, as such, impacts would be minimal.

The natural gas pipeline facilities would be designed, constructed, operated, and maintained in accordance with the U.S. Department of Transportation Minimum Federal Safety Standards (49 CFR Part 192). These regulations are intended to ensure adequate protection of the public from natural gas pipeline failures by specifying material selection and qualification, minimum design requirements, and protection from internal, external, and atmospheric corrosion. In addition, these regulations prescribe the minimum standards for operating and maintaining natural gas pipeline facilities. Long-term impacts resulting from a pipeline release during future operations are unlikely, but they would be minimized by adherence to these standards.

Under Alternative B, EMFs would continue to be produced along the length of the offsite TLs. The strength of the fields within and near the ROW varies with the electric load on the line and with the terrain. Nevertheless, EMF strength attenuates rapidly with distance from the line and is usually equal to local ambient levels at the edge of the ROW. Thus, public exposure to EMFs would be minimal and would not change from existing conditions. TVA would also work with property owners to move features located in the TL ROWs, such as sheds or storage buildings, that may interfere with the ability to operate the TL safely. Therefore, worker and public health and safety during project operation would be maintained and impacts would be minimal.

3.20 Cumulative Impacts

The CEQ regulations (40 CFR §§ 1500-1508) implementing the procedural provisions of the NEPA of 1969, as amended (42 USC § 4321 et seq.), define cumulative impact as:

“...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” (40 CFR § 1508.7).”

This definition of “cumulative impacts” was incorporated in TVA’s amended NEPA regulations that became effective on April 27, 2020. A cumulative impact analysis must consider the potential impact on the environment that may result from the incremental impact of a project when added to other past, present, and reasonably foreseeable future actions (40 CFR § 1508.7). Baseline conditions reflect the impacts of past and present actions. The impact analyses summarized in preceding sections are based on baseline conditions and, therefore, incorporate the cumulative impacts of past and present actions.

3.20.1 Geographic Area of Analysis

The appropriate geographic area over which past, present, and future actions could reasonably contribute to cumulative effects is variable and dependent on the resource evaluated. The cumulative impact analysis is based on the resources of potential concern and the geographic area in which potential adverse effects from site-specific activities have the potential to alter (degrade) the quality of the regional environmental resources.

The offsite proposed actions, including TL upgrades and construction of a natural gas compressor, involve temporary short-term construction with small crews of workers at specific sites along each TL corridor and at the existing compressor station. As impacts from these offsite actions are relatively minor, associated cumulative effects would be localized and negligible. Therefore, the appropriate geographic area of analysis is limited to the immediate Paradise and Colbert CT plant project areas and the respective vicinities (5-mile radius for many resources) surrounding them. The proposed CT plants, onsite components, and adjacent gas pipeline upgrades are within Muhlenberg County, Kentucky and Colbert County, Alabama. Therefore, these counties were used to define the geographic area of analysis for cumulative effects on air quality.

3.20.2 Identification of “Other Actions”

Past, present, and reasonably foreseeable future actions that are appropriate for consideration in this cumulative analysis are listed in Table 3-27 for the vicinity of the Paradise CT plant project area and in Table 3-27 for the vicinity of the Colbert CT plant project area. These actions were identified within the geographic areas of analysis as having the potential to, in aggregate, result in larger and potentially adverse impacts to the resources of concern.

Table 3-27. Summary of Past, Present, and Reasonably Foreseeable Future Actions in the Vicinity of the Paradise CT Plant Project Area

Action	Description	Timing and Reasonable Foreseeability
Closure of Units 1 and 2 at Paradise Fossil Plant	TVA closed Units 1 and 2 in April 2017.	Past
Construction and operation of the Paradise CC Plant	CC plant located on the Paradise Reservation that became operational in April 2017 with a generating capacity of 1,100 MW.	Past and Present
Closure of Unit 3 at Paradise Fossil Plant	TVA closed Unit 3 in February 2020.	Past
Closure of Ash Disposal Areas	Described in Paradise Fossil Plant CCR Management Operations EA (TVA 2017a).	Present
Deconstruction of the Paradise Fossil Plant (TVA 2020c)	Demolition and deconstruction of the Paradise Fossil Plant.	Present
Construction and Operation of Aeroderivative CTs at the Johnsonville Fossil Plant	Construction and operation of 500-650 MW of new aeroderivative CT units at the former Johnsonville Fossil Plant and Cumberland reservations	Reasonably Foreseeable
Retirement of Two Coal-Fired Units at the Cumberland Fossil Plant (CUF) and the Construction and Operation of Replacement Generation	Retirement and decommissioning of CUF and replacement of approximately 1,450 MW of new generation to recover the generation capacity lost from retirement of one CUF unit.	Reasonably Foreseeable
Wendell H. Ford Western Kentucky Parkway (WKP) Pavement Work	Pavement improvements to approximately 22 miles of WKP (6 miles within geographic area of analysis) from Rockport to Neafus in Ohio County, Kentucky, scheduled for fiscal year 2021 (Kentucky Transportation Cabinet 2020a).	Reasonably Foreseeable

Table 3-28. Summary of Past, Present, and Reasonably Foreseeable Future Actions in the Vicinity of the Colbert CT Plant Project Area

Action	Description	Timing and Reasonable Foreseeability
Closure of Colbert Fossil Plant	Unit 5 was idled in 2013. Colbert units 1 through 4 were retired in March of 2016, effectively closing the plant.	Past
Ash Impoundment Closure (TVA 2016c)	The 52-acre Ash Impoundment #4 at the Colbert Fossil Plant, which held 3.2 million cubic yards of CCR in the form of Fly Ash and Bottom Ash was closed in March 2018.	Past
Deconstruction of the Colbert Fossil Plant	Demolition and deconstruction of the Colbert Fossil Plant.	Past and Present
Colbert Ash Pond 4 Seismic Project	TVA is conducting initial planning to improve post-earthquake stability of a portion of the east dike of Ash Pond 4.	Reasonably Foreseeable
TL Upgrades associated with Colbert CT Plant	TVA has identified additional TL segments that may require upgrades or reconductor work as part of the Colbert CT plant project. The specific nature, timing, and location of the work is yet to be determined and will be considered in a future environmental review.	Reasonably Foreseeable
Expansion of Cherokee Industrial Landfill (ADEM 2020)	The Solid Waste Disposal Authority plans to expand the Cherokee Industrial Landfill (located one mile west of Colbert CT plant project area) from 56.35 to 64.44 acres.	Reasonably Foreseeable
Construction of solar farm in Cherokee, Alabama (Business Alabama 2020)	Development of 2,500-acre solar farm approximately three miles from the Colbert CT plant project area in Cherokee, Alabama in 2021.	Reasonably Foreseeable

Actions that are listed as having a timing that is “past” or “present” inherently have environmental impacts that are integrated into the base condition for each of the resources analyzed in this chapter. However, these actions are included in this discussion to provide for a more complete description of their characteristics. Actions that are not reasonably foreseeable are those that are based on mere speculation or conjecture, or those that have only been discussed on a conceptual basis.

3.20.2.1 Past and Present Actions

3.20.2.1.1 Construction and Operation of the Paradise CC Plant

TVA constructed and is operating the Paradise CC plant located on the Paradise Reservation just north of the coal units. The CC facility became operational in April 2017 and is comprised of three combustion turbines, three triple-pressure heat recovery steam generators with supplemental duct-firing, and a steam turbine (TVA 2020b). The plant has a generating capacity of 1,100 MW. Construction of this facility also included construction of a new gas pipeline lateral connecting the plant to an existing gas interstate pipeline that has adequate transportation capacity to supply the plant (TVA 2013).

3.20.2.1.2 Retirement of Paradise Fossil Plant

TVA retired Units 1 and 2 in April 2017 and replaced their generation with the Paradise CC plant mentioned above. Unit 3 ceased operation in February 2020. Virtually all coal unit operational measures were discontinued, and the coal plant is currently subject to basic care and maintenance measures. Primary operational measures that were discontinued include daily coal barge operations, coal pile management, pumping and use of water from the Green River for condenser cooling, and thermal discharges to the Green River. The plant has discontinued the discharge of fly ash and bottom ash to designated wet impoundment areas. Routine plant deliveries have also been discontinued. Employment at the plant has been reduced.

3.20.2.1.3 Retirement of Colbert Fossil Plant

Colbert Fossil Plant originally had five coal-fired generators onsite, Units 1-5. Unit 5 was retired in 2013, and TVA retired the remaining units on March 23, 2016. As a result, virtually all coal unit operational measures were discontinued, and the plant is currently subject to basic care and maintenance measures. TVA has continued operations of the eight frame CT units located at the facility.

3.20.2.1.4 Ash Impoundment Closures at Paradise and Colbert Fossil Plants

The closure of the ash impoundments at the Paradise Fossil Plant, which is currently ongoing, is described in the *Paradise Fossil Plant CCR Management Operations EA* (TVA 2017a) and the *Paradise CCR Management and Process Water Basins Supplemental EA* (TVA 2018). The closure of the impoundment portion of the Colbert Fossil Plant was completed in 2018 and is addressed in TVA's *Ash Impoundment Closure EIS, Part II – Site Specific NEPA Review* (TVA 2016c).

3.20.2.1.5 Colbert Fossil Plant Deconstruction and Demolition

Coal-fired power generation ceased at the Colbert Fossil Plant in March 2016. Decommissioning of the plant is currently ongoing, and the target brownfield restoration is anticipated to be complete by 2023. The environmental impacts of activities associated with decommissioning have been assessed in the *Colbert Fossil Plant Decontamination and Deconstruction EA* (TVA 2016a), which included a detailed cumulative effects assessment as part of the evaluation of alternatives.

3.20.2.1.6 Paradise Fossil Plant Deconstruction and Demolition

Decommissioning of the Paradise Fossil Plant is anticipated to start in March of 2021 and be complete by 2030. Therefore, decommissioning activities would be concurrent with the construction activities associated with the Paradise CT plant analyzed in this EA. The demolition of the barge loop is scheduled to be complete by July 2021, which would allow for site preparation work for the 500-kV TL switchyard associated with the Paradise CT plant to begin shortly after. The environmental impacts of activities associated with decommissioning of the Paradise Fossil Plant are being assessed in an ongoing environmental review that includes a detailed cumulative effects assessment as part of the evaluation of alternatives, including the effects of this project.

3.20.2.2 Reasonably Foreseeable Future Actions

3.20.2.2.1 TVA TL Upgrades Required Subsequent to CT Plant Construction

TVA has identified additional TLs (or TL segments) for future uprates or reconductor work to facilitate the Colbert CT plant project. Upgrades would be performed to increase the electrical capacity of the existing TLs and may include the following: moving features that

interfere with clearance, replacing and/or modifying existing structures, installing intermediate structures, modifying, or replacing some of the existing conductor in order to increase ground clearance, adding fill rock or dirt (surcharge) around the base of existing structures, and working with the local power companies to modify their lines. The specific nature, timing, and location of the work is yet to be determined and will be considered in a future environmental review, which will include an evaluation of cumulative impacts associated with these actions; however, these upgrades would occur in existing ROW and involve minimal impact to natural resources or surrounding uses.

3.20.2.2.2 Construction and Operation of Aeroderivative CT Units at TVA’s Johnsonville Reservation

TVA is evaluating the addition of aeroderivative CT units at the existing TVA Johnsonville site in New Johnsonville, Tennessee. Although the 2019 IRP programmatically evaluated future decisions related to the IRP, individual asset decisions – including the proposed addition of 10 natural gas-fired aeroderivative CTs will be analyzed in a separate environmental review. This review is anticipated to be completed by Spring 2022.

3.20.2.2.3 Retirement of Two Coal-Fired Units at the Cumberland Fossil Plant (CUF) and the Construction and Operation of Replacement Generation

TVA is considering retirement, decommissioning, and demolition of the two coal-fired units at the Cumberland Fossil Plant (CUF) and the construction and operation of approximately 1,450 MW of replacement generation to recover the generation capacity lost from retirement of one CUF unit. TVA is considering alternatives for replacement generation, including construction and operation of a Combined Cycle CT at CUF, construction and operation of Simple Cycle CT Gas Plants at alternate locations, and construction and operation of Solar and Storage Facilities, primarily at alternate locations. Because TVA is in the preliminary planning phase for determining the type and location of replacement generation, the specific characteristics of these potential projects are not yet known. Although the 2019 IRP programmatically evaluated future decisions related to the IRP, individual asset decisions will be analyzed in a separate environmental review. This review is anticipated to be completed by Fall 2022.

3.20.2.2.4 Wendell H. Ford WKP Pavement Improvements

Pavement improvements to approximately 22 miles of WKP in both directions from Rockport to Neafus in Ohio County, Kentucky (milepoint 65.68 to milepoint 83.3). Approximately 6 miles of the WKP improvements project that is near Rockport northwest of the Paradise CT plant project area would fall within a 5-mile radius of the project. The improvements are scheduled to begin in fiscal year 2021 (Kentucky Transportation Cabinet 2020a). This project is expected to be completely within previously disturbed areas and would not result in any notable resource impacts.

3.20.2.2.5 Expansion of Cherokee Industrial Landfill

The Solid Waste Disposal Authority of the cities of Muscle Shoals, Sheffield, and Tuscumbia, Alabama purchased the Cherokee Industrial Landfill and adjoining acreage in Barton, Alabama, located near the Barton Riverfront Industrial Park on Cane Creek Road approximately one mile west of the Colbert CT plant project area, and provisions are in place to allow for future expansion of the landfill. The Solid Waste Disposal Authority will issue approximately \$14 million in revenue bonds and \$4 million in taxable bonds to finance the purchase, and future development of additional cells. The Authority submitted to the ADEM an application to renew and modify the industrial waste landfill permit for the landfill.

The proposed permit modification expands the waste disposal area from 56.35 to 64.44 acres (ADEM 2020). The permit indicates the project would not impact wetlands, threatened and endangered species, or cultural resources.

3.20.2.2.6 Construction of Solar Farm in Cherokee, Alabama

TVA partnered with Longroad Energy to build the largest solar farm in Alabama. Construction is currently underway and should be complete by mid-2021 (Allen Media Broadcasting 2020). Longroad Energy is the developer of the project and Orsted is the current owner. The solar farm would be located approximately three miles northwest of the Colbert CT plant project area on almost 2,500 acres of land off of Mulberry Lane in Cherokee, Alabama. TVA agreed to build associated TL updates and a switching substation that would be constructed and operated by TVA. Construction workforce may include 300 people and is expected to bring \$1 million in sales tax revenue for Colbert County (Business Alabama 2020). TVA prepared an environmental assessment for this project which resulted in a FONSI.

3.20.2.2.7 Colbert Ash Pond 4 Seismic Project

TVA is conducting initial planning to improve post-earthquake stability of a portion of the east dike of Ash Pond 4. TVA is considering the placement of a soil- and rock-fill buttress against a portion of the east dike, which would require relocating a segment of Cane Creek from its present alignment. TVA estimates that up to 18 acres would be disturbed under the proposal, primarily in an area just east of Ash Pond 4. TVA is currently preparing an environmental assessment for this project and, depending on the outcome of TVA's final decision, construction could begin in 2022.

3.20.3 Analysis of Cumulative Effects

To address cumulative impacts, the existing affected environment surrounding the project area was considered in conjunction with the environmental impacts presented in Chapter 3 and the potential resource impacts from the past, present, and reasonably foreseeable future actions. These combined impacts are defined by the CEQ as "cumulative" in 40 CFR Section 1508.7 and may include individually minor, but collectively significant actions taking place over a period of time.

TVA evaluated a full range of environmental resource issues associated with Alternative B for inclusion in the cumulative impacts analysis. The proposed actions identified under Alternative B would occur mostly on land that was previously disturbed and is used for industrial purposes. The landscapes surrounding the existing Paradise and Colbert reservations are already subject to environmental stressors associated with industrial operations and previous disturbances of the sites. Consequently, as has been described in prior subsections of this EA, the existing quality of environmental resources potentially directly or indirectly affected by project activities is generally low.

The cumulative impact analysis must consider the potential impact on the environment that may result from the incremental impact of a project when added to other past, present, and reasonably foreseeable future actions. This cumulative impact analysis is limited to those resource issues potentially adversely affected by project activities. Accordingly, land use and prime farmland; geology and soils; groundwater; floodplains; wildlife; vegetation; natural areas, parks, and recreation; visual resources; cultural resources; socioeconomics; noise; hazardous materials and solid and hazardous waste; and public health and safety are not included in this analysis as these resources are either not adversely affected, or the

effects are considered to be temporary, negligible or beneficial. In addition, the analyses summarized in preceding sections showed that the proposed action would result in only minor adverse impacts to undisturbed or sensitive resources including surface water; aquatic ecology; wetlands; and threatened and endangered species. Therefore, impacts from the Paradise and Colbert CT project in combination with the “other actions” described above would not result in incrementally greater cumulative effects to these resources.

Overall, cumulative impacts associated with Alternative B would be negligible. The potential for cumulative effects associated with implementation of Alternative B are analyzed below.

3.20.3.1 Air Quality

The geographic reference area for air quality for the Paradise CT plant is Muhlenberg County, Kentucky. It is expected that emissions would continue from local vehicles in these areas, and air emissions associated with other reasonably foreseeable future actions in Muhlenberg County such as WKP pavement work, closure of ash disposal areas at Paradise, demolition and deconstruction of the Paradise Fossil Plant, and additional TL upgrades, together with construction activities under the proposed actions, would also result in a potential temporary increase in local emissions and fugitive dust. The geographic reference area for air quality for the Colbert CT plant is Colbert County, Alabama. It is expected that emissions would continue from local vehicles in these areas, and air emissions associated with other reasonably foreseeable future actions in Colbert County such as future TL upgrades and expansion of the Cherokee Industrial Landfill would also result in a potential temporary increase in local emissions and fugitive dust if construction schedules for this project overlap. The cumulative impact of these construction activity emissions, when combined with the ongoing emissions from local vehicles, would incrementally increase emissions within the reference areas for Paradise and Colbert reservations under the proposed action, but such increases would not be notable on a regional scale. If the reasonably foreseeable future actions occur at the same time as the proposed projects, there would be potential for short-term and minor impacts to air quality. However, exceedances of applicable ambient air quality standards are not expected. Therefore, the cumulative impacts of the proposed action on air quality would not adversely affect regional air quality.

Operation of new CT units and natural gas upgrades at Colbert would result in increases in local emissions that would be offset by the reduction in regional emissions associated with closure of existing CTs at Allen and Johnsonville. The Cherokee Landfill would be operated in compliance with applicable regulations and permits and as such operation of this facility concurrent with operation of the CT units at Colbert would not be expected to result in a cumulative impact to air quality.

3.20.3.2 Greenhouse Gas Emissions

GHG emissions associated with the operation of the proposed CT plants at Paradise and Colbert are identified in Section 3.2 of the EA. The proposed action as well as the reasonably foreseeable future actions related to replacement generation at Johnsonville Fossil Plant and CUF and the proposed retirement of CUF are all part of the Target Power Supply Mix strategy identified in the 2019 IRP. The 2019 IRP programmatically evaluated future decisions related to the IRP and determined that the implementation of the 2019 IRP would result in an incremental reduction in annual GHG emissions. The IRP also notes that the reduction in CO₂ emissions will have small but beneficial impacts on the potential for associated climate change. However, individual asset decisions, including the potential

addition of natural gas-fired aeroderivative CTs at Johnsonville, the closure of CUF, and construction and operation of replacement generation will be analyzed in separate environmental reviews that will include an analysis of cumulative impacts.

3.20.3.3 Transportation

The potential for cumulative effects to transportation from the proposed action and other identified actions would be related to the construction phase of these actions. Traffic generated by these actions would consist of construction workforce and goods and equipment transport to construction sites. The reasonably foreseeable future actions at and near Paradise including demolition and deconstruction of the Paradise Fossil Plant combined with the CT plant construction would contribute to additional traffic volumes on area roads in the vicinity of the Paradise Reservation including SR 176, CR 1008, and Riverside Road. Additional traffic may cause some traffic delays. In addition, workers commuting to the sites from outside the project area may experience delays due to the WKP pavement improvement project.

The reasonably foreseeable future actions near Colbert including the demolition and deconstruction of the Colbert Fossil Plant, expansion of the Cherokee Industrial Landfill, and construction of a large solar farm near the Colbert Reservation, as well as additional TL upgrades for the CT plant, would contribute to additional traffic volumes on the US 72 and Steam Plant Road, which could lead to congestion or delays at intersections near Colbert.

TVA would mitigate congestion or delays near the project sites by implementing appropriate traffic controls, as needed by staging of trucks, spacing logistics, staggering work shifts, or timing truck traffic to occur during lighter traffic hours. With implementation of these mitigation measures, cumulative impacts of the proposed actions to transportation are expected to be minor.

3.20.3.4 Environmental Justice

As noted in Section 3.18, communities that meet the criteria for environmental justice considerations were identified within the Paradise and Colbert CT plant study areas. Given the proximity of these communities to the CT plant project areas, there is a potential that these communities would experience temporary, minor impacts from increased workforce traffic and construction vehicles on local roads during the construction period. It is also likely that some of these communities would be along the routes taken during construction activities for other reasonably foreseeable future actions on and within the vicinity of the reservations, including closure of ash disposal areas, demolition and deconstruction of the Paradise Fossil Plant, the Wendell H. Ford Western Kentucky Parkway improvements at Exit 58 near Paradise Reservation and the demolition and deconstruction of the Colbert Fossil Plant, expansion of the Cherokee Industrial Landfill, construction of large solar farm near the Colbert Reservation, the Colbert Ash Pond 4 seismic project and additional TL upgrades for both CT plants.

Because these short-term actions are potentially coincident, the cumulative impacts of the proposed action on noise and dust emissions have the potential to represent a minor increase in impacts to environmental justice populations. Such impacts associated with construction vehicle traffic (i.e., noise, dust) would be mitigated through BMPs identified in Section 2.7. These impacts would also be temporary, occurring during the construction periods of these projects, and would not be disproportionate as impacts would be

consistent across all communities (i.e., environmental justice and non-environmental justice) along the local roadways.

Operation of new CT units, compressor engine, and natural gas upgrades would result in increases in local emissions. These emissions together with expected emissions from the reasonably foreseeable future actions identified in Tables 3-27 and 3-28 may result in increased localized air emissions. However, these emissions would be in compliance with applicable permitting requirements which are designated to protect public health and welfare. In addition, air quality impacts would be borne primarily by the population within the study area, many of which do not meet the criteria as an environmental justice community. Therefore, cumulative impact to environmental justice communities would be minor.

3.21 Unavoidable Adverse Impacts

Unavoidable adverse impacts are the effects of the proposed action on natural and human resources that would remain after mitigation measures or BMPs have been applied. Mitigation measures and BMPs are typically implemented to reduce a potential impact to a level that would be below the threshold of significance as defined by the CEQ and the courts. Impacts associated with the construction and operation of the proposed CT plants at Paradise and Colbert and the associated offsite natural gas and TL upgrades have the potential to cause unavoidable adverse effects to several natural and human environmental resources. TVA has reduced the potential for adverse effects during the planning process. In addition, TVA would implement mitigation measures (Section 2.7) to further reduce potential adverse effects to certain environmental resources.

Construction of the proposed CT plants and associated offsite natural gas and TL upgrades would require the permanent conversion of approximately 9.5 acres of forest vegetation for the Paradise CT plant and approximately 5 acres of forest vegetation for the Colbert CT plant to herbaceous vegetation or to unvegetated, developed areas. Additionally, some low-quality herbaceous vegetation would be permanently converted to developed land. These habitat alterations would result in impacts to localized species composition and wildlife habitat for the lands immediately affected. However, due to the abundant habitat of similar quality within the vicinity of the project sites, the overall impact to vegetation and wildlife is considered minor.

Approximately 8.7 acres of potentially suitable summer roosting habitat for Indiana bat and northern long-eared bat could be removed at Paradise and approximately 0.5 acres of potentially suitable summer roosting habitat for Indiana bat and northern long-eared bat could be removed at Colbert. These activities were addressed in TVA's programmatic consultation with the USFWS on routine actions and federally listed bats in accordance with ESA Section 7(a)(2) and completed in April 2018. For those activities with potential to affect bats, TVA committed to implementing specific conservation measures. Due to the application of identified conservation measures, TVA has determined that proposed actions are not likely to significantly impact the Indiana bat, or northern long-eared bat.

Two active osprey nests were documented on the Paradise CT plant project area, two active osprey nests were documented on the Colbert CT plant project area, and one additional nest was observed on an offsite TL structure with proposed upgrades on TL 5676 during field reviews in August and September 2020. All observed osprey nests were within 660 feet of construction activities. If the timing of proposed actions within 660 feet of these nests cannot be modified to avoid nesting seasons, coordination with the USDA Wildlife Services would be required to ensure compliance under the EO 13186.

The construction of the proposed CT plants and associated offsite natural gas and TL upgrades would also result in potential minor effects to surface water and wetland resources. These impacts would be mitigated through adherence to permit requirements and the provision of appropriate compensatory mitigative measures, if needed. Temporary impacts to water quality from runoff during construction, as well as ongoing vegetation maintenance along the TLs, could impact nearby receiving water bodies but would be reduced with application of appropriate BMPs.

Although the Paradise CT will not require a PSD evaluation it must meet the requirements and limits provided in KDAQ and federal regulations. The Paradise plant site currently operates under a Title V operating permit, which will require a significant modification for the proposed project. For the Colbert CT plant, TVA has begun the process of complying with PSD requirements with the submission of Class I and Class II modeling protocols to ADEM in August 2020. If the results from the PSD analysis are accepted, ADEM will issue a construction permit, which allows initial unit operations for approximately one year. The terms of the construction permit will be rolled into the existing Colbert Title V operating permit via a Title V permit modification. As both plants would operate within the parameters of the respective Title V permits, the overall unavoidable emissions adverse impacts to air quality would be minor. Unavoidable localized increases in air and noise emissions would also occur during construction activities. Activities associated with the use of construction equipment may result in varying amounts of dust, air emissions, and noise that may potentially impact onsite workers, users of adjacent recreational lands and water bodies, and residents located near the offsite TL segments and natural gas tie-in. Potential noise impacts also include traffic noise associated with the construction workforce traveling to and from the site. Emissions from construction activities and equipment are minimized through implementation of BMPs including proper maintenance of construction equipment and vehicles. Low income and minority communities would not suffer any disproportionate air, dust, noise, transportation, or waste impacts.

Additionally, there would be unavoidable adverse impacts to floodplains in association with the installation of buried natural gas pipeline at the Colbert CT plant. However, these impacts would be minor and limited to the duration of construction activities.

In the context of the availability of regional resources that are similar to those unavoidably adversely affected by the project, coupled with the application of appropriate BMPs and adherence to permit requirements, unavoidable adverse effects would be minor.

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

NEPA requires a discussion of the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity. This EA focuses on the analyses of environmental impacts associated with the construction and operation of the proposed CT plants at Paradise and Colbert, as well as associated offsite natural gas and TL upgrades. These activities are considered short-term uses of the environment for the purposes of this section. In contrast, the long-term productivity is considered to be that which occurs beyond the conclusion of decommissioning the CT plants and associated infrastructure. This section includes an evaluation of the extent that the short-term uses preclude any options for future long-term use of the project sites.

Construction of the CT plants and associated offsite natural gas and TL upgrades would cause a minor, short-term deterioration in existing air quality during construction. These impacts would be mitigated through implementation of mitigative measures to reduce

emissions from construction phase equipment and minimize emissions of fugitive dust. Operational impacts to air quality would be minor because appropriate emission controls are included within the CT plant infrastructure to allow the plants to operate under their respective Title V permit conditions. Similarly, operational impacts to climate change would be minor and would not affect regional or national GHG emissions. Therefore, there would be no effect on the enhancement of long-term productivity related to air quality or climate change following decommissioning.

The acreage disturbed during construction of the CT plants is larger than that required for the actual permanent structures and other ancillary facilities necessary once the site is operational because of the need for laydown, warehouse, and temporary use areas. Preparation of these onsite areas coupled with noise from construction activities may displace some wildlife and alter existing vegetation. Once the new facilities are completed, the areas not needed for operations would be expected to be returned to pre-existing conditions. Likewise, areas within the existing TL corridors disturbed by construction would return to existing conditions following the completion of upgrade activities. Additionally, following decommissioning of CT plants, TLs and supporting infrastructure, lands would be available for redevelopment thereby maintaining long term productivity of the site.

The principal change in short-term use of the project area would be the loss of vegetation within the areas impacted by operation of the CT plant facilities. The Paradise and Colbert plant sites have been developed for heavy industrial use; they are not currently used for agriculture and only support fragmented areas of woody vegetation. Therefore, there would be no losses to agricultural activities or large-scale timber production. Additionally, because the vicinity of the project area includes similar vegetation and habitat types, the short-term disturbance to support CT plant operations is not expected to significantly alter long-term productivity of wildlife, agriculture, or other natural resources.

Construction of the Paradise and Colbert CT plants, including the offsite upgrades to natural gas and TL infrastructure, would reduce the long-term productivity of the land for other purposes while these facilities are in operation. However, after decommissioning, the lands could be reused and made available for other uses.

3.23 Irreversible and Irretrievable Commitments of Resources

The term “irreversible commitments of resources” describes environmental resources that are potentially changed by the construction or operation of the proposed projects that could not be restored to their prior state by practical means at some later time. Irreversible commitments generally occur to nonrenewable resources such as minerals or cultural resources and to those resources that are renewable only over long timespans, such as soil productivity. A resource commitment is considered irretrievable when the use or consumption is neither renewable nor recoverable for use until reclamation is successfully applied. Irretrievable commitments generally apply to the loss of production, harvest, or other natural resources and are not necessarily irreversible. For example, the construction of a road through a forest would be an irretrievable commitment of the productivity of timber within the road ROW as long as the road remains. Mining of ore is an irreversible commitment of a resource; once the ore is removed and used, it cannot be restored.

The land used for the proposed CT plants and associated infrastructure is not irreversibly committed because once the plants cease operations and the facilities are decommissioned, the land supporting the facilities could be returned to other industrial or nonindustrial uses. The ROW used for the natural gas pipeline and TLs would constitute an

irretrievable commitment of onsite resources, such as wildlife habitat and forest resources, for the length of time the pipeline and TLs are in place. However, the approximate previous land use and land cover could be returned upon retirement of these facilities. In the interim, compatible uses of the ROW could continue.

The transfer of borrow material from the borrow site in the Paradise Reservation to the switchyard at the Paradise CT plant could be both an irreversible and irretrievable commitment of resources. The loss of soil (which requires a very long time to generate) would constitute an irreversible and irretrievable resource commitment; however, revegetating the borrow site would return the site to its previous condition. Thus, the loss of vegetation until the area is successfully revegetated would be an irretrievable commitment, but not irreversible.

Resources required by construction activities, including labor, fossil fuels and construction materials, would be irretrievably lost through the use of gasoline and diesel-powered equipment during construction. In addition, operation of the CT plants would result in the irretrievable loss of natural gas which would be used to fuel the CTs. In addition, the materials used for the construction of the proposed site would be committed for the life of the facilities. However, these fossil fuels and building materials are not in short supply and their use would not have an adverse effect upon continued availability of these resources.

CHAPTER 4 – LIST OF PREPARERS

4.1 NEPA Project Management

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4.2 Other Contributors

TENNESSEE VALLEY AUTHORITY

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Experience: 22 years of experience in wetlands and natural resources

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CHAPTER 5 – ENVIRONMENTAL ASSESSMENT RECIPIENTS

5.1 Federal Agencies

U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service

5.2 Federally Recognized Tribes

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

5.3 State Agencies

Alabama Department of Agriculture and Industries
Alabama Department of Conservation and Natural Resources
Alabama Department of Economic and Community Affairs
Alabama Department of Environmental Management
Alabama Department of Transportation
Alabama Forestry Commission
Alabama Historical Commission
Alabama State Historic Preservation Officer
Kentucky State Clearinghouse
Kentucky State Historic Preservation Officer
Tennessee Department of Agriculture
Tennessee Department of Environment and Conservation
Tennessee State Historic Preservation Officer
Tennessee Wildlife Resources Agency

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Appendix A – Public and Agency Comments on the Draft EA

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Appendix A
Public and Agency Comments and TVA's Responses to Comments on the
TVA Paradise and Colbert CT Plants
Draft Environmental Assessment

The Draft EA was released for a 30-day public comment period on February 1, 2021 and was posted on TVA's website (<http://tva.com/nepa>). The availability of the Draft EA was announced in a news release and in newspapers that served both the Paradise and Colbert CT plant project areas where associated offsite transmission line upgrades would occur. These newspapers include the following by respective state and county.

Alabama Counties

Colbert: Colbert County Reporter
Lauderdale: TimesDaily and East Lauderdale News
Morgan: Decatur Daily and Hartselle Enquirer

Kentucky Counties

Muhlenberg: Leader News and Times-Argus
Todd: Todd County Standard

Tennessee Counties

Hardin: The Courier
Lawrence: The Democrat Union
Montgomery: The Leaf-Chronicle, Main Street: Clarksville, and Fort Campbell Courier
Sumner: The Gallatin News, The Hendersonville Standard, The Portland Leader, and Portland Sun
Wayne: The Wayne County News
Wilson: Lebanon Democrat, The Wilson Post, Mt. Juliet News, and The Chronicle of Mt. Juliet

TVA's interagency involvement included circulation of the Draft EA to local, state, and federal agencies for comments. A request for extension of the comment period was received and granted by TVA. With the extension of the comment period, comments on the Draft EA were accepted from February 1, 2021 through March 13, 2021 via mail, and e-mail. TVA received comment submissions from the following:

- Agencies – Tennessee Department of Environment and Conservation (TDEC), Kentucky Department for Environmental Protection (KDEP), and U.S. Environmental Protection Agency (EPA)
- Organizations – Southern Environmental Law Center (SELC) and Sierra Club
- Individual members of the public

Among the comments submitted by the Sierra Club were 176 individual comment submissions by members of the public via the organization. Additionally, eight comment submissions were made by unaffiliated members of the public.

TVA carefully reviewed all the substantive comments that were received for consideration in the Final EA. Summarized comments and TVA's responses are included in Table A-1. Original comment submissions follow Table A-1 and will be retained as part of the project's Administrative Record. Footnotes shown within individual comments on Table A-1 can be referenced on the original comment submissions following the table.

**Table A-1. TVA Paradise and Colbert CT Plants Draft EA
Comments and TVA Responses**

Comment No.	Organization/ Name	Comment	TVA Response
1	TDEC	TDEC believes the Draft EA adequately addresses potential impacts to cultural resources within the proposed project area.	Comment noted.
2	TDEC	<p>As it relates to TL construction and other activities occurring in Tennessee, TDEC recommends the use of best practices to minimize the generation of fugitive dust, open burning be kept to a minimum, regulatory requirements pertaining to asbestos be followed, and that all construction equipment be well-maintained and equipped with the latest emissions control equipment.</p> <p>Tennessee Air Pollution Control Regulation (TAPCR)³ provides specific requirements for prevention of fugitive dust, including use, where possible, of asphalt, water, or suitable chemicals to limit its creation. TDEC encourages TVA to include these considerations in the Final EA.</p>	As noted in the EA, fugitive dust produced from construction activities would be temporary and controlled by BMPs (e.g., wet suppression) as stated in the TVA's fugitive dust control plans required under existing Clean Air Act Title V operating permits.
3	TDEC	TDEC has open burning regulations ⁴ and the Division of Air Pollution Control would need to be contacted prior to any open burning of any vegetative or construction/demolition related debris generated from the project. TDEC encourages TVA to include these considerations in the Final EA.	As noted in Section 3.1.2.2.1, TVA would adhere to all appropriate state and county regulatory requirements if burning of landscape waste is conducted. TVA will obtain all necessary permits and required approvals before project activities begin.
4	TDEC	If any structures in Tennessee will be demolished, an asbestos demolition notification must be provided in advance, and proper pre-demolition surveys need to be conducted to identify any regulated asbestos containing materials (ACM) present. ⁵ Prior to any demolition, all facilities must be examined for ACM and all potential ACM in the buildings proposed for demolition must be handled and disposed of according to the applicable federal, state, and local regulations. TDEC encourages TVA to include these considerations in the Final EA.	Demolition is not anticipated as part of the proposed action. However as noted in Section 3.17.2.2, solid and hazardous wastes generated during construction and operation of the CT plants at Paradise and Colbert would be managed in accordance with established procedures and applicable regulations.
5	TDEC	TDEC recommends that the Final EA consider and explicitly reflect that all wastes generated during the proposed activities be managed in accordance with the Solid and Hazardous Waste Rules	As noted in Section 3.17.2.2, Solid and hazardous wastes generated during construction and operation of the CT plants at

TVA Paradise and Colbert Combustion Turbine Plants EA

Comment No.	Organization/ Name	Comment	TVA Response
		and Regulations of the state (TDEC DSWM Rule 0400 Chapters 11 and 12, respectively) in addition to other potentially applicable regulations (federal, state, and TVA best management practices and standard mitigation measures).	Paradise and Colbert (and of associated transmission activities) would be managed in accordance with established procedures and applicable regulations. This includes applicable provisions of Tennessee’s Solid and Hazardous Waste rules.
6	TDEC	With respect to hazardous waste generator categories, depending on the volume produced and/or amount accumulated/stored in a calendar month, there are various requirements pertaining to hazardous waste management. Such requirements include but are not limited to waste identification and notification, satellite accumulation areas, container storage requirements, preparedness & prevention measures, used oil management, universal waste management, recordkeeping and reporting, personnel training, and emergency response requirements. TDEC encourages TVA to include these considerations in the Final EA.	Comment noted. These considerations are included in Section 3.17.2.2 of the Final EA.
7	TDEC	Based on review of the Draft EA, TL replacements and modifications in Hardin, Lawrence, Montgomery, Sumner, Wayne, and Wilson Counties in Tennessee will likely involve multiple stream crossings, necessary for the work to be done. As noted by TVA in the Draft EA, activities with potential to impact streams in Tennessee will require an Aquatic Resource Alteration Permit (ARAP).	Comment noted. TVA will obtain all necessary permits and required approvals before project activities begin
8	TDEC	TDEC concurs with the Draft EA that TL-related activities are also expected to disturb more than one acre of land and require a construction stormwater general permit (CGP) including a Surface Water Pollution Prevention Plan (SWPPP).	Comment noted.
9	TDEC	TDEC appreciates the opportunity to comment on this Draft EA. Please note that these comments are not indicative of approval or disapproval of the proposed action or its alternatives, nor should they be interpreted as an indication of future permitting decisions by TDEC.	Comment noted.

Appendix A – Public and Agency Comments and TVA's Responses to Comments

Comment No.	Organization/ Name	Comment	TVA Response
10	KDEP	Please refer to Kentucky's list of special use waters located in 401 KAR 10:026 to determine whether any special use water will be impacted by the transmission lines. 401 KAR 10:031 specifies additional criteria that apply to Kentucky's special use waters. Questions should be directed to Andrea Fredenburg, Water Quality Branch, (502) 782-6950, Andrea.Fredenburg@ky.gov.	Impacted streams in Kentucky for transmission upgrades were evaluated for special designations. No streams were noted to have special designations.
11	KDEP	Further review of this proposed Combustion Turbine Plant at Paradise and Offsite Related Actions Associated with the Proposed Combustion Turbine Plant at Paradise is needed to determine if a Kentucky DOW Application for Permit to Construct Across or Along a Stream is required. For pipeline stream crossings that are not covered under 401 KAR 4:050, a Kentucky DOW Application for Permit to Construct Across or Along a Stream must be submitted. Questions should be directed to Shawn Hokanson, Floodplain Management Section, (502) 782-6977, Shawn.Hokanson@ky.gov.	Comment noted. As stated in the EA, TVA will adhere to all state regulations.
12	KDEP	If the activity requires a federal permit due to activities in or near Waters of the U.S., a Clean Water Act Section 401 Water Quality Certification from the DOW may be required for this project. Questions should be directed to the Water Quality Certification Section, at 401WQC@ky.gov or (502) 564-3410.	Comment noted.
13	KDEP	The DOW terminated Water Withdrawal Permit #0901 that authorized Tennessee Valley Authority (TVA), Paradise Fossil Plant to conduct water withdrawals from Green River, River Mile 100.3 in Muhlenberg County, Kentucky effective August 6, 2020. A Water Withdrawal Application is required for any project proposing raw water withdrawals of 10,000 gallons per day or more. Applications should be completed and submitted four to six months prior to proposed withdrawal initiation. The proposed Combustion Turbine Plant at Paradise is within the Central City Water and Sewer System designated Source Water Protection Areas, Zone 3 (Zone of Responsibility). So, the proposed Combustion Turbine Plant at Paradise would be identified within the Contamination Source Inventory as assessed for susceptibility ranking. Questions should be directed to Chloe Brantley, Water Supply Section, (502) 782-6898, Chloe.Brantley@ky.gov.	KDOW's Water Withdrawal regulations exempt steam generating plants from the requirement to obtain a permit. The Paradise Combustion Turbine Plant will be obtaining its water from the Paradise Combined Cycle Plant, which is a steam electric plant, and, therefore, no permit is expected. Permit #0901 was for the coal wash facility and is not related to this project.

TVA Paradise and Colbert Combustion Turbine Plants EA

Comment No.	Organization/ Name	Comment	TVA Response
14	KDEP	It is the recommendation of the Groundwater Section of the Watershed Management Branch that the project be made aware of the requirements of 401 KAR 5:037 and the need to develop a groundwater protection plan (GPP) for the protection of groundwater resources. This will include installation, construction, operation or abandonment of wells, bore holes or core holes and any other project activities that may need a GPP. 401 KAR 5:037 § 2(2)(m) references the scope and applicability of the proposed project. Also, the project needs to be aware of 401 KAR 6 and the need for licensed well drillers in the Commonwealth of Kentucky in addition to well construction and installation will have to meet standards of 401 KAR 6:350. Questions should be directed to Adam Nolte, Groundwater Section, (502) 782-1312, Adam.Nolte@ky.gov or Kurtis Spears, Groundwater Section, (502) 782-7119, Kurtis.Spears@ky.gov.	Comment noted. The project will not involve well installation, construction, operation, or abandonment. Section 3.4.2.2 of the Final EA states that all state and federal requirements would be followed to ensure protection of groundwater.
15	KDEP	Based on the information provided by the applicant for this project: All solid and hazardous wastes produced by TVA Kentucky facilities during construction, operations or demolition at the combustion turbine plants, offsite compressor station and transmission lines should be disposed of in accordance with the appropriate Kentucky Statutes and Regulations and approval by the Kentucky Division of Waste Management. All solid waste generated by this project must be disposed of at a permitted facility. If asbestos, lead paint and/or other contaminants are encountered during this project contact the Division of Waste Management for proper disposal and closure. Solid Waste Branch Issues - Closest landfill is the onsite TVA Residual Landfill. Any solid waste generated by this project must be disposed of at a permitted facility.	Comment noted. TVA will obtain all necessary permits and required approvals before project activities begin.
16	KDEP	Underground Storage Tank Branch - Indicates TVA has an active 10,000 gallon gas tank onsite. If any underground storage tanks are encountered during this project contact the UST Branch for proper closure.	Comment noted. TVA will obtain all necessary permits and required approvals before project activities begin.

Appendix A – Public and Agency Comments and TVA's Responses to Comments

Comment No.	Organization/ Name	Comment	TVA Response
17	KDEP	Please keep in mind additional locations of releases, potential contamination or waste facilities may be present but unknown to the agency. Therefore, it is recommended that appropriate precautions be taken during construction activities. Please report any evidence of illegal waste disposal facilities and releases of hazardous substances, pollutants, contaminants or petroleum to the 24-hour Environmental Response Team at 1-800-928-2380.	Comment noted. TVA will obtain all necessary permits and required approvals before project activities begin.
18	KDEP	As this project is presented, the owner or operator of this company should comply with any applicable Division for Air Quality permitting requirements contained in 401 KAR Chapter 52 Permits, Registrations, and Prohibitory Rules located at https://legislature.ky.gov/Pages/index.aspx and https://eec.ky.gov/EnvironmentalProtection/Air/Pages/Air-Permitting.aspx . For permitting information, please contact the Division for Air Quality Permit Review Branch Manager, at (502) 782-6997.	Comment noted. TVA will obtain all necessary permits and required approvals before project activities begin.
19	KDEP	401 KAR 63:010, Fugitive Emissions, states that no person shall cause, suffer, or allow any material to be handled, processed, transported, or stored without taking reasonable precaution to prevent particulate matter from becoming airborne. Additional requirements include the covering of open bodied trucks, operating outside the work area transporting materials likely to become airborne, and that no one shall allow earth or other material being transported by truck or earth-moving equipment to be deposited onto a paved street or roadway. Please note the Fugitive Emissions Fact Sheet located at https://eec.ky.gov/Environmental-Protection/Air/Documents/Fugitive%20Dust%20Fact%20Sheet.pdf	As noted in Section 3.1.2.2.1 of the EA, fugitive dust produced from construction activities would be temporary and controlled by BMPs (e.g., wet suppression) as stated in the TVA's fugitive dust control plans required under existing Clean Air Act Title V operating permits.
20	KDEP	401 KAR 63:005 states that open burning shall be prohibited except as specifically provided. Open Burning is defined as the burning of any matter in such a manner that the products of combustion resulting from the burning are emitted directly into the outdoor atmosphere without passing through a stack or chimney. However, open burning may be utilized for the expressed purposes listed on the Open Burning Brochure located at https://eec.ky.gov/Environmental-Protection/Air/Pages/Open-Burning.aspx	As noted in Section 3.1.2.2.1 of the EA, TVA would adhere to all appropriate state and county regulatory requirements if burning of landscape waste is conducted. TVA will obtain all necessary permits and required approvals before project activities begin.

TVA Paradise and Colbert Combustion Turbine Plants EA

Comment No.	Organization/ Name	Comment	TVA Response
21	KDEP	<p>The Division would like to offer the following suggestions on how this project can help us stay in compliance with the NAAQS. These air quality control strategies are beneficial to the health of citizens of Kentucky.</p> <ul style="list-style-type: none"> § Utilize alternatively fueled equipment. § Utilize other emission controls that are applicable to your equipment. § Reduce idling time on equipment. <p>The Division also suggests an investigation into compliance with applicable local government regulations.</p>	Comment noted.
22	KDEP	<p>Your project might have the potential of impacting federally or state listed species and natural communities. Go to the Kentucky Biological Assessment Tool (kynaturepreserves.org) to obtain a Standard Occurrence Report for information regarding listed species known within your project area. The report will also provide information on public and private conservation lands, areas of biodiversity significance, and other natural resources in your project area for which the Office of Kentucky Nature Preserves maintains data.</p>	<p>Comment noted. As discussed in Section 3.11.2 of the EA, TVA has conducted records research including a review of the Kentucky State Nature Preserves Commission database of aquatic and terrestrial animal species considered threatened, endangered, special concern, or otherwise tracked in Kentucky because the species is rare and/or vulnerable within the state. Additionally, TVA conducted field investigations of the study areas to document plant communities and suitable habitat for federally or state listed species.</p>
23	KDEP	<p>This review is based upon the information that was provided by the applicant. An endorsement of this project does not satisfy, or imply, the acceptance or issuance of any permits, certifications or approvals that may be required from this agency under Kentucky Revised Statutes or Kentucky Administrative Regulations. Such endorsement means this agency has found no major concerns from the review of the proposed project as presented other than those stated as conditions or comments.</p>	Comment noted.
24	EPA	<p>The EPA understands that TVA's preferred alternative is the Proposed Action Alternative. The EPA has not identified any significant environmental impacts to the proposed action that would require substantive changes to the DEIS or require the TVA's consideration of alternatives for the location of the proposed CT</p>	<p>Comment noted. TVA has considered the enclosed detailed technical comments in further responses to EPA comments. Please note the NEPA document is a Draft EA rather than a DEIS</p>

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		Plants and upgrades. The EPA has enclosed detailed technical comments for your consideration (See enclosure).	
25	EPA	The EPA recommends the inclusion of the completed PSD modeling in the Final EA as an appendix.	The CCT PSD application, which includes air dispersion modeling, has been submitted to ADEM. The information will be posted for public review and comment as part of the PSD permitting process. The permit application is part of the administrative record for this NEPA review.
26	EPA	The EPA principally defers to the FWS regarding compliance with the Endangered Species Act. The EPA recommends that any additional conservation measures identified by the FWS during consultation be included in the Final EA and/or Finding of No Significant Impact (FONSI).	Comment noted. No additional conservation measures have been identified by the FWS.
27	EPA	The EPA recommends any contractor working on-site use best management practices and address any potential impacts to off-site streams and waterways. The EPA also recommends that site grading, excavation, and construction plans should include implementable measures to prevent erosion and sediment runoff from the project site during and after construction.	Where applicable, TVA would be working under a NPDES or Construction Storm Water Permit which would require the use of a detailed BMP or SWPPP plan which would include grading plans and erosion and sediment control BMPs to control and prevent the migration of sediment from the project sites. Please see the Surface Water Section (Section 3.5) of the EA for more information on these controls and permits.
28	EPA	The EPA notes that over the two-year duration of the proposed project construction, a large amount of earth moving will occur. The presence of diesel equipment will result in an increase in diesel emissions from construction equipment. To maintain healthy air quality, the EPA recommends the use of diesel emission controls, cleaner fuel, and cleaner construction practices for on-road and off-road equipment used for transportation, soil movement, or other project activities.	Comment noted. Additional language has been added to Section 3.1.2.2.1 of the Final EA to reflect that these practices would be employed.
29	SELC	With its mission to serve the environment and economy of the Tennessee Valley, as well as a directive from the President to decarbonize the grid and to promote environmental justice, TVA is well positioned to lead the national response to the world's climate crisis. Yet the utility's plan to build new gas power plants balks at	TVA is an industry leader in carbon reduction – already reducing carbon emissions by 63% from 2005 levels. We aspire to achieve net zero carbon emissions by 2050 and to support broader national efforts to decarbonize the

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		<p>that opportunity, proposing to accelerate climate change during the narrow moment remaining to mitigate its worst effects.</p>	<p>economy. As we make progress towards achieving these goals, it's important that we continue to balance high reliability and low energy costs. At TVA, we have a firm plan to achieve 70% carbon reduction by 2030 and a path to ~80% reduction by 2035. Progress towards net zero emissions will require continued investment in new technologies in addition to nuclear, solar, wind, and hydro. We see gas as a bridging strategy – a way to continue to add renewables and support the needs of the system while new technologies are developed and to accelerate the retirement of coal plants. As one of the nation's largest electricity providers, we are committed to being part of the solution and to working with others to solve this important challenge. The proposed units at Paradise and Colbert would replace capacity at Allen and Johnsonville that is reaching end of life. These new units are more efficient than those they are replacing, will ensure TVA maintains a reliable peaking fleet, and will enhance system flexibility to integrate intermittent renewable resources. Peaking units typically run for short periods of time and ensure that TVA can meet peak power demand year-round, especially during extreme weather conditions in the summer and winter. The 2019 IRP recommended enhancing system flexibility to integrate renewables and distributed resources. Overall, new peaking CT units are more efficient and will have a positive impact towards reducing system-wide carbon emissions by improving the efficiency of the peaking fleet and enabling higher penetration levels of renewable resources.</p>

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30	SELC	<p>The proposal risks additional harm to environmental justice communities that have already shouldered decades of pollution from TVA's coal fired plants. Rather than provide the clear-sighted analysis necessary to lead the response to the climate crisis and to achieve environmental justice, the Draft EA ignores and mischaracterizes the climate change impacts of the proposed gas plants, ignores their impacts to environmental justice communities, and fails to consider or even acknowledge reasonable, carbon-free alternatives.</p>	<p>The Final EA has been revised (Section 3.18) to address the environmental justice issues raised in the comment. The revised analysis includes consideration of the potential for disproportionate impacts on low-income and / or minority communities identified in the study area of each of the proposed projects as well as an analysis of potential impacts on smaller communities with sensitive minority and/or low-income populations subject to environmental justice considerations identified in the vicinity of the Colbert CT Plant.</p> <p>TVA considered a variety of renewable technologies in the 2019 IRP which recommended enhancing system flexibility to integrate renewables and distributed resources. As noted in Section 1.1 of the EA, TVA identified the gas fleet, including CTs, as playing a critical role in providing the flexibility needed to integrate renewable energy generation and promote distributed energy resources. At this time, carbon-free replacements cannot provide the magnitude of year-round reliable and cost-effective energy required for replacement generation from the retirement of aging CT units. Replacement of aging units at Allen and Johnsonville with new, efficient CTs is the least-cost, dependable capacity option for the TVA system which also enhances flexibility to integrate intermittent renewable resources already in our plan. While solar prices are becoming competitive, solar does not contribute to the winter peak, which is typically just before sunrise. Therefore, solar requires peaking gas generation to support the winter peak. Wind</p>

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			<p>resources do contribute to both summer and winter peak capacity (less than one-third of nameplate or maximum rated output), but they are typically more expensive due to low regional wind speeds or high transmission costs. TVA currently has over 2,500 MW of solar either operating or contracted, with total projected solar capacity of about 10,000 MW by 2035. Dependable peaking gas additions will help integrate these solar additions by supporting TVA's winter peak demand.</p> <p>The Energy Information Administration projections indicate that battery storage system costs are over 60% higher than Frame-type CTs with less than half the service life (Feb 2021 Capital Cost and Performance Characteristic Estimates for Utility Scale Electric Power Generating Technologies). TVA recognizes the value that both short- and long-duration storage technologies will play in the future. TVA is working to gain operational experience with battery storage technology through the deployment of a 20 MW battery storage project near Vonore, TN and 180 MW of storage paired with solar under contract, all planned to be online by the end of 2023. TVA is also exploring pilot projects for additional short- and long-duration storage use-cases. Flexible capacity, such as gas CTs and storage, will help TVA integrate increasing levels of intermittent renewable resources.</p> <p>The Final EA has been revised (Section 2.2) to further reflect TVA's recognition and use of renewable energy alternatives as noted above.</p>

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31	SELC	For these reasons, we urge TVA to prepare a full environmental impact statement that resolves these critical deficiencies and complies with NEPA.	When determining the appropriate level of NEPA review, TVA considered multiple factors, including if the proposed action was likely to have significant effects on the environment or public health and safety. TVA prepared this Environmental Assessment to determine whether the nature and location of the action would have significant effects. Based on this Environmental Assessment, TVA concluded that the proposed action would not result in significant impacts to human health or the environment and TVA has issued a Finding of No Significant Impact. An EIS, therefore, is not necessary.
32	SELC	With plans for new gas plants at Colbert and Paradise, TVA shirks its obligation to rapidly decarbonize and achieve environmental justice, flouting a presidential mandate. In Executive Order 13990, President Biden directed all executive departments and agencies to “immediately review” and “take action” to address any Federal “actions during the last 4 years that conflict with these important national objectives [including the reduction of greenhouse gas emissions and advancement of environmental justice], and to immediately commence work to confront the climate crisis.” ¹² The order reestablishes the Interagency Working Group on the Social Cost of Greenhouse Gases and instructs agencies to use the Social Cost of Carbon to “capture the full costs of greenhouse gas emissions as accurately as possible, including by taking global damages into account.” Executive Order 13990 also makes clear that TVA should look to the Council on Environmental Quality’s 2016 guidance on climate change analysis during NEPA review. ¹⁴ That guidance recommends that agencies quantify greenhouse gas emissions and provide “a qualitative summary discussion of the impacts of GHG emissions.”	Over the past 15 years, TVA’s investments to modernize its fleet through the retirement of coal units as well as additions of lower-carbon natural gas, carbon-free nuclear, wind, and solar has resulted in a 63% decline in carbon emissions from 2005 to 2020. Additionally, TVA has a plan for 70% reduction by 2030 (from a 2005 baseline) and a path to ~80% by 2035, primarily leveraging cost-effective technologies that exist today. TVA is also investing to research and develop new carbon-free technologies, such as small modular reactors, short, mid- and long-duration storage, and carbon capture, to enable their potential commercial deployment in 2030 to 2040 and beyond. TVA plans its system based on least-cost, with consideration of risk, reliability, and environmental stewardship. Under the TVA Act and Section 113 of the Energy Policy Act of 1992, TVA must plan its system using least-cost planning methodologies to ensure power rates

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			<p>as low as feasible for its service territory. TVA continues to review its actions consistent with EO 13990 and other federal directives and will comply with all applicable laws and regulations.</p> <p>See response to comment #43 regarding the GHG analysis. The analysis considers the objective provided by the EO 13990 issued January 20, 2021.</p>
33	SELC	<p>Facing the urgent climate crisis and a clear mandate from the President to rapidly decarbonize the grid, TVA proposes to build new fossil-fuel plants. These are not minor additions TVA can easily walk away from whenever it pleases. Gas plants represent a major investment, often lasting more than forty years¹⁶ and requiring extensive new infrastructure like the gas compressor, transmission lines, and additional gas pipelines TVA proposes.¹⁷ Investing hundreds of millions of ratepayer dollars in fossil fuels now would generate avoidable and dangerous greenhouse gas emissions for decades to come, giving TVA no chance to meet Executive Order 14008's deadline to decarbonize the grid by 2035. TVA's generation decision comes at a critical moment when substantial reductions in greenhouse gas emissions are both necessary and feasible. TVA projects flat or declining load,¹⁸ and only 5% of its energy portfolio is from renewables and energy efficiency.¹⁹ TVA has no need for new fossil fuels. Instead, TVA should replace existing generation with carbon-free alternatives to align with President Biden's 2035 decarbonization mandate and to do its part in addressing the climate crisis, achieving environmental justice, and fulfilling its statutory duty as an environmental steward²⁰ for the Tennessee Valley.</p>	<p>See responses to comment #29 (carbon emissions reduction) and #30 (alternatives). TVA continuously monitors a variety of market signals to inform its planning, including forecasts for loads, commodities, and resource costs. Higher demand expectations for residential and supporting services, such as data centers, is being driven by an observed shift in interstate migration patterns into the Valley, and they are expected to continue. Incorporating these trends, our current load forecasts indicate slightly increasing peak loads over the next 20 years. With the approved retirement of Bull Run Fossil Plant in 2023, TVA will be at minimum reserve targets and must therefore replace any retiring capacity with dependable capacity to maintain summer and winter targets. Combustion Turbines to replace capacity at Allen and Johnsonville that is reaching end of life provides the least-cost dependable capacity option for the TVA system.</p>
34	SELC	<p>TVA's Draft EA fails to take a hard look at the impacts of building new gas plants at Colbert and Paradise. TVA has not accurately disclosed the greenhouse gas emissions from these plants, and it has not mentioned the effects of accelerating the climate crisis.</p>	<p>As presented in the Draft EA, Section 3.1 (Tables 3.1 and 3.2), net emissions from operation of the proposed CT plants at Paradise would result in a net emission decrease of regulated pollutants for purposes of the air permitting analysis, including GHGs. Potential</p>

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			<p>air emissions from the Colbert CT Plant (if operated at a conservatively high scenario) are rigorously evaluated within the PSD permit application submitted to ADEM. In addition, TVA has provided information in Section 3.1.2.2.3 of the Final EA that illustrates that the more efficient new units would likely replace power from the retired units with a decrease in system wide emissions. The new units are subject to stricter requirements than predecessors, including 40 CFR Part 60, subpart TTTT, and will be used as peaking units to provide grid stability and reliable power. The proposed CT units would provide flexible generation available to complement existing and future green energy sources such as wind and solar. See response to comment 43 (GHG analysis). The GHG emissions have been accurately disclosed and adequately assessed through a proxy analysis.</p>
35	SELC	<p>Nor has TVA considered the environmental injustice of building a new fossil-fuel plant at Colbert, near the overburdened, predominately Black community of Red Rock/Barton, or at Paradise, near overburdened, low-wealth communities.</p>	<p>TVA has revised section 3.18.1.1 of the EA to identify the Red Rock/Barton community as a small community that was not identified in the analysis of block group-level census data. This community is identified as a sensitive minority population subject to environmental justice considerations. The potential for any disproportionate impacts to this community are assessed in Section 3.18.2.2 of the Final EA. TVA also conducted additional outreach around the proposed Paradise CT Plant to determine if any similar small communities were present. No additional similar communities were identified.</p>

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36	SELC	TVA's failure to consider a single carbon-free alternative to combustion turbine gas plants means neither TVA nor the public is able to make a reasonable, informed decision. Because of the significant harms to climate change and environmental justice, TVA must prepare an EIS to more rigorously analyze this proposal's effects and alternatives.	<p>TVA considered a variety of renewable technologies in the 2019 IRP which recommended enhancing system flexibility to integrate renewables and distributed resources. (See response to comment #30.) We see gas as a bridging strategy – a way to continue to add renewables and support the needs of the system while new technologies are developed. The gas strategy also helps accelerate the retirement of the coal fleet.</p> <p>See response to comment #31 (request for EIS).</p>
37	SELC	Not only does the Draft EA propose the harmful policy choice to invest in fossil-fuel generation, but it fails TVA's obligation to take a hard look at the proposal's climate impacts. Because "[t]he harms associated with climate change are serious and well recognized," ²⁷ carefully considering a project's climate impacts is critical to any NEPA review—particularly when the project's very purpose is the combustion of gas in power plants ²⁸ , thereby emitting carbon dioxide and other greenhouse gases that drive climate change.	<p>See response to comment # 29 (carbon emissions reduction). TVA has considered the potential impacts to climate change in the EA, Section 3.2. TVA projected GHG emissions as a proxy for assessing potential climate change effects of the proposed action and provided a qualitative summary discussion of impacts of GHG emissions based on authoritative reports. Such an analytical approach is recommended by the Council on Environmental Quality. Additionally, TVA has expanded its proxy analysis to include the incremental increase in GHG emissions at the proposed Paradise CT, even though from an air permitting perspective, emissions from this plant are netted out. The GHG emissions from TVA's composite proposal are expected to be systematically less – perhaps even resulting in a net reduction since the newer CTs installed at Paradise and Colbert would operate at a higher thermal efficiency than the ones being retired at Allen and Johnsonville.</p>

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38	SELC	<p>TVA must accurately quantify the greenhouse gas emissions of the Colbert and Paradise gas plants, as well as the cumulative effects of its Combustion Turbine Gas Modernization program. The Draft EA's quantification of greenhouse gas emissions is limited and misleading. TVA diminishes the impacts of the new gas plants by crediting itself for decreased emissions elsewhere. At its Paradise facility, TVA claims that 750 MW of new fossil fuel generation somehow reduces greenhouse gas emissions.²⁹ To conclude that there is a "net emission decrease," TVA credits itself with the greenhouse gas emissions eliminated when it made the independent decisions to retire the Paradise coal plant, which closed in February 2020.³⁰ TVA points to its "commitment" to modestly decrease carbon emissions "system-wide" to find building new fossil-fuel plants at Paradise and Colbert somehow has no effect on climate change. First, TVA has refused to make a real commitment to decarbonize, despite the presidential mandate in Executive Order 14008 and the growing trend of decarbonization commitments from other electric utilities.³² Second, regardless of what happens "systemwide," these fossil fuel plants would add more greenhouse gas to the atmosphere, exacerbating climate change. Even if other regulatory schemes allow for such offset accounting,³³ NEPA does not. TVA is not "excused from making emissions estimates just because the emissions in question might be partially offset by reductions elsewhere."³⁴ Instead, TVA must accurately quantify and consider the greenhouse gas emissions of this proposed action.</p>	<p>The CT Modernization study results and recommendations are posted on the TVA website Here. Recommendations to sustain a reliable and flexible peaking fleet included investing to maintain reliable units, refurbish challenged units, replace most challenged units, and add aeroderivatives CTs to enhance system flexibility. This EA focuses on the third element of the recommendation, the replacement of most challenged units at Allen and Johnsonville. In total, replacement of older, less efficient combustion turbines will make the system more efficient and results in less emissions overall. This EA, as well as the 2019 IRP, assesses the cumulative impacts of the various independent elements of the CT Modernization study. Overall, modernizing the peaking fleet will have a positive impact towards reducing system-wide carbon emissions by improving the efficiency of the peaking fleet and enabling higher penetration levels of renewable resources.</p> <p>See responses to comments #32 (consideration of EOs) and #37 (climate impacts).</p>
39	SELC	<p>For both gas plants, the Draft EA diminishes the greenhouse gas emissions of burning new fossil fuels by asserting that any emissions would represent "an insignificant increase in regional and national emissions" and "would not negatively impact regional and national GHG emissions or climate change."³⁵ But if building new gas-fired power plants does not negatively impact climate change, nothing does.</p>	<p>See responses to comments #30 (alternatives), #37 (climate impacts), and #38 (CT modernization program).</p>

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Comment No.	Organization/ Name	Comment	TVA Response
40	SELC	Rather than dismiss the gas plants' climate impacts as individually minor, TVA must quantify cumulative greenhouse gas emissions from its decision to build new fossil-fuel generation.	See responses to comments #37 (climate impacts) and #41 (cumulative impacts).
41	SELC	CEQ has rejected TVA's justification—that two gas-fired power plants do not significantly worsen climate change by themselves—as misunderstanding the climate analysis NEPA requires: CEQ recognizes that the totality of climate change impacts is not attributable to any single action, but are exacerbated by a series of actions including actions taken pursuant to decisions of the Federal Government. Therefore, a statement that emissions from a proposed Federal action represent only a small fraction of global emissions is essentially a statement about the nature of the climate change challenge, and is not an appropriate basis for deciding whether or to what extent to consider climate change impacts under NEPA. Moreover, these comparisons are also not an appropriate method for characterizing the potential impacts associated with a proposed action and its alternatives and mitigations because this approach does not reveal anything beyond the nature of the climate change challenge itself: the fact that diverse individual sources of emissions each make a relatively small addition to global atmospheric GHG concentrations that collectively have a large impact. ³⁹	See responses to comment #37 (climate impacts). Additional detail regarding the cumulative impact of GHGs is provided in Section 3.20 of the EA. TVA projected GHG emissions as a proxy for assessing potential climate change effects of the proposed action and provided a qualitative summary discussion of impacts of GHG emissions based on authoritative reports. Such an analytical approach is recommended by the Council on Environmental Quality
42	SELC	To address cumulative impacts, TVA must provide data on the combined emissions of building new combustion turbine gas units at Paradise and Colbert. Further, TVA must analyze and disclose the climate impacts of its Combustion Turbine Gas Modernization program. NEPA requires analysis of the cumulative impacts of connected actions. ⁴¹ Actions are connected when they “[a]re interdependent parts of a larger action and depend on the larger action for their justification.” ⁴² TVA justifies its decision to build new gas units as part of a program to modernize its combustion turbine gas fleet. “In Fiscal Year 2019, TVA completed a CT Modernization Study to evaluate the condition of TVA’s current CT units and form recommendations for investments to ensure a reliable peaking fleet into the future.” ⁴³ Pursuant to that study, TVA determined that “it is prudent to replace [Allen and Johnsonville CT] units with more	See response to comments #38 (CT modernization program) and #41 (cumulative impacts). The elements of the CT Gas Modernization Program have independent value and are not connected actions. The cumulative impacts of these elements are assessed in this EA as well as the 2019 IRP, which goes further in assessing the cumulative impacts of a target supply mix (including gas generation) over the IRP’s planning horizon.

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		<p>efficient frame CT technology available today.”⁴⁴ TVA’s decision to build new gas units at Paradise and Colbert is part of a broader Combustion Turbine Gas Modernization program, and TVA must take a hard look at the program’s climate impacts. For example, TVA seems to unreasonably assume that it must replace at least as much combustion turbine gas generation as it retires. But what are the climate impacts of replacing all of the “Most Challenged” combustion turbine gas units with new gas? What about replacing the “Challenged” gas units, too? TVA must disclose and analyze these program-wide climate impacts.</p>	
43	SELC	<p>TVA should use the Social Cost of Carbon to consider and disclose the climate impacts of its proposal, as compared to the status quo and reasonable alternatives. TVA should quantify those impacts using the Social Cost of Carbon. Developed in 2010 and updated in 2016, the Social Cost of Carbon is a scientifically derived metric to “provide a consistent approach for agencies to quantify [climate change] damage in dollars.”</p>	<p>Comment Noted. TVA reviewed the Climate Change and GHG analysis presented in Section 3.2 of the Draft EA. The Final EA includes an expanded discussion of findings of the U.S. Global Change Research Program (USGCRP), the leading U.S. scientific body which provided a qualitative discussion of the effects of GHG on both a national and regional scale. In addition, TVA also considered use of the social cost of carbon (SCC) metric in the assessment of climate change impacts resulting from operation of the CT plants. TVA conducted a proxy analysis that analyzed GHG emissions within the context of local, national, and global projections.</p> <p>It is within TVA’s discretion to provide qualitative or quantitative GHG analysis as long as it clearly explains why.</p> <p>TVA’s concerns with the use of SCC echo those made by the National Academy of Sciences and Medicine, Engineering (NASEM) <i>Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide</i> (2017). These concerns include: (1) the lack of consensus on</p>

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			<p>the appropriate discount rate leads to significant variation in outputs, rendering those outputs unreliable; (2) the SCC tool does not measure the actual incremental impacts of an individual projects due to both scale and complexity, and (3) there are no established criteria identifying the monetized values considered significant for NEPA purposes.</p> <p>On February 19, 2021 CEQ's 2019 proposed NEPA guidance was rescinded. CEQ was directed to take this action through EO 13990. Also in February 2021, the Interagency Working Group on the Social Cost of Greenhouse Gases, released <i>Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under Executive Order 13990</i>. These SCC estimates are considered "interim" values that are currently being evaluated by study groups.</p> <p>While the withdrawal of the 2019 draft NEPA guidance does not formally reinstate the previous 2016 NEPA guidance, CEQ's announcement of recession encourages agencies to consider "all available tools and resources" when analyzing GHG emissions and climate change in their NEPA reviews, including the 2016 NEPA guidance "as appropriate and relevant." The assessment in this EA follows CEQ's 2016 NEPA guidance.</p> <p>In light of the stated concerns about the SCC methodology, TVA's use of a proxy emissions analysis is not only appropriate but is consistent with the 2016 CEQ NEPA guidance.</p>

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44	SELC	Not only will the Social Cost of Carbon convey the harms of TVA's proposal, but it allows TVA "to incorporate the social benefits of reducing carbon dioxide (CO ₂) emissions" in carbon-free alternatives to building new gas.	See response to comment #43 (SCC).
45	SELC	<p>TVA has not discussed climate impacts. Under NEPA, TVA must "quantify and consider" a project's downstream greenhouse gas emissions, or explain why it cannot. Even if TVA's quantitative analysis were adequate, TVA must do more. "The key requirement of NEPA . . . is that the agency consider and disclose the actual environmental effects in a manner that . . . brings those effects to bear on decisions to take particular actions that significantly affect the environment."⁵³ Therefore, in the context of greenhouse gas emissions, NEPA review must "include a discussion of the 'significance' of this indirect effect . . . as well as 'the incremental impact of the action.'"</p> <p>TVA includes a brief, general discussion of climate change and recognizes that it is caused by activities that burn fossil fuels like gas. TVA does not discuss the impacts of running gas-fired power plants for decades to come. TVA should include a "qualitative summary discussion of the impacts of GHG emissions based on authoritative reports."</p>	See response to comment #37 (climate impacts) and comment #41 (cumulative impacts).
46	SELC	For TVA, the past three years have been the wettest years in 131 years of record keeping, and 2020 set the single-year record with rainfall 139% above normal. ⁶⁰ These climate impacts should be top of mind for TVA, given its mission to manage the Tennessee River watershed and control flooding in the Valley. A robust discussion of actual and worsening climate effects like these is essential for NEPA review of TVA's generation decisions. Considering reasonable alternatives, disclosing their greenhouse gas emissions, and discussing their environmental impacts, including through the Social Cost of Carbon, will ensure that TVA and the public have the information necessary to make a reasoned decision.	<p>Section 3.2 of the Draft EA has been revised to include a robust discussion of U.S. Global Change Research Program (USGCRP) findings regarding impacts attributed to climate change in the southeast region of the U.S.</p> <p>See responses to comments #37 (climate impacts) and #43 (SCC).</p>
47	SELC	TVA's analysis of the impact of the proposed gas plants on air quality is premised on its assertion that the new plants will comply	TVA has assessed the air quality impacts of the proposed projects in section 3.1 of the EA.

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		<p>with permit limits set by “applicable state and federal regulations.”⁶¹ Even though the new gas plants will “result in an increase in local emissions,” TVA concludes that these increases will not be significant because of these permit limits: “[C]ompliance with PSD requirements . . . ensures there is no significant impact to or deterioration of air quality due to the proposed project.”⁶² But permit compliance alone cannot justify a not significant finding under NEPA. Even the largest polluters must comply with the conditions of applicable permits, and yet their emissions may still be significant and warrant review in a NEPA document. Indeed, some air pollutants, like fine particulates, have harmful effects even when air quality standards are not violated.⁶³ TVA must actually perform some analysis of impacts to air quality to justify the conclusion presented in the Draft EA. It failed to do so.</p>	<p>Emissions from the Colbert CT were determined through the PSD program which provides a rigorous analysis of source emission and their local impacts. For the Paradise project, the contemporaneous emissions/GHG credits for the retired Paradise coal-fired boiler is allowed via 40 CFR 52.21 and is utilized in agreement with the state regulatory agency. This analysis supports the conclusion that emissions will not exceed the NAAQS which are established to be protective of human health, including sensitive populations such as children, the elderly, and those with compromised respiratory function. In addition, the plan to use these units for peaking power helps integrate renewables and decrease future emissions while providing reliability and stability, enabling TVA to build a cleaner greener fleet of power generation. The air quality analysis is conducted against the backdrop of extensive state and federal regulations developed under the Clean Air Act and analogous state statutes, providing a comprehensive assessment of the air quality impacts of the project. The air quality analysis in Chapter 3.1 of the EA is further supplemented by an analysis of Climate Change and Greenhouse Gas Emission impacts in Section 3.2 of the EA.</p>
48	SELC	<p>TVA fails to take a “hard look” at disproportionate impacts on environmental justice communities.</p> <p>TVA’s cursory approach to assessing the impacts of the proposed gas plants on air quality is even more problematic in the context of its environmental justice analysis.</p>	<p>TVA has revised the analysis in Section 3.18 to provide more detail regarding the analysis of potential disproportionate impacts to environmental justice communities as a result of air quality emissions. As noted in that analysis, while operation of the CT plants would result in localized minor emissions that would be dispersed throughout the study area population</p>

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			<p>groups, many of which do not meet the criteria to be an environmental justice community. Impacts of the air emissions on the minority and low-income populations would not be disproportionate and those emissions also would not have significant adverse air quality effects on communities within the study area.</p> <p>See response to comment #47 (air quality analysis).</p>
49	SELC	<p>TVA's environmental justice analysis for the Colbert gas plants is flawed in two respects. First, the utility relied solely on a desktop demographics analysis using EJSCREEN and census block data which failed to identify the predominantly Black community of Red Rock/Barton located less than a mile from TVA's facility. Residents in this community organized in 2015 and 2016 to oppose TVA's plans to cap its coal ash lagoons and permanently store its waste ash on the Colbert site. They frequently communicated with TVA about its coal ash disposal plans, participated in filming a video entitled "Ashes to Ashes" documenting their experiences, and were the subject of local news reporting.⁷⁷ Longtime residents expressed concern about particulates that covered their homes and cars from the stacks of the Colbert Fossil Plant before it was closed.⁷⁸ Yet TVA never acknowledges the existence of the Red Rock/Barton community in the Draft EA, despite the community's record of engagement with the utility.</p>	<p>See responses to comments #35 (environmental justice communities) and #48 (environmental justice communities).</p>
50	SELC	<p>The fate of the Red Rock/Barton community in the Draft EA is a problem faced by other environmental justice communities.⁷⁹ It is arbitrary for TVA to conclude that no communities of people of color will be affected by the proposed gas plants when it has evidence that one such community, on the boundary of the utility's property, has spoken up and raised concerns about other issues at the site. At a bare minimum, TVA must identify this community and any other environmental justice communities hidden beneath the coarse analytics of its desktop demographic analysis.</p>	<p>See responses to comments #35 (environmental justice communities) and #48 (environmental justice analysis).</p>

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51	SELC	<p>TVA concludes—again without analysis—that because the proposed gas plants at Colbert would comply with the conditions of a Clean Air Act permit, there will be no disproportionate impacts to environmental justice communities. But the Fourth Circuit flatly rejected this approach in <u>Friends of Buckingham</u>, a case involving emissions from a gas-fired compressor station in the historic community of Union Hill, Virginia: “[B]lindly relying on ambient air standards is not a sufficiently searching analysis of air quality standards for an EJ community.”⁸⁰ The Fourth Circuit had good reason to dismiss the notion that mere compliance with NAAQS means there will be no disproportionate adverse health risks. Whether a facility would allow an area to comply with air quality standards is distinct from whether it would have a disproportionately high and adverse effect on environmental justice populations. Otherwise, consideration of disproportionate harm would be required only for facilities that would contribute to a violation of such air quality standards—and thus could not lawfully be built.⁸¹ TVA must assess the impact of the proposed gas-plant emissions on the specific environmental justice communities that live near the Colbert site, including the low-income communities identified in TVA’s desktop analysis and the Red Rock/Barton community.</p>	<p>See response to comments #35 (environmental justice communities), #37 (climate impacts), #47 (air quality analysis), and #48 (impacts not disproportionate)</p>
52	SELC	<p>TVA’s analysis of the impacts of emissions from the proposed gas plants at the Paradise location is also flawed. Here, TVA concludes that because it shuttered the Paradise Unit 3 coal plant in February 2020, low-wealth communities will actually ⁸² experience less pollution once the gas plants are operational than they did in the past. TVA’s argument misdirects the focus of the analysis away from the proposed gas plants to an unrelated action—the closure of a different power plant not part of the Draft EA—that the utility took more than a year ago.⁸³ The question that TVA must address now, in 2021, is whether the emissions from the new gas plants—the three proposed combustion turbines—will cause a disproportionate impact on the neighboring low-wealth communities. TVA’s Draft EA does not attempt to answer that question.</p>	<p>The netting of the shuttered emissions from Paradise Unit 3 and those from the Paradise proposed gas plant is permissible under the PSD regulations. TVA has assessed the incremental effect of the emissions from the Paradise gas plant on the surrounding environmental justice communities and found no disproportionate impacts on those communities. See responses to comments #35 (environmental justice communities) and #48 (environmental justice analysis).</p>

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53	SELC	TVA unlawfully limited its cumulative impacts analysis to only “those resource issues potentially adversely affected by project activities.” ⁸⁴ But the purpose of a cumulative impacts analysis is to identify the “incremental impact” of the proposed action, even when that action has “individually minor” impacts. ⁸⁵ NEPA requires that the Draft EA contain “some quantified or detailed information” about cumulative impacts” and that the “analysis must be more than perfunctory[.]” ⁸⁶ TVA cannot wave off its obligation to conduct a meaningful analysis of cumulative impacts solely because it concludes that the direct and indirect impacts of its proposed gas plants are minor.	TVA has revised the cumulative impact assessment to consider potential cumulative impacts to air quality, climate change and environmental justice communities. Other resources considered in the EA are not included in the cumulative impact analysis as those resources are either not adversely affected, or the effects are considered to be temporary, negligible or beneficial.
54	SELC	TVA's Draft EA must examine the cumulative air quality impacts on environmental justice communities of the expansion of the Cherokee Industrial Landfill. Like the proposed gas plants, the landfill is located near the predominantly Black community of Red Rock/Barton. ⁸⁷ The landfill is slated for a significant expansion, increasing its footprint by an additional eight acres, fourteen percent larger than its current size. ⁸⁸ According to state records, the waste stream permitted at the landfill includes “nonhazardous industrial wastes, nonhazardous industrial sludge, construction and demolition wastes, rubbish . . . , asbestos, and tires” and contemplates the open burning of waste with a subsequent approval from state regulators. ⁸⁹ Yet the Draft EA does not acknowledge, let alone assess, the potential cumulative impacts to local air quality for the Red Rock/Barton community next door to the proposed Colbert gas plants and does not satisfy NEPA.	See Response to comment #53 (expanded cumulative impact assessment). The EA recognizes the planned expansion of the Cherokee Industrial Landfill in the cumulative impact analysis (Section 3.20) and concludes the cumulative impact of construction activities associated with landfill expansion when combined with the ongoing emissions from local vehicles, together with construction activities associated with the CT Plant at Colbert, would incrementally increase emissions within the surrounding area. However, these increases would be minor, localized, and not disproportionate, as these impacts would not be disproportionate because they would be consistent across all communities (i.e., environmental justice and non-environmental justice). In addition, the Cherokee Landfill would be operated in compliance with applicable regulations and permits and state and federal criteria for operation, including design criteria, location restrictions, financial assurance, corrective action (cleanup), and closure requirements. As such, the operation of the landfill will not adversely affect public health or

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			the environment. In addition, as noted in the comment, any changes in current permitted operations at the landfill, such as open burning of waste, would require subsequent state approval, and as such would be conducted in accordance with federal and state requirements that are designed to protect human health and the environment.
55	SELC	TVA ignores reasonable, carbon-free alternatives to the proposed gas plants, even though these alternatives could eliminate the project’s greenhouse gas emissions and its impacts on environmental justice communities. ⁹⁰ These alternatives include: <ul style="list-style-type: none"> • Retiring, but not replacing, the Allen and Johnsonville gas plants • Energy efficiency, demand response, solar, and battery storage options • Reasonable combinations of carbon-free technology, such as demand response or solar combined with battery storage 	See response to comment #30 (alternatives).
56	SELC	TVA defines the purpose of its proposed action so narrowly that it gives the agency a perfunctory, binary choice: (1) do nothing or (2) replace old gas plants with new gas plants: The Draft EA’s alternatives closely track this narrow purpose, never considering or even mentioning the possibility that TVA may not need to replace this peaking capacity at all or that clean, carbon-free alternatives to the proposed gas plants exist. TVA only considered “various gas asset types” to replace retired generation at Allen and Johnsonville, before settling on “gas-fired frame combustion turbines” because of their ability meet peak demand. ⁹⁶ There is no analysis of an option in which TVA retires, but does not replace, the Allen and Johnsonville plants and no mention of energy efficiency, demand response, and battery storage, all viable peaking resources, or other carbon-free alternatives.	The proposed action to replace lost CT capacity because of the retiring CTs at Allen and Johnsonville is not narrow. Rather, it aligns with the 2019 IRP to evaluate end-of-life dates for aging generation units and to continue the integration of renewables through the installation of replacement generation units. See response to comment #30 (alternatives) and comment #58 (generating capacity).
57	SELC	The Draft EA’s restricted analysis is not consistent with the 2019 IRP. To be sure, the IRP contemplates the addition of some gas-fired combustion turbines in the future. But it also emphasizes that the utility must have flexibility to adjust its plans to ongoing changes	As noted in Section 1.4 of the EA, the proposed actions evaluated in the EA support TVA’s preferred alternative, Target Power Supply Mix, as described in the IRP and accompanying EIS.

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		<p>in the energy landscape of the Tennessee Valley. The IRP does not select a preferred scenario for energy development, instead opting to recognize that “a variety of future scenarios are possible and each strategy has positive aspects.”⁹⁷ TVA went on to select all of the IRP results for its final recommendation “to provide flexibility for how the future evolves.”⁹⁸ For gas specifically, the IRP observes that the need for new gas generation will depend on “demand for electricity, solar penetration, and evolution of other peaking technologies.”⁹⁹ In other words, the IRP contemplates later analysis at the individual project stage to gauge the pace, scope, and cost of these changes and to determine the best manner and resources to address them. The Draft EA never acknowledges TVA’s commitment to resource flexibility, let alone offers a robust alternatives analysis of these options.</p>	<p>The IRP Target Power Supply Mix included the potential for up to 5,200 MW of CT additions by 2028, partly driven by the potential to retire some of TVA’s oldest combustion turbines. Given this possibility, the EIS that accompanied the IRP evaluated the potential retirement of TVA’s oldest CT units, which included the Allen CT Plant and Johnsonville CT units 1-16. The IRP also recommended a near-term action to enhance system flexibility to integrate renewables and distributed resources. As the peaking gas fleet will be critical in successful integration of renewables, a CT Modernization Study was completed that evaluated alternatives and made recommendations to TVA leadership. The EA evaluates the recommendation to modernize the gas fleet. Modernizing the peaking gas fleet is only one piece of enhancing system flexibility. TVA has contracted for 180 MW of battery storage, in conjunction with 2,100 MW of contracted solar additions to come online by 2023. Also, TVA is planning to install a 20 MW battery storage facility near Vonore, TN by 2023. Operational experience with these early battery use cases will inform the path forward for future battery storage additions to provide additional system flexibility.</p>
58	SELC	<p>TVA must evaluate an alternative which retires, but does not replace, the Allen and Johnsonville gas plants. One factor identified in the IRP—changes in the “demand for electricity”—raises significant questions about the need for the proposed gas plants. In the Draft EA, TVA assumes, again without acknowledgment, that it will need to replace the 1400 MWs of gas plants at Allen and Johnsonville that it plans to retire. But it is far from clear that TVA must replace this retiring capacity at all, let alone with another 1400</p>	<p>TVA continuously monitors a variety of market signals to inform its planning, including forecasts for loads, commodities, and resource costs. Higher demand expectations for residential and supporting services, such as data centers, is being driven by an observed shift in interstate migration patterns into the Valley that is expected to continue.</p>

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		<p>MW of gas generation that will pollute for decades into the future. Indeed, during the recent extreme weather event in February 2021, TVA touted the fact that it was not only able to meet its own three-year high of demand, but was also able to send excess electricity outside of the region to assist neighboring utilities who were suffering grid outages.¹⁰⁰ Further, while TVA credited the diversity of its generation for reliable service during the extreme weather, adding more gas plants hardly increases the diversity of the utility's fleet.¹⁰¹ TVA also maintains a large reserve margin, one that is substantially larger than recommended by the North American Electric Reliability Corporation to maintain reliability¹⁰², and expects demand "to be flat, or even declining slightly, over the next 10 years."¹⁰³</p>	<p>Incorporating these trends, our current load forecasts indicate slightly increasing peak loads over the next 20 years. With the approved retirement of Bull Run Fossil Plant in 2023, TVA will be at minimum reserve targets and must therefore replace any retiring capacity with dependable capacity to maintain summer and winter targets. Combustion Turbines to replace capacity at Allen and Johnsonville that is reaching end of life provides the least-cost dependable capacity option for the TVA system. During the extreme weather event in February 2021, only the very western side of the TVA region experienced the extreme cold temperatures. Had the entire TVA service area experienced the extreme cold weather there would have been less excess power to sell to neighboring utilities. TVA maintains one of the most reliable and diverse resource portfolios in the nation. As additional coal plants reach end of life, TVA plans to add a mixture of solar, gas, and storage resources in the 2020s, while emerging technologies will play a role in the 2030s and beyond. Renewable, gas, and storage resources complement TVA's existing nuclear and hydro fleets to create a diverse generating portfolio. Every two to three years, TVA conducts a reserve margin study, targeting an industry standard of one loss of load event in 10 years. In 2020, TVA refreshed its reserve margin study and established planning targets of 18% in summer and 25% in winter, using the same methodology explained in the 2019 IRP (Appendix D). NERC evaluates electric reliability</p>

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			<p>for the nation, which is largely summer peaking, so the 15% is a summer planning guideline. Also, the larger the region being evaluated the lower the target can be, as there is diversity across the region. Some utilities in the Southeast are becoming winter peaking, so reliability studies must also focus on the winter season which has much greater weather volatility.</p>
59	SELC	<p>In addition, demand for TVA power may decline further because several customers are evaluating terminating their power supply contracts with the utility. These customers include four local utilities that filed a petition with the Federal Energy Regulatory Commission for unbundled access to TVA's transmission grid.¹⁰⁴ These four utilities represent roughly three to four percent of TVA's overall load. TVA's largest customer, Memphis Light, Gas & Water, representing another ten percent of TVA's load, has also actively considered other power supply options. While the CEO of the Memphis utility recently advised suspending that process, he also noted a number of uncertainties that may spur the utility to revisit the issue in the near future.¹⁰⁵ TVA has been so concerned about the defection of its distribution utility customers and the corresponding load loss that, in 2019, it made a dramatic change in its power supply contracts in an attempt to forever lock in as much of its load as possible.¹⁰⁶</p>	<p>The long-term partnership with the LPCs aligns our interests such that there is more engagement in TVAs direction setting and strategic decisions, and more flexibility to address near-term and mid-term interests of all parties. In general, the Valley public power model works because its benefits and costs are equitably shared across everyone served by the system. For TVA and local power companies, sharing the benefits and related costs of the power system is the foundation of public power. Allowing the four FERC petitioners to use the TVA transmission system in this way would shift their share of fixed costs to the other 149 local power companies served by TVA, which is fundamentally inequitable and unfair to the 10 million people TVA serves. Additionally, TVA evaluates additional planning sensitivities to evaluate the impacts of declining load resulting from either economic conditions or other loss of load, including customer notice. At this time, TVA has no current customers that have provided notice that they intend to terminate their contract at the end of its current term. As such, TVA maintains an obligation to serve their load. TVA is evaluating the retirement of the</p>

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			balance of the coal fleet by 2035 and has PPAs which will expire over time. If notice by customers is given, TVA would have the option to not replace a portion of that capacity.
60	SELC	These details, and their implication that TVA has excess generating capacity, are specifically the types of changes in the energy landscape that TVA pledged, in the 2019 IRP, to evaluate. ¹⁰⁷ They raise serious questions about whether there is even a need to replace the 1400 MW of gas generation that TVA is retiring, but the Draft EA never grapples with them. TVA must evaluate an alternative that retires, but does not replace, the Allen and Johnsonville plants.	See response to comment #58 (generating capacity).
61	SELC	Another alternative potentially affecting demand that TVA has failed to discuss is the proposed Southeast Energy Exchange Market (SEEM), currently pending before the Federal Energy Regulatory Commission. ¹⁰⁸ The SEEM was not part of the 2019 IRP, nor is it mentioned in the Draft EA. TVA must analyze whether SEEM could provide an alternative to building the proposed new gas plants.	The proposed Southeast Energy Exchange Market (SEEM) would provide an avenue for TVA and neighboring utilities to more easily buy and sell excess energy intra-hour on a non-firm basis. Since power would only be available for purchase within the current hour, this market would not provide TVA with additional dependable capacity that can be counted on during peak periods and extreme weather events.
62	SELC	TVA must evaluate the use of carbon-free options, alone or in combination, as alternatives to the proposed gas plants. A second factor identified in TVA's 2019 IRP—"the evolution of other peaking technologies"—also warrants review in the Draft EA's alternatives analysis. The TVA Act requires the utility to consider energy efficiency and "to treat demand and supply "resources on a consistent integrated basis." And TVA's own sensitivity analysis in the 2019 IRP identified the value of these resources: when artificial caps are removed, the planning model picks energy efficiency and demand response instead of new gas generation. ¹¹⁰ Specifically, the sensitivity analysis revealed that 1900 MW of energy efficiency and demand response displace the need for new gas-fired combustion turbines like the plants proposed for Colbert and Paradise. ¹¹¹ The IRP also identifies demand response and battery	See response to comment #30 (alternatives). Modernizing the dispatchable peaking fleet allows TVA to optimally integrate intermittent renewable resources. While energy efficiency and demand response programs can be effective at reducing load, energy efficiency is not dispatchable and demand response options are limited in the number of times they can be called on.

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		<p>storage options as peaking technologies with the potential to provide the same reliability and flexibility as the proposed gas plants.¹¹² For batteries, TVA goes so far as to express the goal of gaining “early experience with battery storage on its system” to understand how this new technology can be used “to provide economic benefit and system flexibility”¹¹³ and notes that “the trajectory and timing of [battery storage] additions” are in flux as the technology evolves.¹¹⁴ TVA also committed to “continue to monitor rapidly evolving battery storage technologies for improving economics.”¹¹⁵</p>	
63	SELC	<p>Yet while the IRP identifies these carbon-free options, the Draft EA does not carry forward the analysis. TVA simply leaves unanswered any questions about whether energy efficiency, demand response, battery storage—or any other carbon-free option—is today, in 2021, a competitive alternative to the proposed gas plants. Can energy efficiency and demand response replace the proposed gas plants? Are the Colbert or Paradise locations suitable sites for the utility to gain early experience with battery storage? Has battery technology evolved since 2019 as contemplated by the IRP? The Draft EA is silent, conflicting with TVA’s own assessments in 2019. TVA’s restricted analysis also does not track the evolving facts on the ground. In 2020, TVA announced two battery storage projects, including a solar plus storage Green Invest project in Mississippi (50 MW for four hours) and a storage-only project owned by TVA in East Tennessee (40 MW).¹¹⁶</p>	<p>See response to comment #30 (alternatives) and #62 (energy efficiency and demand response). As TVA considers future resource additions, including storage, it will consider a variety of factors during site selection. These factors include transmission system needs, environmental concerns, fuel supply availability, geography, financial considerations, and others. Colbert and Paradise are attractive options for several types of resource additions given their brownfield state and existing connections to the transmission grid.</p>
64	SELC	<p>TVA does not—and indeed cannot—claim that carbon-free alternatives to the proposed gas plants are policy-based options that it can summarily dismiss. Rather, they are alternatives that the utility must consider because they are “within the ambit” of TVA’s statutory mission.¹¹⁷ Again, TVA fails to meet this standard in the Draft EA. TVA’s mission is “serving the Tennessee Valley through energy, environmental stewardship, and economic development.”¹¹⁸ In describing its mission, the agency’s website announces, among other things, that the utility is “generating . . . more renewable energy” contributing to a large reduction in</p>	<p>See discussion of alternatives in response to comment #30 (alternatives) that explains why, among other things, the carbon-free replacements cannot provide the magnitude of year-round reliable and cost-effective energy required for replacement generation from the retirement of aging CT units. Further, the CT replacements would help TVA integrate more renewables on the system.</p>

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		greenhouse gas emissions. ¹¹⁹ Moreover, the 2019 IRP explicitly contemplates the addition of options like battery storage and demand response—all alternatives are on the table for future consideration. ¹²⁰ When TVA reaches project-specific decision points, like the proposed construction of new gas plants, it must include alternatives that fall within the ambit of its statutory mission and the 2019 IRP.	
65	SELC	Even if replacing the retired gas plants at Allen and Johnsonville with carbon-free alternatives were inconsistent with the 2019 IRP—which it is not—the IRP is a broad planning document and “does not dictate a specific series of actions . . . at particular plants.” ¹²¹ The IRP “sets nothing in stone about the particular amount, or even the particular range” of a given generation source across TVA’s system, much less at specific facilities. ¹²² Because TVA demurred on selecting a specific capacity addition portfolio in the 2019 IRP, it must again evaluate a full range of carbon-free alternatives, alone or in combination, for meeting the purported capacity need asserted in the Draft EA for the Colbert and Paradise gas plants.	See response to comment #57 (2019 IRP) and comment #30 (alternatives).
66	SELC	TVA’s alternatives analysis must address unresolved conflicts related to climate change and environmental justice. While courts accept that an agency’s obligation to evaluate alternatives is lessened in an environmental assessment, TVA cannot just fall back on its conclusion that the impacts of the proposed gas plants are not significant to wave off meaningful consideration of carbon-free options. As we wrote above, the agency simply did not take a hard look at the project’s greenhouse gas emissions or its impacts on environmental justice communities. But even accepting—and commenters do not—TVA’s conclusion that the impacts of the proposed gas plants would be insignificant, NEPA is clear: an environmental assessment, standing alone, must contain a meaningful consideration of alternatives. ¹²³ Under § 4332(2)(E), federal agencies must “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources.” ¹²⁴ Here, unresolved conflicts exist concerning how TVA should use the Paradise and Colbert properties to	Per CEQ Regulations at 1502.14 (1978), an agency must “...objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.” As discussed in Chapter 2, the peaking generation lost as a result of retiring CTs at Allen and Johnsonville, must be replaced. In determining replacement generation, TVA evaluated alternative generation types and locations. Table 2-1 in the EA provides a summary of the criteria that was used to evaluate alternatives. Based on that criteria, alternatives to the proposed action that were not considered reasonable were dismissed. In addition, TVA believes the analysis of impacts of the proposed action on climate change and environmental justice

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		generate electricity for the Tennessee Valley, how TVA should use the resources of the atmosphere to discharge climate-warming greenhouse gases from gas-fired plants, and the impacts of its proposal on people of color and low-wealth communities. The climate crisis and environmental justice are priorities for every federal agency. ¹²⁵ NEPA's alternatives requirement takes on special importance in this context. TVA's conclusory analysis fails to meaningfully address these conflicts and violates NEPA.	communities has been adequately addressed in the EA. See responses to comments #30 (alternatives) and #36 (renewables).
67	SELC	Because building new gas-fired power plants is a major federal action with significant environmental effects, TVA must prepare an environmental impact statement (EIS).	See response to comment #31 (request for EIS).
68	Jim Steitz	The construction of new gas-fired generators at the Paradise, KY and Colbert, AL sites is not commensurate with the appropriate urgency that TVA should feel regarding our climate situation. New gas-fired generators, which demand a production life of several decades to be economically rational, reside rather discordantly against the future climate choice that we are today making. Recent data concerning methane leakage from the natural gas industry calls into question the climate advantages of this fuel, and therefore the past and future reduction of system-wide climate impact (as CO2 heat-trapping equivalent) claimed by TVA pursuant to that fuel. I urge you to drop the plan for new gas-fired generators at Paradise, KY and Colbert, AL, and to build instead more solar, wind, and battery storage, whose short-term costs are higher but minuscule relative to the cost of continuing to push atmospheric carbon concentration beyond its present 410 ppm.	Comment noted. As noted earlier, the CTs at Paradise and Colbert will help integrate renewables in the TVA system and thereby help reduce GHG emissions. See, also, response to comment #29 (carbon emissions reduction).
69	Adrian Reif	Your proposal to build 3 new natural gas plants is a bad deal for your rate payers. There are more cost-effective solutions now (and by the time that construction is permitted and finished there will be even more). Caps and costs on carbon are coming, making these new projects poor decisions for a carbon constrained future. According to the EIA, rates are going to keep increasing while neighboring generators, investing in renewables, will have lower rates.	See response to comment #30 (alternatives).

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70	Nathan Ottinger	I would like you to reconsider the proposal to construct additional natural gas generating facilities which will undoubtedly cost more to construct and operate than renewable sources would cost to operate.	See response to comment #30 (alternatives).
71	Nathan Ottinger	Your proposal will result in higher electricity rates than necessary, which will then result in large metro areas (e.g., Memphis) leaving TVA and purchasing electricity from lower cost providers sourcing electricity from lower cost renewables, which will further result in higher electric rates for customers of small utilities that can't get out of costly TVA contracts such as my parents, customers of Greeneville Light and Power.	See response to comment #30 (alternatives) and comment #59 (TVA partners).
72	Grace McPherson	In order for these to be financially viable, they must stay in operation for decades! I believe the average life span is about 40 years for these types of units, but internationally it has been agreed that we must phase out fossil fuels much sooner than the full lifespan of these proposed units. Surely, if we have the resources to build two new CT plants, we can divest and shift to a clean energy option	See response to comment #30 (alternatives).
73	Marie Mainil	I am writing to let you know that I think that the TVA proposing to build 3 new natural gas plants in Kentucky and Alabama is a bad idea.	Comment noted.
74	Russ Krul	I say go for it. You guys at TVA have been supplying us with good "quality" clean electricity for a fair price for years and years.	Comment noted.
75	Jack Keeling	I suggest following policy of the Administration and spend the money instead on renewables.	Comment noted. See response to comment #36 (renewables).
76	Terri Brown	Kentucky has historically been maligned as a coal only entity; however, history shows that our state has and is well diversified in power generation. To continue that history, we must innovate and not become a slave to one fuel source. It is inevitable that natural gas will not stay at a sub \$3.00 per cubic feet. As demand increases, regardless of how plentiful we believe our nations supply is, the price will once again reach untenable levels where profits are negated. Science has already proposed hybrid split systems, such as solar H2 productions coupled with natural gas, as a way to hedge against future rising costs. This consideration would start the move to an all H2 facility. These projects would meet the US	Comment noted. See response to comment #30 (alternatives).

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		<p>directives for cleaner energy. Other systems that could be considered are modular nuclear, pump storage (air or water) in and out of abandoned mines. Any project that employs or retains personnel is a project we will be proud to endorse. To that end, ensuring a resilient network of power that is innovative and meets the policy and regulation demands required for our future, would be an asset to our area. Placing a significant project at Paradise would allow TVA to hedge against the other inevitable, when the Madrid Fault erupts again and Shawnee completely fails. A project at Paradise, projected to be unscathed by the Madrid, would ensure the resiliency required in Energy generation. power generation that utilizes stored energy, particularly green energy, should also be considered.</p>	
77	Christine Garcia	We need to move toward renewable energy, not fossil fuels	Comment noted. See response to comment #36 (renewables).
78	Dave Batten	It's time to transition to clean energy, not double down on pollution.	Comment noted. See response to comment #36 (renewables).
79	Richard Tittle	Tennessee is green, get it green and keep it green! We are not the sharpest state in the Union, but we could be. Let's start honing!!!	Comment noted. See response to comment #36 (renewables).
80	Michael Pardee	Protect our environment.	Comment noted.
81	Russell Kennedy	<p>We need to distance ourselves from burning fossil fuels. Let's change our path forward and incorporate renewables like wind and solar. Together we can take some load off of the infrastructure that is in place now and put in some storage like batteries or pumped hydro. Take some of the money used to build a new gas fired plant to put solar on homes and businesses. There are so many opportunities for our region other than polluting fossil fuels. Let's lead the way in clean renewable energy and put the Tennessee Valley to work building wind turbines and putting solar on our roofs. Make this region cleaner for ourselves and future generations to come.</p>	Comment noted. See response to comment #36 (renewables).
82	Susan Hathcock	This is literally the last thing we need.	Comment noted.

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83	Christina Norris	Climate change is threatening our very existence. Experts say we need to end our reliance on fossil fuels and replace such fuels with renewable resources. Building more gas plants is going in the wrong direction. Please stop creating more gas infrastructure and, instead, expand renewable resources.	Comment noted. See response to comment #36 (renewables).
84	Dick and Lacy Bell	Please leave fossil fuel in the past. Solar and wind are your future!!!!	Comment noted. See response to comment #36 (renewables).
85	David Riall	This is B.S. we don't need fossil fuels any more!!!!	Comment noted.
86	Christie Walters	TVA must begin to invest in clean energy now. More pipelines for oil and drilling by cracking only ruin the environment. We all must live on this Earth and must protect it before it's too late.	Comment noted. See response to comment #36 (renewables).
87	Mark Doyle	Please, please, please recognize that more fossil fuels are the last thing the world needs. I'd like my children to grow up in a world where this sort of thing is as outdated as the powdered wig.	Comment noted.
88	Elizabeth Barger	The gas lines in TN are in terrible shape. We don't need to add to expense of polluting gas for our electricity. Let's put our American energy into sustainable energy. It is the efficient and most profitable way to go.	Comment noted. See response to comment #36 (renewables).
89	Susan O'Connor	It is time to increase wind and solar energy production.	Comment noted. See response to comment #36 (renewables).
90	Cassandra Gronendyke	I want to see new development in renewable energy, not fossil fuels.	Comment noted. See response to comment #36 (renewables).
91	Sonja Hunter	Rather than continuing to poison people with heavy metals and particulates in the air, toxics seeping from coal ash ponds into our drinking water and spewing CO2 into the atmosphere, use more solar and wind!!!	Comment noted. See response to comment #36 (renewables).
92	Casper Kittle	I've lived in Chattanooga all my life- what Tennessee and the South and the WORLD needs now is to move away from non-renewables. We can't keep putting short-term profits or economic successes above the longevity and well-being of ourselves and those we care about. I really love TVA and have been to TVA-Raccoon Mountain so many times in my youth, but I'm really disheartened to hear about the natural gas pipeline plans- I urge you as a recent Chattanooga college grad and as a Tennessean and as a TVA	Comment noted.

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Comment No.	Organization/ Name	Comment	TVA Response
		supporter and as a concerned human on this planet that cares for sustainable energy initiatives, please don't do this!	
93	Jennifer Ivey	Our planet and in particular the state of TN can't afford to keep fracking operations going with concomitant pollution and poisoning of drinking water. Also earthquakes are not needed. The state is already situated on fault lines. We owe it to our children to ensure safe drinking water and safe world to live in.	Comment noted. See response to comment #227 (fracking).
94	Roger Hampshire	Tennessee is beautiful. Let's keep it that way. All these gas infrastructures will hurt tourism.	Comment noted.
95	Lynn Seeger	Please. We must be good guardians of the earth. Human beings must stop being so greedy and reckless. Where are we going to live if we keep ruining our precious planet? Humans have no right to rape and pillage our planet. We will pay heavily for these sins.	Comment noted.
96	Paul Rowney	Please wake up to the 21st century and the inescapable facts about fossil fuels and the effect on the environment. Do something for your children's future that is good for their health not the benefit of the oil industry's profit.	Comment noted.
97	Jane Morris	Please, help TN and the southeast, look to the future. Clean energy is here, available and we need you to help push this way of life. Fossil fuels are no longer necessary. Gas kills. The sooner you go this direction, the better for you, us and this earth.	Comment noted.
98	Anna Blair	Please protect us and our fossils from destruction which will surely happen if you pursue these life threatening plans. Use your powers to save and improve not to damage and destroy.	Comment noted.
99	Scott Sheaffer	stop poisoning the air and water	Comment noted.
100	Barbara Johnson	Make the choice to use power sources that do not contribute to the warming of our planet and pollution of our air and water. Those sources exist. Please use them instead.	Comment noted. See response to comment #30 (alternatives) and comment #36 (renewables).
101	Sheryl Mustain	This is a man-made disaster for our planet. Do not expand fracking and gas burning!	Comment noted.
102	Gary Moser	Enough of fossil fuel destroying the planet.	Comment noted.

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Comment No.	Organization/ Name	Comment	TVA Response
103	Paul Bienhoff	Please stop adding more climate change debt to your/our children's accounts!	Comment noted.
104	Donna Hester	Please stop. When is enough, enough? When will our leaders start caring about the environment?	Comment noted.
105	Emily Freeman	Pipelines cross my family farm in a cluster of five. The topography is flat as we are in the flood plains of the Mississippi River. Since construction time during my childhood my father has worked around that slash with livestock and row cropping. Safety and health concerns have been heeded successfully in our tenure as landowners. We are concerned about future land use over those five pipelines.	Comment noted.
106	Linda Utley	Go to renewable energy sources. Stop harming our planet.	Comment noted.
107	Carol Villaverde	I value the health of our ecosystem and want to leave a thriving planet for future generations. This means developing and utilizing sustainable energy sources and technologies and phasing out those that damage the environment.	Comment noted.
108	Bob Carlough	Please come into the 21st century and focus on renewable energy sources!	Comment noted. See response to comment #36 (renewables).
109	Samuel Robinson	We must reduce, not increase, our carbon footprint as rapidly as possible.	Comment noted.
110	Walter Woods	We do not need more archaic energy sources. The TVA should invest in solar, wind, and nuclear power.	Comment noted. See response to comment #36 (renewables).
111	Cindy Hatcher	It is passed time to move beyond fossil fuels. Focusing on innovative alternative energy sources should be the goal of all energy cooperatives.	Comment noted. See response to comment #30 (alternatives) and comment #36 (renewables).
112	Mary Beaty	It's clear that in order to slow climate change we need to be working towards more renewable energy. Please stop plans for more gas infrastructure and fracking.	Comment noted. See response to comment #36 (renewables).
113	Lea Alexander	TVA should be leading the way toward green energy, not staying mired in technologies that harm people and the planet. I know of people still suffering in the aftermath of the coal ash spill. Do better with funds you receive from us!	Comment noted. See response to comment #36 (renewables).

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Comment No.	Organization/ Name	Comment	TVA Response
114	Emilee Null	I moved to TN for it's natural beauty! Why would you want to ruin that by adding gas lines? Move forward into the future with clean energy instead of reverting to the old way of fossil fuels!	Comment noted.
115	Teresa Carr	Please consider the air that we breath. We have destroyed enough of the ozone layer. Surely i don't need to get into details over that. I am more interested in renewable energy.	Comment noted. See response to comment #36 (renewables).
116	Linda Smithyman	More cracked gas is NOT the smart answer to our needs. Wind and solar power are less expensive all around. This is the better way to go. Please give this serious thought for the future of our children and those coming after them.	Comment noted. See response to comment #36 (renewables).
117	Cynthia Waters	I care about the future of planet Earth. It's time to put our environment and personal safety ahead of personal profit and power.	Comment noted.
118	Thomas Hilton	As a life-long Tennessee resident (both in Middle and Western Tennessee), I understand the value that TVA brings to our communities. TVA's mindset has helped us through power situations that other states *coughTexascough* wouldn't be able to handle. There are other avenues that TVA should consider taking, including renewables and nuclear, before fossil fuels.	Comment noted. See response to comment #30 (alternatives) and #36 (renewables).
119	Jane Herron	As a customer, I implore you to consider the long range damage instead of the short term gains. Our children and grandchildren deserve better.	Comment noted.
120	Jeannine Blalock Horton	We have the technology to move forward with Green Non-Fossil Fuel energy!!! We need new energy not old fossil thinking!!! We don't want fracking and pipelines killing our waters and landscapes! No pipelines, no fracking! Go Forward with Green Nonfossil fuels! Other countries are doing this! This matters to me because we only get one planet, one home, and it is no lack of evidence that fossil fuel energy use is destroying our planet, our climate and our home!!!	Comment noted. See response to comment #227 (fracking).
121	Kurt Emmanuele	These gas lines detract from the scenery, and I do not like their contribution to carbon pollution	Comment noted.
122	Laura O'Reilly	Our continuing dependence on fossil fuels is leading to an uninhabitable planet.	Comment noted.

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Comment No.	Organization/ Name	Comment	TVA Response
123	Sarah Rowe	Protect the environment by not adding more gas electricity plants!	Comment noted.
124	John and Kathleen Harkey	I've got solar panels on my roof and get 80-90 percent of my energy from them. We don't need more natural gas. It will be a transition fuel that dies a natural death.	Comment noted.
125	Curtis Tomlin	GO GREEN NOW!	Comment noted.
126	Kitty Williams	Please consider the alternatives to fracked gas that are far more reasonable than this, such as financially, climate, and safety. Thank you.	Comment noted. See response to comment #30 (alternatives) and #36 (renewables).
127	Joyce Coombs	Stop poisoning our environment, our children!!	Comment noted.
128	Jenna Henderson	Fracking is bad for the environment and for people! Please put resources towards a sustainable energy infrastructure for TN! (solar, wind)	Comment noted. See response to comment #227 (fracking).
129	David Ostermeier	Renewable energy is our future. Future energy investments should NOT include fossil fuel infrastructure. For our kids & future generations, please invest in renewables!!	Comment noted. See response to comment #36 (renewables).
130	Jack Boyles	For the future of our country, please do not support a declining industry, abandon your plans for a gas infrastructure.	Comment noted.
131	Charlene Nash	I can't believe with all the information about how toxic fracking is that we are still having this conversation!	Comment noted.
132	Popi Missios	Please, respect our environment Spend the money for something good not worse.	Comment noted.
133	Kristy Wilhoite	Let's rise to the challenge of providing them with an infrastructure that is ready for the future instead of one that is useless. TVA can lead the way!	Comment noted.
134	Angie Kincaid	Let's move forward, NOT backwards in the past.	Comment noted.
135	Christine Macdonnell	Please please please consider alternative sources of energy to help save our planet. Please think of the future and the damage that will be done if you continue on the path you are on!!!!	Comment noted. See response to comment #30 (alternatives) and comment #36 (renewables).

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Comment No.	Organization/ Name	Comment	TVA Response
136	Benjamin Carter	As a Kentucky native who lives near the Paradise TVA plant, let me start by saying thank you for the jobs you provide to the region. To keep providing jobs, we must make proactive investments in renewable energy and keep up with an ever-shifting energy economy. Increasing the TVA's dependence on gas in this day and age only creates needless environmental harm while actively putting the Kentuckians employed at TVA at an economic disadvantage when our energy economy shifts away from gas. For the sake of the land, for the sake of the workers, and for the sake of TVA's economic vitality for years to come, we need proactive steps on renewable energy, not a further commitment to an extractive economy that has already taken so much from the land I call home and from the people who reside in it.	Comment noted. See response to comment #36 (renewables).
137	Chris Chapman	Please don't stick my family and children with an outdated and costly polluting power source that will saddle us with higher prices for the next 40 years.	Comment noted.
138	Don Craft	Let's look ahead! Switch to climate friendly sources for power!	Comment noted.
139	Patsy Coats	Fracking is devastating for the environment. Don't use framed gas!	Comment noted. See response to comment #227 (fracking).
140	Stephanie Salazar	Please instead work on alternative energy such as more solar and wind power options. We need to work to be more sustainable.	Comment noted. See response to comment #36 (renewables).
141	Julie Brown	I am asking you to please vote against any plans to build new gas frack plants. It is time to make the move to clean energy!	Comment noted. See response to comment #36 (renewables).
142	Timothy Kent	Be part of the solution, not the problem! TVA can set an example for the rest of the country by scrapping plans for gas infrastructure and investing in clean energy!	Comment noted. See response to comment #36 (renewables).
143	Bonita Mccay	Please be leaders of our way forward in clean and sustainable energy, and not stuck in the past with the dinosaurs.	Comment noted. See response to comment #36 (renewables).
144	John Noel	Cheap energy is good but a failed climate and planet diminishes humanity.	Comment noted. See response to comment #36 (renewables).

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Comment No.	Organization/ Name	Comment	TVA Response
145	Tharon Kirk	We need to protect our environment. I don't want to see more fracking. Explore other energy sources	Comment noted. See response to comment #30 (alternatives), comment #36 (renewables), and comment #227 (fracking).
146	Nathaniel Bass	Hello TVA Board. Gas plants, for real? Let's instead please build some modern, clean power in the 2020's.	Comment noted. See response to comment #36 (renewables).
147	Joseph Payne	I recommend that Tennessee Valley Authority take advantage of the programs that other utilities see as a path to the future and quit relying on old policy. New jobs will come with reduced carbon energy alternatives and TVA could be in the forefront. Please head the signs of an impending climate catastrophe.	Comment noted. See response to comment #36 (renewables).
148	Nancy Mott	But gas is no longer the clean energy it was.	Comment noted.
149	Richard Gillaspie	We need move away from fossil fuels, and focus on renewables.	Comment noted. See response to comment #36 (renewables).
150	Andrew Hamlett	Board of Directors Please stop investing in natural gas. Switch to solar and wind which cost less and do not accelerate global temperature rise.	Comment noted. See response to comment #36 (renewables).
151	George Cash	Fracking endangers our water supply. Consider safer alternatives such as wind, solar, or hydro!	Comment noted. See response to comment #30 (alternatives) and comment #227 (fracking).
152	William H. Etter III	How about getting a jump on renewable energy sources and take a giant step towards some kind of energy independence?	Comment noted. See response to comment #36 (renewables).
153	Carol Martin	Please no more fracking!!!!.	Comment noted. See response to comment #227 (fracking).
154	Helen Debus	I can't express the deep concern for this shortsighted move on TVA's part. Please look for sustainable fuel sources that will not continue to damage our planet.	Comment noted.
155	Graham Marema	I believe in the history of innovation and leadership at the TVA to build a better future, and I know that you can embody that leadership now by leaving behind energy sources that will pollute our environment and threaten the future of our planet.	Comment noted.
156	Kristin Tubb	I hope that you'll continue to explore clean, green new ways to provide for our community, AND create new jobs in the process.	Comment noted. See response to comment #36 (renewables).

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Comment No.	Organization/ Name	Comment	TVA Response
157	Linda McClendon	Cut the demand for fracked gas. The use of harmful chemicals in fracking should ban fracking in USA. TVA should support clean energy.	Comment noted. See response to comment #227 (fracking).
158	Amanda Schenlcer	I beg you to please move into this century and think of how our beautiful state is still being impacted by harmful practices like fracking. Please act responsibly, so that at least seven more generations of Alabamians will be able to live healthily and happily.	Comment noted. See response to comment #227 (fracking).
159	J Woodruff	Stop polluting our beautiful Tennessee! We should be using renewable energy, not fossil fuels.	Comment noted.
160	Stella Hurley	It is time to consider the risks of such energy sources, it has been proven to have very negative effects on the environment and health. Please let your conscience guide you to bringing forth safer and environmentally sensitive sources for energy.	Comment noted.
161	Irene W. Dowdell	I want to advocate for a world that is without pollution. Please work to clean up our planet.	Comment noted.
162	David Williford	Around the world, other countries and communities are utilizing new technologies to provide cheaper and cleaner energy. Often in a way that creates jobs. Renewable energy sources are obviously better for the environment which I hold dear and depend on. But if it is also cheaper, a source of jobs, and a better longterm investment	Comment noted. See response to comment #36 (renewables).
163	Horst Stollberg	Go solar wind and Nuclear. Less impact on the environment.	Comment noted. See response to comment #36 (renewables).
164	John Meyer	This dirty polluting energy source has no place in our valley. Please reconsider this option and go with renewal sources of energy.	Comment noted. See response to comment #36 (renewables).
165	Kendall Wimberley	I urge TVA not to build new gas which we will be stuck paying for after we transition away from fossil fuels as people and the planet need and want.	Comment noted. See response to comment #36 (renewables).
166	Kent Minault	All gas infrastructure is harmful, due to the severe impacts of methane leakage. Carbon reduction goals are not really serious if at the same time one expands natural gas.	Comment noted.
167	Barbara Cloud	The smart thing is to increase clean ways to generate electricity, now, not waiting until sometime in the future.	Comment noted.

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Comment No.	Organization/ Name	Comment	TVA Response
168	Caleb Haynes	We can't continue to go backward as an economy and society... the infrastructure that we invest in today will have ramifications for our children's children. Please do not invest more money, time, resources in this non-renewable, pre-historic means of energy.	Comment noted. See response to comment #36 (renewables).
169	William McCabe	instead of fossil fuels, develop wind and solar, allowing individuals, small businesses, and YOUR ELECTRIC PROVIDERS to move into the safer and more sustainable power users.	Comment noted. See response to comment #36 (renewables).
170	Gail Henley	I thought everyone agreed that we should be reducing our carbon output.	Comment noted.
171	Gloria Griffith	Please reject plans for more gas.	Comment noted.
172	Angeline Mahe	I am a Tennessee resident and I strongly oppose the plans to build new gas infrastructure in this beautiful state. The way forward should be renewable energy to protect our planet now and for our future.	Comment noted.
173	Polly Partridge	Please consider a cleaner, safer method of providing power for the Tennessee Valley. A cleaner fuel is available! Please use it!	Comment noted.
174	David Hegseth	Let's start looking at rooftop solar.	Comment noted.
175	Lisa Burtis	It's time to move forward, not backwards.	Comment noted.
176	Patricia Glenn	It is time for TVA to look to energy sources that don't damage the environment and don't endanger native plants and animals.	Comment noted.
177	Renee Edwards	The Tennessee Valley area is beautiful! Please preserve it, keep it clean and pursue alternate methods for energy!	Comment noted.
178	DAVID WILLIAMS	We have the technology to transform our energy economy to renewable sources. Solar and wind are cost competitive with fossil fuels, and can be put closer to the point of use, reducing the impact of severe weather, earthquakes, and other disasters. Geothermal and hydroelectric plants are already contributing where hot springs and flowing water exist. Alabama is one of the leading states in the country for solar energy potential, which when paired with storage options, is a good, clean alternative to smog-creating fossil fuels.	Comment noted. See response to comment #30 (alternatives)

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Comment No.	Organization/ Name	Comment	TVA Response
179	Barbara Mott	Recent research shows that chemicals used in fracking are dangerous for young children and infants. Moving ahead with fracking plans in the face of these findings, TVA will need to pull attorneys off the coal ash lawsuits to focus on extensive, time consuming, and enormously expensive investigations and court litigation.	Comment noted. TVA does not foresee any upstream fracking impacts as a result of this action to construct CT units at Paradise and Colbert. See response to comment #227 (fracking).
180	Sonya Zaremba	Please invest in the wind and solar energy for all of us and the future generations.	Comment noted. See response to comment #36 (renewables).
181	Guerry McConnell	No more destroying land. No more pipelines transporting across lands and waters. There is no need to continue with fossil fuels!	Comment noted.
182	Mark Koppel	NO MORE FOSSIL FUELS. SOLAR SOLAR SOLAR WIND WIND WIND	Comment noted.
183	Fran Ansley	Please help us prevent climate catastrophe by committing to the kind of smart, strong change that we so desperately need.	Comment noted. See response to comment #36 (renewables).
184	Michelle Housen	Stop killing people for profit	Comment noted.
185	Catherine McGavin	It's beyond time to be utilizing clean renewable energy.	Comment noted.
186	Louis Laub	Every step we take towards carbon reduction goals brings us closer to achieving these goals.	Comment noted.
187	Mary Lasater	I started a plan with Middle Tennessee Electric to use all renewable resource energy.	Comment noted.
188	Donna Brian	Let's move toward wind farms instead!	Comment noted.
189	Kayleigh Walker	Fracking is dirty, dangerous, and poisonous to the communities it happens in. As leaders in energy solutions, the TVA should be looking at renewable sources.	Comment noted. See response to comment #36 (renewables) and comment #227 (fracking).
190	Michelle Haverland	It's time to turn away from our reliance on fossil fuels.	Comment noted.
191	Bob Bates	Replace old coal plants with renewable energy. Be bold for the future: promote renewables.	Comment noted. See response to comment #36 (renewables).

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Comment No.	Organization/ Name	Comment	TVA Response
192	Linda Orth	Why invest millions/billions on infrastructure that will be obsolete in 10 years? Burning fossil fuels causes environmental damage and in an era where green technologies are an available viable alternative. Government subsidies should be for green energy only to encourage divestment in fossil fuels.	Comment noted. See response to comment #36 (renewables).
193	Eleanor Shippen	I want Tennessee to work towards the future, and that means embracing cleaner energy sources.	Comment noted.
194	Vincent Harrman	TVA started with renewable power. Time to return to its roots.	Comment noted.
195	Vance Sterling	Global warming is very real, and any kind of pollution is not something you should be promoting.	Comment noted.
196	Lawrence Clark	Do we have to destroy every semblance of logic in the believe of science being correct for our children and grandchildren of the United States.	Comment noted.
197	Carrie Bailey	The health and well-being of our planet is more at risk everyday.	Comment noted.
198	Katherine Nelson	Clean energy is the best choice to combat climate change while still providing the energy the Tennessee needs. I hope your decisions will move towards wind and solar.	Comment noted. See response to comment #36 (renewables).
199	Ron Shrieves	TVA should not fall back on it's historical decisions on hydro and nuclear as a justification for not being aggressive on "renewable" energy. All utilities should do their share to move away from carbon emissions,	Comment noted. See response to comment #36 (renewables).
200	Jason Batey	It is time to move away from fossil fuels. We cannot continue to harm our environment and think that we won't reap the consequences. Let's phase out our dependence on dirty energy and, most certainly, not add new sources of it. Solar and wind power has become increasingly affordable and over time easily pays for itself and then some. Please take these pleas from concerned citizens seriously and don't allow more gas plants in the Tennessee Valley.	Comment noted. See response to comment #36 (renewables).

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Comment No.	Organization/ Name	Comment	TVA Response
201	Kim Young	Tennessee and the entire nation needs to vastly increase our use of renewal energy sources ASAP!! There needs to be a very strong push to expand alternative energy sources NOW, not later, the health of our state and our planet cannot wait!! PLEASE do the correct thing for everyone concerned and move away from coal AND gas now.	Comment noted. See response to comment #36 (renewables).
202	Sarah Denslow	We need to focus on restarting the economy and providing jobs by investing in renewable energy plants. We have the technology. Renewable energy will provide jobs for our citizens and keep our country safe - all while helping to keep Americans healthy and protect the natural beauty of our country.	Comment noted. See response to comment #36 (renewables).
203	Bart Munyan	there's enough gas being wasted into the atmosphere without having to ruin the Earth by fracking. There are alternatives to gas anyway	Comment noted. See response to comment #30 (alternatives) and comment #227 (fracking).
204	Jane Shoun	Can you not build clean energy, wind mills and solar instead	Comment noted. See response to comment #36 (renewables).
205	James Marziotti	I do not want my well compromised for the quick profits of a fracking company. When the environmental hazards of fracking are factored in, there are safer and less expensive way to generate energy. Please choose green energy.	Comment noted. See response to comment #227 (fracking).
206	John Todd Waterman	None of TVA's mandate to provide affordable, reliable power to build our region's economy while protecting our environment can be fulfilled by burning fossil fuels. The climate crisis is the transcendent environmental and economic challenge of our time. Rapidly shifting public and political opinion supporting carbon pricing will also inevitably make new gas plants stranded assets in the near future, wasting ratepayer money that could have been spent directly on the renewable generation and energy storage that must soon replace them.	Comment noted. See response to comment #36 (renewables).

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Comment No.	Organization/ Name	Comment	TVA Response
207	Kenneth Clark	The U.S. Department of Energy reported that recent wind farms have gotten so cheap that you can build and operate them for less than the expected cost of buying fuel for an equivalent gas plant. We must STOP polluting the atmosphere.	Comment noted. TVA's proposal to build CT units will help integrate more solar power into its system. Because of the lower potential for wind resource in our area and its high transmission cost, solar is the renewable option with greater potential. And TVA's CT proposal will help integrate more solar.
208	Carol Antoniewicz	I oppose fracking for natural gas - it's bad for the environment and thus for people. I support solar and wind - please do more of those, and stop fracking!!	Comment noted. See response to comment #36 (renewables) and comment #227 (fracking).
209	Guerry McConnell	Stop running backwards! It only makes sense to embrace the campaign for renewable energy energy!	Comment noted.
210	Eleanor Bower	As an indirect customer of TVA through my local coop - it would bring me great satisfaction to see TVA promoting more roof top and co-op type solar installations. In the long run - more cost effective.	Comment noted.
211	Nancy Bell	In Rogersville we have a large coal ash dump along our river, and now we have a new energy plant, but it, too, sends carbon into the air we breathe and harms the health of our planet. After all these years and recent climate disasters, it is time to find a new path forward -- that is, away from fossil fuels.	Comment noted.
212	Romulus Wright Iii	Please consider reducing dependance on fracking and coal for our energy needs in TN!	Comment noted. See response to comment #36 (renewables) and comment #227 (fracking).
213	Alleia Bakker	We don't need or want new gas infrastructure.	Comment noted.
214	John Wojtowicz	Time to protect Tennessee's environment.	Comment noted.
215	Barbara Wolff	We need to get our energy from renewable sources, not destroy our earth with fracking.	Comment noted. See response to comment #227 (fracking).
216	Mike Murphy	Let's harvest energy using renewables.	Comment noted. See response to comment #36 (renewables).
217	K Melton	Fossil fuels are proven excessively poor for the Climate. We are in the midst of a climate crisis and it is past time for TVA to clean up its energy.	Comment noted.

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Comment No.	Organization/ Name	Comment	TVA Response
218	Richard Gilbert	Fossil fuels are not good for the future of TVA, only for a few executives bonuses.	Comment noted.
219	Louise Mallory-Elliott	Fracking damages the environment and all creatures who live nearby! it must be done more responsibly if it is used at all.	Comment noted. See response to comment #227 (fracking).
220	Donald Plunk	Fracked gas is dirty energy. We need more clean energy. Global warming is a serious threat to everyone.	Comment noted.
221	Allison Stillman	Stop living in the past and start moving into green renewables, you are throwing money away and endangering people's health.	Comment noted. See response to comment #36 (renewables).
222	Christina Norris	I am especially concerned about the dangerous impact of climate change on future generations. We must stop relying on fossil fuels now.	Comment noted.
223	Geneva Andrews	No New Fracking! Please! Invest in clean energy source instead!	Comment noted. See response to comment #227 (fracking).
224	Shirley Hull	Although we appreciate TVA for giving us the electric power we need here we don't need for terrible gas use to both change the beauty of this place but also the future of both the land but the air.	Comment noted.
225	Eileen Koesy	Listen to your children & grandchildren, if not your constituents.	Comment noted.
226	Cristina Vazquez	We must protect nature!!	Comment noted.
227	Richard Phelps	The great environmental impact of hydrofracking must be considered in any expansion. The pollution generated by HF is enormous and affects air, groundwater and the land itself. Earthquakes have resulted and nearby resident have been exposed to known toxins. The fluids used are of undisclosed composition but are known to migrate from the wells and potentially contaminate drinking water supplies. As fracking is largely unregulated currently, frackers can freely avoid environmental safeguards and avoid site remediation. The high rate of extraction of oil and gas will soon deplete these fields leaving stranded assets and polluted soils, water and strata. TVA should be proactive in leaving hydrofracking and investing in non-polluting, sustainable energy sources: solar, wind, small nukes and improved turbine efficiency and distribution lines. TVA should expand incentives for users to economize and insulate as well.	<p>Comment noted. See response to comment #36 (renewables).</p> <p>TVA is unaware of the ultimate production source for the natural gas to be transported to the Paradise/Colbert project sites, as the transportation path is not tied to any particular production area. Natural gas is expected to be sourced from multiple existing supply areas and pooling points that are accessible through interconnections along the supplying pipeline systems. The ultimate production sources cannot be reasonably traced nor are any such sources within TVA's control. TVA expects any such sources to comply with regulations applicable to fracking.</p>

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Comment No.	Organization/ Name	Comment	TVA Response
228	Sharon Hart	TVA has always been a leader in affordable energy. Now it needs to be a leader into the 21st century, by doubling down on green energy and leaving fossil fuels where they do the most good--in the ground.	Comment noted. See response to comment #36 (renewables).
229	Margaret Mann	Coal ash plus this...please consider health of community.	Comment noted.
230	Patricia Post	Almost one-quarter of global greenhouse gas emissions are from electricity generation. These emissions must be reduced to near zero if we are to avoid the worst effects of climate change. It is important to decarbonize the electricity sector as rapidly as possible while maintaining a reliable and affordable electric supply. TVA should be focusing on reduction of new natural gas installations rather than increasing them and minimizing carbon emissions from existing installations, primarily through methane leaks. If hydrogen is blended with (or replaces) natural gas to fuel remaining gas plants when they do operate, it could reduce their carbon emissions. I strongly urge the TVA Board to be proactive in transforming energy dependence in the Southeastern United States by transitioning to carbon-free electricity as rapidly as possible.	Comment noted. See response to comment #36 (renewables).
231	Robert McGahey	I implore you to rethink employing more fracked gas in the TVA area. We need to move rapidly towards a zero-carbon world, utilizing solar, wind, and nuclear for baseload. I know that latter is expensive, but done with care, it can provide a bridge to a non-carbon future. Natural gas sure beats coal, but it's still safely sequestered carbon that should be burned as sparingly as possible.	Comment noted. See response to comment #36 (renewables).
232	Lynn Learch	I, as a TVA, consumer want TVA to invest more in renewable energy sources and division gas and coal.	Comment noted. See response to comment #36 (renewables).
233	Gaea Mitchel	We need to focus on renewable, clean energy. Fossil fuels are a dead-end energy source that not only promotes climate change but requires hazardous infrastructure for transport. Instead, renewable energy can often be produced closer to the point of use, and doesn't promote global warming.	Comment noted. See response to comment #36 (renewables).
234	Jerry Brown	No more fossil fuel plants.	Comment noted.

Appendix A – Public and Agency Comments and TVA's Responses to Comments

Comment No.	Organization/ Name	Comment	TVA Response
235	Marilyn Williams	TVA can do better to serve the public good by using solar and wind instead of fracking for meeting our energy needs. TVA has done so much to improve the lives of Appalachians, and now need to prevent disaster for so many as a result of our reliance on carbon. We must reduce our carbon footprint!	Comment noted. See response to comment #36 (renewables) and comment #227 (fracking).
236	Patrick Conley	By the estimate of the IPCC we have little more than eight years before climate collapse in 2030. A CIA investigation of the climate crisis some years ago prediction social breakdown in the same year. The earth has lost a million species since 1970. Methane emissions from the northern latitudes as permafrost dissolves will be a juggernaut for temperature increases.	Comment noted.
237	Scott Sheaffer	stop poisoning the valley	Comment noted.
238	Don Sizemore	Nobody wants this, nobody needs this.	Comment noted.
239	Cathy Jobe	This issue matters to me because the lives of us all (people) being able to live in a healthy environment.	Comment noted.
240	Stephanie Davis	Our children deserve to have history	Comment noted.
241	Marlene Clausen	TVA needs to make a commitment to invest in ONLY clean, green energy. End the use of all sources of fossil fuels. Make the area you serve a clinic in how we can move to 100% clean energy and, at the same time, create thousands of high paying, quality jobs for the area TVA serves.	Comment noted. See response to comment #36 (renewables).
242	Richard Phelps	Fracked NG is a short time, extremely damaging method of extending our dependence of carbon extracting TVA must shift its long term energy generation to sustainable no or low carbon methods: Wind, solar, package nukes and improved generator and transmission efficiencies. Further incentives to users for economies must be provided as well. fracking has damaged critical water supplies, creates toxic waste and is implicated in earth quakes. Further, many HF companies are going bankrupt and leaving the equivalent of Brownfields. There is no current mandate to remediate these.	Comment noted. See response to comment #36 (renewables).

TVA Paradise and Colbert Combustion Turbine Plants EA

Comment No.	Organization/ Name	Comment	TVA Response
243	Anne Gielisse	PLEASE!!! NO MORE GAS!!! Let's protect our CLIMATE AND OUR CHILDREN AND CHILDREN'S CHILDREN! LET'S PASS THE PRICELESS GIFT OF CLEAN ENERGY ON TO THEM!!!	Comment noted.
244	Edwin Pyle	Please refocus on renewable sources. Stored energy such as Raccoon Mountain should be replicated and solar should be expanded.	Comment noted. See response to comment #36 (renewables).
245	Dan Firth	TVA needs to move away from fossil fuels for electricity generation as rapidly as possible. 2030 is a critical milepost for decarbonizing the power supply. Adding and/or maintaining additional gas plants is expensive and polluting when compared to adding solar and storage. TVA should put its time and resources to implementing clean renewable power sources to provide power to the grid. Achieving climate decarbonization goals will result in the stranding of new and refurbished fossil fuel assets that will continue to serve as a drag on economic development in the Tennessee Valley and continue to disadvantage the communities where they are located. Customers and communities want the switch. Now is the time to end the use fossil fuels and leave them in the ground.	Comment noted. See response to comment #36 (renewables).
246	Rebecca Hunter	Please protect our environment. Tennessee is such a beautiful state; please keep it that way	Comment noted.
247	Rachel Elmore	Gas is dead as dinosaurs and nobody should be clinging to the past. TVA can use the dams instead. How come we don't have power from the dams???	Comment noted. Twelve percent of TVA's energy is generated by hydroelectric generation.
248	Erin Racine	We need to invest in clean energy, not older methods that end up harming the environment. Please move away from relying on gas and invest in our children's future.	Comment noted.
249	Sharon S Kane	It Pollutes and it's Ugly. Don't do It!!	Comment noted.
250	Rebecca McMurtry	It's time to move into the future with sustainable, renewable energy sources. Protecting the environment for healthy human habitation in conjunction with nature is important.	Comment noted.

Appendix A – Public and Agency Comments and TVA's Responses to Comments

Comment No.	Organization/ Name	Comment	TVA Response
251	Deborah Nygard	I live within 2 miles of a TVA plant that burns coal. This plant poses a health risk because of noise and air pollution, not to mention the coal ash disposal. While use of natural gas seems at first glance to be a viable alternative to coal, that solution is short sighted. Solar and wind power are obvious solutions that are cheaper and safer than natural gas, especially in AL and KY. I urge the Board to reject voting for fracked natural gas and instead vote for an energy solution that protects our planet's future.	Comment noted. See response to comment #36 (renewables).
252	Brian Sullivan	Enough is Enough Already!	Comment noted.



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

DAVID W. SALYERS, P.E.
COMMISSIONER

BILL LEE
GOVERNOR

March 3, 2021

Via Electronic Mail to aapilakowski@tva.gov

Attn: Ashley Pilakowski, NEPA Specialist
Tennessee Valley Authority
400 West Summit Hill Drive, WT 11B
Knoxville, TN 37902

Dear Ms. Pilakowski:

The Tennessee Department of Environment and Conservation (TDEC) appreciates the opportunity to provide comments on the Tennessee Valley Authority (TVA) *Draft Environmental Assessment* (EA) for the proposed retirement of Combustion Turbine (CT) Units 1-20 at TVA's Allen Reservation in Memphis, Tennessee, and CT Units 1-16 at TVA's Johnsonville Reservation in New Johnsonville, Tennessee, and the construction and operation of three new natural gas-fueled frame CT units (750 megawatt [MW] total) at TVA's Paradise Reservation in Drakesboro, Kentucky, and three natural gas-fueled frame CT units (750 MW total) at TVA's Colbert Reservation in Tusculumbia, Alabama, for a system total of 1,500 MW to replace the capacity lost as a result of retiring Allen and Johnsonville CTs. Additionally, TVA's proposed action would result in the need for upgrades to the existing natural gas supply as well as actions to connect the CT plants to TVA's existing transmission system, including transmission line (TL) network upgrades.¹

Actions considered in detail within the Draft EA include:

- **Alternative A – No Action Alternative.** Under Alternative A, TVA would not retire CT Units 1-20 at Allen or CT Units 1-16 at Johnsonville. These units would continue to operate as part of the TVA generation portfolio. In order for the existing units to remain operational, additional repairs and maintenance would be necessary in the future to maintain reliability. Any repairs proposed to the existing CTs would be evaluated under a separate NEPA review as needed.
- **Alternative B – Retirement of Allen CT Units 1-20 and Johnsonville CT Units 1-16 and Construction of CT Units at Paradise and Colbert.** Under Alternative B, TVA would retire CT Units 1-20 at Allen and CT Units 1-16 at Johnsonville. However, TVA would retain a few Allen CT units (about 80 MW) for emergency regional black start purposes until a suitable alternative is in place. Although the specific units to be retained have not been identified, they would only be used for

¹ Preliminary project scoping identified approximately 10 TLs, two for Paradise and eight for Colbert, which would require network upgrades. TVA separated these TL upgrades into two categories: TL upgrades that must be complete prior to the new CT plants in-service date on TVA's system and other impacting projects (two TLs for Paradise and four TLs for Colbert), and TL upgrades that may be completed, as and if necessary, after the CT plants are in service (four TLs for Colbert).

emergency purposes and would not be considered part of TVA's normal operational system. In order to replace the capacity lost as a result of retiring the Allen and Johnsonville CTs, TVA would construct and operate three new natural gas-fueled frame CT units (750 MW total) at Paradise and three natural gas-fueled frame CT units (750 MW total) at Colbert for a system total of 1,500 MW. Actions associated with implementation of this alternative are described in the Draft EA document starting on page 9.

TDEC has reviewed the Draft EA for activities occurring in Tennessee and has the following comments regarding the proposed action and its alternative:

Cultural Resources

TDEC believes the Draft EA adequately addresses potential impacts to cultural resources within the proposed project area.²

Air Resources

As it relates to TL construction and other activities occurring in Tennessee, TDEC recommends the use of best practices to minimize the generation of fugitive dust, open burning be kept to a minimum, regulatory requirements pertaining to asbestos be followed, and that all construction equipment be well-maintained and equipped with the latest emissions control equipment.

Tennessee Air Pollution Control Regulation (TAPCR)³ provides specific requirements for prevention of fugitive dust, including use, where possible, of asphalt, water, or suitable chemicals to limit its creation. TDEC encourages TVA to include these considerations in the Final EA.

TDEC has open burning regulations⁴ and the Division of Air Pollution Control would need to be contacted prior to any open burning of any vegetative or construction/demolition related debris generated from the project. TDEC encourages TVA to include these considerations in the Final EA.

If any structures in Tennessee will be demolished, an asbestos demolition notification must be provided in advance, and proper pre-demolition surveys need to be conducted to identify any regulated asbestos containing materials (ACM) present.⁵ Prior to any demolition, all facilities must be examined for ACM and all potential ACM in the buildings proposed for demolition must be handled and disposed of according to the applicable federal, state, and local regulations. TDEC encourages TVA to include these considerations in the Final EA.

Solid Waste

Chapter 3 Section 17 outlines the effects of the proposal with respect to solid and hazardous wastes, both of which will be generated throughout construction, installation, operation, maintenance, and decommissioning activities. TDEC recommends that the Final EA consider and explicitly reflect that all wastes generated during the proposed

² This is a state-level review only and cannot be substituted for a federal agency Section 106 review/response. Additionally, a court order from Chancery Court must be obtained prior to the removal of any human graves. If human remains are encountered or accidentally uncovered by earthmoving activities, all activity within the immediate area must cease. The county coroner or medical examiner, a local law enforcement agency, and the state archaeologist's office should be notified at once (Tennessee Code Annotated 11-6-107d).

³ Reference TDEC TAPCR 1200-03-08, <http://sos.tn.gov/effective-rules>.

⁴ Reference TDEC TAPCR 1200-03-04, <http://sos.tn.gov/effective-rules>.

⁵ Reference TDEC TAPCR 1200-03-11-.02, <http://sos.tn.gov/effective-rules> which includes requirements for structures potentially contaminated with asbestos.

activities be managed in accordance with the Solid and Hazardous Waste Rules and Regulations of the state (TDEC DSWM Rule 0400 Chapters 11 and 12, respectively) in addition to other potentially applicable regulations (federal, state, and TVA best management practices and standard mitigation measures).

With respect to hazardous waste generator categories, depending on the volume produced and/or amount accumulated/stored in a calendar month, there are various requirements pertaining to hazardous waste management. Such requirements include but are not limited to waste identification and notification, satellite accumulation areas, container storage requirements, preparedness & prevention measures, used oil management, universal waste management, recordkeeping and reporting, personnel training, and emergency response requirements. TDEC encourages TVA to include these considerations in the Final EA.

Water Resources

Based on review of the Draft EA, TL replacements and modifications in Hardin, Lawrence, Montgomery, Sumner, Wayne, and Wilson Counties in Tennessee will likely involve multiple stream crossings, necessary for the work to be done. As noted by TVA in the Draft EA, activities with potential to impact streams in Tennessee will require an Aquatic Resource Alteration Permit (ARAP). TDEC concurs with the Draft EA that TL-related activities are also expected to disturb more than one acre of land and require a construction stormwater general permit (CGP) including a Surface Water Pollution Prevention Plan (SWPPP).

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

Sincerely,



Matthew Taylor

Senior Policy Analyst, Office of Policy and Sustainable Practices
Tennessee Department of Environment and Conservation

Matthew.K.Taylor@tn.gov

(615) 979-2449

cc: Kendra Abkowitz, PhD, TDEC, OPSP
Benjamin Almassi, TDEC, DSWM
Daniel Brock, TDEC, DoA
Molly Cripps, TDEC, OEP
Lacey Hardin, TDEC, DAPC
Tom Moss, TDEC, DWR
Jennifer Tribble, PhD, TDEC, OPSP



ANDY BESHEAR
GOVERNOR

REBECCA W. GOODMAN
SECRETARY

**ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION**

ANTHONY R. HATTON
COMMISSIONER

300 SOWER BOULEVARD
FRANKFORT, KENTUCKY 40601
TELEPHONE: 502-564-2150
TELEFAX: 502-564-4245

March 9, 2021

Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

Re: DRAFT ENVIRONMENTAL ASSESSMENT (EA) – REQUEST FOR PUBLIC AND AGENCY COMMENT – PARADISE AND COLBERT COMBUSTION TURBINE PLANTS; ALABAMA, TENNESSEE AND KENTUCKY--SERO 2021-02

Dear Ms. Pilakowski,

The Energy and Environment Cabinet serves as the state clearinghouse for review of environmental documents generated pursuant to the National Environmental Policy Act (NEPA). Within the Cabinet, the Commissioner's Office in the Department for Environmental Protection coordinates the review for Kentucky state agencies. We received your letter requesting an environmental review for this project. We have reviewed the document and provided comments below.

Division of Water

Water Quality Branch:

Please refer to Kentucky's list of special use waters located in 401 KAR 10:026 to determine whether any special use water will be impacted by the transmission lines. 401 KAR 10:031 specifies additional criteria that apply to Kentucky's special use waters. Questions should be directed to Andrea Fredenburg, Water Quality Branch, (502) 782-6950, Andrea.Fredenburg@ky.gov.

Water Resources Branch:

Further review of this proposed Combustion Turbine Plant at Paradise and Offsite Related Actions Associated with the Proposed Combustion Turbine Plant at Paradise is needed to determine if a Kentucky DOW Application for Permit to Construct Across or Along a Stream is required. For pipeline stream crossings that are not covered under 401 KAR 4:050, a Kentucky DOW Application for Permit to Construct Across or Along a Stream must be submitted. Questions should be directed to Shawn Hokanson, Floodplain Management Section, (502) 782-6977, Shawn.Hokanson@ky.gov.

If the activity requires a federal permit due to activities in or near Waters of the U.S., a Clean Water Act Section 401 Water Quality Certification from the DOW may be required for this project. Questions should be directed to the Water Quality Certification Section, at 401WQC@ky.gov or (502) 564-3410.

Watershed Management:

The DOW terminated Water Withdrawal Permit #0901 that authorized Tennessee Valley Authority (TVA), Paradise Fossil Plant to conduct water withdrawals from Green River, River Mile 100.3 in Muhlenberg County, Kentucky effective August 6, 2020. A Water Withdrawal Application is required for any project proposing raw water withdrawals of 10,000 gallons per day or more. Applications should be completed and submitted four to six months prior to proposed withdrawal initiation. The proposed Combustion Turbine Plant at Paradise is within the Central City Water and Sewer System designated Source Water Protection Areas, Zone 3 (Zone of Responsibility). So, the proposed Combustion Turbine Plant at Paradise would be identified within the Contamination Source Inventory as assessed for susceptibility ranking. Questions should be directed to Chloe Brantley, Water Supply Section, (502) 782-6898, Chloe.Brantley@ky.gov.

It is the recommendation of the Groundwater Section of the Watershed Management Branch that the project be made aware of the requirements of 401 KAR 5:037 and the need to develop a groundwater protection plan (GPP) for the protection of groundwater resources. This will include installation, construction, operation or abandonment of wells, bore holes or core holes and any other project activities that may need a GPP. 401 KAR 5:037 § 2(2)(m) references the scope and applicability of the proposed project. Also, the project needs to be aware of 401 KAR 6 and the need for licensed well drillers in the Commonwealth of Kentucky in addition to well construction and installation will have to meet standards of 401 KAR 6:350. Questions should be directed to Adam Nolte, Groundwater Section, (502) 782-1312, Adam.Nolte@ky.gov or Kurtis Spears, Groundwater Section, (502) 782-7119, Kurtis.Spears@ky.gov.

Field Operations Branch:

No comments. Questions should be directed to Connie Coy, Field Operations Branch, (502) 782-6587, Constance.Coy@ky.gov.

Division of Waste Management

Based on the information provided by the applicant for this project:

All solid and hazardous wastes produced by TVA Kentucky facilities during construction, operations or demolition at the combustion turbine plants, offsite compressor station and transmission lines should be disposed of in accordance with the appropriate Kentucky Statutes and Regulations and approval by the Kentucky Division of Waste Management.

All solid waste generated by this project must be disposed of at a permitted facility.

If asbestos, lead paint and/or other contaminants are encountered during this project contact the Division of Waste Management for proper disposal and closure.

Solid Waste Branch Issues - Closest landfill is the onsite TVA Residual Landfill. Any solid waste generated by this project must be disposed of at a permitted facility.

MASTER AI ID: 99604

MASTER AI NAME: Muhlenberg County Emergency Landfill
USER GROUP DESCRIPTION: DWMSWB- General
ALTERNATE AI ID: SW08900038
LONGITUDE: -87.020167
LATITUDE: 37.24236099999995
MASTER AI ID: 3239

MASTER AI NAME: Tennessee Valley Authority (TVA) - Paradise Fossil Plant
USER GROUP DESCRIPTION: DWMSWB- General
ALTERNATE AI ID: SW08900012
LONGITUDE: -86.981381
LATITUDE: 37.259167
MASTER AI ID: 129493

MASTER AI NAME: City of Elkton Dump
USER GROUP DESCRIPTION: DWMSWB- General
ALTERNATE AI ID: sw11000001
LONGITUDE: -87.111864
LATITUDE: 36.818438

Superfund Branch Issues:

Sinclair Surface Mine
MASTER AI ID: 65222
SUBJECT ITEM DESIGNATION: 20558
CLOSURE OPTION DESC: Option C Restored
CLOSURE DATE: 10/04/1994
LAT LONG SOURCE: SI
LONGITUDE: -86.996279
LATITUDE: 37.263148

Tennessee Valley Authority (TVA) - Paradise Fossil Plant
MASTER AI ID: 3239
SUBJECT ITEM DESIGNATION: 41784
CLOSURE OPTION DESC: Option A No Action Necessary
CLOSURE DATE: 07/13/1997
LAT LONG SOURCE: SI
LONGITUDE: -86.993264
LATITUDE: 37.260885

Tennessee Valley Authority (TVA) - Paradise Fossil Plant
MASTER AI ID: 3239
SUBJECT ITEM DESIGNATION: 38151
CLOSURE OPTION DESC: Option C Restored
CLOSURE DATE: 01/01/1997
LAT LONG SOURCE: SI
LONGITUDE: -86.980749

LATITUDE: 37.260104

Tennessee Valley Authority (TVA) - Paradise Fossil Plant

MASTER AI ID: 3239

SUBJECT ITEM DESIGNATION: 102813

CLOSURE OPTION DESC: Option A No Action Necessary

CLOSURE DATE: 06/11/1995

LAT LONG SOURCE: SI

LONGITUDE: -86.974

LATITUDE: 37.259833

Texas Gas - Muhlenberg Co

MASTER AI ID: 52893

SUBJECT ITEM DESIGNATION: 20243

CLOSURE OPTION DESC: Option C Restored

CLOSURE DATE: 11/01/1998

LAT LONG SOURCE: SI

LONGITUDE: -87.314161

LATITUDE: 37.295761999999996

Texas Gas - Muhlenberg Co

MASTER AI ID: 52893

SUBJECT ITEM DESIGNATION: 20244

CLOSURE OPTION DESC: Unfounded

CLOSURE DATE: 11/02/1998

LAT LONG SOURCE: SI

LONGITUDE: -87.314161

LATITUDE: 37.295761999999996

Texas Gas - Muhlenberg Co

MASTER AI ID: 52893

SUBJECT ITEM DESIGNATION: 20240

CLOSURE OPTION DESC: Option C Restored

CLOSURE DATE: 11/01/1998

LAT LONG SOURCE: SI

LONGITUDE: -87.313127

LATITUDE: 37.295716999999996

Texas Gas - Muhlenberg Co

MASTER AI ID: 52893

SUBJECT ITEM DESIGNATION: 20246

CLOSURE OPTION DESC: Option C Restored

CLOSURE DATE: 10/28/1998

LAT LONG SOURCE: SI

LONGITUDE: -87.314161

LATITUDE: 37.295761999999996

Texas Gas - Muhlenberg Co

MASTER AI ID: 52893

SUBJECT ITEM DESIGNATION: 20245

CLOSURE OPTION DESC: Unfounded

CLOSURE DATE: 11/02/1998

LAT LONG SOURCE: SI

LONGITUDE: -87.314161

LATITUDE: 37.295763

Texas Gas Transmission LLC - Midland III Compressor Station

MASTER AI ID: 44340

SUBJECT ITEM DESIGNATION: 53866

CLOSURE OPTION DESC: Option A No Action Necessary

CLOSURE DATE: 05/20/1993

LAT LONG SOURCE: SI

LONGITUDE: -87.314711

LATITUDE: 37.296648

Underground Storage Tank Branch - Indicates TVA has an active 10,000 gallon gas tank onsite. If any underground storage tanks are encountered during this project contact the UST Branch for proper closure.

Active Site:

Tennessee Valley Authority (TVA) - Paradise Fossil Plant

MASTER AI ID: 3239

LONGITUDE: -86.981381

LATITUDE: 37.259167

Closed Sites:

Sinclair Surface Mine

MASTER AI ID: 65222

LONGITUDE: -86.983333

LATITUDE: 37.258333

Southern Sons Gas & Go

MASTER AI ID: 58907

LONGITUDE: -87.033056

LATITUDE: 37.164443999999996

Hazardous Waste Branch Issues include the following:

Tennessee Valley Authority (TVA) - Paradise Fossil Plant

MASTER AI ID: 3239

ALTERNATE AI ID: KY1640013156

USER GROUP DESCRIPTION: EPA ID Number (RCRA)

LONGITUDE: -86.981381
LATITUDE: 37.259167

Texas Gas Transmission LLC - Midland III Compressor Station

MASTER AI ID: 44340
ALTERNATE AI ID: KYD000828574
USER GROUP DESCRIPTION: EPA ID Number (RCRA)
LONGITUDE: -87.314444
LATITUDE: 37.295667

RLA Branch Issues:

MASTER AI ID: 73386
MASTER AI NAME: KY 2270 West Dump
USER GROUP DESCRIPTION: RCLA Dump ID
ALTERNATE AI ID: 089-001
LONGITUDE: -87.05744444
LATITUDE: 37.12886111

MASTER AI ID: 73392
MASTER AI NAME: Dockins Road Dump # 2
USER GROUP DESCRIPTION: RCLA Dump ID
ALTERNATE AI ID: 089-007
LONGITUDE: -87.05738889
LATITUDE: 37.12888889

MASTER AI ID: 73391
MASTER AI NAME: Dockins Road Dump # 1
USER GROUP DESCRIPTION: RCLA Dump ID
ALTERNATE AI ID: 089-006
LONGITUDE: -87.05013889
LATITUDE: 37.13713889

The information provided is based on those facilities or sites that KDWM currently has in its database. If you would like additional information on any of these facilities or sites, you may contact the file room custodian at (502) 782-6357. Please keep in mind additional locations of releases, potential contamination or waste facilities may be present but unknown to the agency. Therefore, it is recommended that appropriate precautions be taken during construction activities. Please report any evidence of illegal waste disposal facilities and releases of hazardous substances, pollutants, contaminants or petroleum to the 24-hour Environmental Response Team at 1-800-928-2380.

Division for Air Quality

As this project is presented, the owner or operator of this company should comply with any applicable Division for Air Quality permitting requirements contained in 401 KAR Chapter 52 Permits, Registrations, and Prohibitory Rules located at <https://legislature.ky.gov/Pages/index.aspx> and <https://eec.ky.gov/Environmental->

[Protection/Air/Pages/Air-Permitting.aspx](#). For permitting information, please contact the Division for Air Quality Permit Review Branch Manager, at (502) 782-6997.

401 KAR 63:010, Fugitive Emissions, states that no person shall cause, suffer, or allow any material to be handled, processed, transported, or stored without taking reasonable precaution to prevent particulate matter from becoming airborne. Additional requirements include the covering of open bodied trucks, operating outside the work area transporting materials likely to become airborne, and that no one shall allow earth or other material being transported by truck or earth-moving equipment to be deposited onto a paved street or roadway. Please note the Fugitive Emissions Fact Sheet located at <https://eec.ky.gov/Environmental-Protection/Air/Documents/Fugitive%20Dust%20Fact%20Sheet.pdf>

401 KAR 63:005 states that open burning shall be prohibited except as specifically provided. Open Burning is defined as the burning of any matter in such a manner that the products of combustion resulting from the burning are emitted directly into the outdoor atmosphere without passing through a stack or chimney. However, open burning may be utilized for the expressed purposes listed on the Open Burning Brochure located at <https://eec.ky.gov/Environmental-Protection/Air/Pages/Open-Burning.aspx>

The Division would like to offer the following suggestions on how this project can help us stay in compliance with the NAAQS. These air quality control strategies are beneficial to the health of citizens of Kentucky.

- Utilize alternatively fueled equipment.
- Utilize other emission controls that are applicable to your equipment.
- Reduce idling time on equipment.

The Division also suggests an investigation into compliance with applicable local government regulations.

Kentucky Nature Preserves

Your project might have the potential of impacting federally or state listed species and natural communities. Go to the Kentucky Biological Assessment Tool (kynaturepreserves.org) to obtain a Standard Occurrence Report for information regarding listed species known within your project area. The report will also provide information on public and private conservation lands, areas of biodiversity significance, and other natural resources in your project area for which the Office of Kentucky Nature Preserves maintains data.

This review is based upon the information that was provided by the applicant. An endorsement of this project does not satisfy, or imply, the acceptance or issuance of any permits, certifications or approvals that may be required from this agency under Kentucky Revised Statutes or Kentucky Administrative Regulations. Such endorsement means this agency has found no major concerns from the review of the proposed project as presented other than those stated as conditions or comments. If you should have any questions, please contact me at (502) 782-0863 or e-mail Louanna.Aldridge@ky.gov.

Sincerely,

A handwritten signature in blue ink that reads "Louanna C. Aldridge". The signature is written in a cursive style with a small dot above the letter 'i' in "Aldridge".

Louanna Aldridge
Staff Assistant
Office of the Commissioner
Department for Environmental Protection
Energy and Environment Cabinet

Alsop, Erin

From: Somerville, Amanetta <Somerville.Amanetta@epa.gov>
Sent: Friday, March 12, 2021 11:00 AM
To: Pilakowski, Ashley Anne
Cc: Kajumba, Ntale; White, Douglas; Somerville, Amanetta
Subject: EPA Comments on the Draft Environmental Assessment for the Paradise and Colbert Combustion Turbine Plants

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

Re: EPA Comments on the Draft Environmental Assessment for the Paradise and Colbert Combustion Turbine Plants, Colbert, Lauderdale, and Morgan Counties, Alabama; Hardin, Lawrence, Montgomery, Sumner, Wayne, and Wilson Counties, Tennessee; and Muhlenberg and Todd Counties, Kentucky

Dear Ms. Pilakowski:

The United States Environmental Protection Agency (EPA) has reviewed the referenced document in accordance with Section 309 of the Clean Air Act and Section 102(2)(C) of the National Environmental Policy Act (NEPA). The purpose of this Draft Environmental Assessment (DEA) is for the Tennessee Valley Authority (TVA) to evaluate the impacts for the construction and operation of three new natural gas-fueled frame Combustion Turbine (CT) units (750 Megawatts (MW)) at TVA's Paradise Reservation in Drakesboro, Kentucky, and three natural gas-fueled frame CT units (750 MW total) at TVA's Colbert Reservation in Tuscumbia, Alabama, for a system total of 1,500 MW to replace the capacity lost due to the proposed retirement of Allen and Johnsonville CTs. Additionally, TVA's proposed action would result in upgrades to the existing natural gas supply, the construction of an offsite compressor station, and actions necessary to connect the CT plants to TVA's existing transmission system, including transmission line network upgrades.

The EPA has reviewed the DEA and the Proposed Action Alternative in addition to the No Action Alternative. Under the No Action Alternative, TVA would not retire CT units 1-20 at Allen or CT units 1-16 at Johnsonville. These units would continue to operate as part of the TVA generation portfolio. Under the Proposed Action Alternative, TVA is proposing to retire a total of 450 MW of Allen Frame CTs (Units 1-20) and a total of 950 MW of Johnsonville Frame CTs (Units 1-16). Additionally, TVA will construct about 1,500 MW of gas-fired frame CTs consisting of three Frame CTs (250 MW each) at Paradise and three Frame CTs (250 MW each) at Colbert to replace the capacity lost because of these retirements. A natural gas compressor will also be constructed 18 miles west of the Paradise CT project area in Muhlenburg County, KY, and 120 miles of Transmission line upgrades.

The EPA understands that TVA's preferred alternative is the Proposed Action Alternative. The EPA has not identified any significant environmental impacts to the proposed action that would require substantive changes to the DEIS or require the TVA's consideration of alternatives for the location of the proposed CT Plants and upgrades. The EPA has enclosed detailed technical comments for your consideration (See enclosure).

The EPA appreciates the opportunity to review the DEA for the Paradise and Colbert Combustion Turbine Plants. If you have questions regarding our comments, please contact Ms. Amanetta Somerville or Mr. Douglas White, Project Managers in the NEPA Section at 404-562-9025 or 404-562-8586 respectively or by e-mail at somerville.amanetta@epa.gov or White.Douglas@epa.gov.

Enclosure

EPA comments on the Draft Environmental Assessment for the Tennessee Valley Authority Paradise and Colbert Combustion Turbine Plants, Colbert, Lauderdale, and Morgan Counties, Alabama; Hardin, Lawrence, Montgomery, Sumner, Wayne, and Wilson Counties, Tennessee; and Muhlenberg and Todd Counties, Kentucky

Air Quality: The proposed project CT plants, compressor stations, gas line upgrades, and offsite transmission lines are in counties that are currently in attainment with the National Ambient Air Quality Standards (NAAQS). Although the proposed project is located in attainment areas, the construction of the proposed plants is subject to New Source Review (NSR). Under NSR, an air quality analysis is performed to demonstrate that the new emissions from a proposed modification will not cause or contribute to a violation of any applicable NAAQS or Prevention of Significant Deterioration (PSD) increment. Section 3.1.2.2 states that in August 2020, TVA began complying with PSD requirements with the submission of Class I and Class II modeling protocols to Alabama Department of Environmental Management (ADEM). Based on this PSD analysis, ADEM is expected to issue a construction permit, allowing initial unit operations for approximately one year. The terms of the construction permit will be rolled into the existing Colbert Title V operating permit via a Title V permit modification after the initial 365 days.

Recommendation: The EPA recommends the inclusion of the completed PSD modeling in the Final EA as an appendix.

Endangered Species: Section 3.11.2.2 of the DEA states that in April 2018, TVA addressed several activities in programmatic consultation with the US Fish and Wildlife Service on routine actions and federally listed bats in accordance with Endangered Species Act Section 7(a)(2). For those activities with the potential to affect bats, TVA committed to implementing specific conservation measures. TVA further stated that activities and associated conservation measures would be reviewed/implemented as part of the proposed project.

Recommendation: The EPA principally defers to the FWS regarding compliance with the Endangered Species Act. The EPA recommends that any additional conservation measures identified by the FWS during consultation be included in the Final EA and/or Finding of No Significant Impact (FONSI).

Wetlands: Section 3.7.2 of the DEA identified 40 wetland acres on the Project Sites of both the Paradise and Colbert plants and the off-site Transmission Line project areas. Of the 40 acres of wetlands delineated, the proposed project would only impact 0.28 acres. The EPA notes that the 0.28 acres of wetland impact are subject to regulatory oversight of the US Army Corps of Engineers, Alabama Department of Environmental Management, Kentucky Department for Environmental Protection, Tennessee Department of Environment and Conservation..

Recommendation: The EPA recommends any contractor working on-site use best management practices and address any potential impacts to off-site streams and waterways. The EPA also recommends that site grading, excavation, and construction plans should include implementable measures to prevent erosion and sediment runoff from the project site during and after construction.

Transportation: Section 3.7.2 of the DEA identified that onsite construction activities for the proposed CT plant at the Paradise and Colbert Reservations would result in increased traffic on local and state roadways in the vicinity of the site due to commuting of construction workers and delivery of materials and equipment for the project. The construction activities will last approximately two years.

Recommendation: The EPA notes that over the two-year duration of the proposed project construction, a large amount of earth moving will occur. The presence of diesel equipment will result in an increase in diesel emissions from construction equipment. To maintain healthy air quality, the EPA recommends the use of diesel emission controls,

cleaner fuel, and cleaner construction practices for on-road and off-road equipment used for transportation, soil movement, or other project activities.

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March 13, 2021

VIA EMAIL TO:

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**Re: Comments on TVA's Draft Environmental Assessment for Paradise
and Colbert Combustion Turbine Plants**

Dear Ms. Pilakowski:

Southern Environmental Law Center, Appalachian Voices, Energy Alabama, GASP, Shoals Environmental Alliance, Sierra Club, and Southern Alliance for Clean Energy submit these comments on TVA's draft environmental assessment for the proposed Paradise and Colbert combustion turbine plants. We have included twenty-three attachments which are incorporated into our comments.

With its mission to serve the environment and economy of the Tennessee Valley, as well as a directive from the President to decarbonize the grid and to promote environmental justice, TVA is well positioned to lead the national response to the world's climate crisis. Yet the utility's plan to build new gas power plants balks at that opportunity, proposing to accelerate climate change during the narrow moment remaining to mitigate its worst effects. Further, the proposal risks additional harm to environmental justice communities that have already shouldered decades of pollution from TVA's coal-fired plants. Rather than provide the clear-sighted analysis necessary to lead the response to the climate crisis and to achieve environmental justice, the Draft EA ignores and mischaracterizes the climate change impacts of the proposed gas plants, ignores their impacts to environmental justice communities, and fails to consider or even acknowledge reasonable, carbon-free alternatives. For these reasons, we urge TVA to prepare a full environmental impact statement that resolves these critical deficiencies and complies with NEPA.

Thank you for your consideration of our comments. Please contact us if we can answer any questions.

Sincerely,

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COMMENTS

I. With plans for new gas plants at Colbert and Paradise, TVA shirks its obligation to rapidly decarbonize and achieve environmental justice, flouting a presidential mandate.

Climate change is causing immediate, devastating harms to public health, biodiversity, and economic productivity.¹ Those harms will only worsen as greenhouse gas emissions increase. While climate change is global, not all communities suffer equally. Instead, the Tennessee Valley and the Southeast are especially vulnerable.² Low-wealth and Black, indigenous, and other people of color are disproportionately harmed by climate change.³ There is broad scientific consensus that global anthropogenic CO₂ emissions must reach net zero by around 2050 to avoid the worst impacts of climate change.⁴

To address the climate crisis, President Biden ordered the entire federal government to take decisive, bold action—including swiftly decarbonizing the electricity sector. In Executive Order 14008, *Tackling the Climate Crisis at Home and Abroad*, President Biden emphasized the urgency of the moment: “The United States and the world face a profound climate crisis. We have a narrow moment to pursue action at home and abroad in order to avoid the most catastrophic impacts of that crisis and to seize the opportunity that tackling climate change presents.”⁵ The Executive Order calls for a “government-wide approach,” as the “Federal Government must drive assessment, disclosure, and mitigation of climate pollution and climate-related risks in every sector of our economy, marshaling the creativity, courage, and capital necessary to make our

¹ U.S. Global Change Research Program, *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* (Reidmiller, D.R. et al. eds), U.S. Global Change Research Program, Washington, DC (2018), <https://nca2018.globalchange.gov/>, at Summary Findings, at 25–32.

² *Id.* at 743.

³ Kristie S. Gutierrez and Catherine E. LePrevost, *Climate Justice in Rural Southeastern United States: A Review of Climate Change Impacts and Effects on Human Health*, *Int. J. Environ. Res. Public Health*, 13(2): 189 (Feb. 2016) (**Att. 1**)

⁴ IPCC Special Report at Summary for Policymakers, <https://www.ipcc.ch/sr15/chapter/spm/>, at 6 and 14.

⁵ Exec. Order No. 14008, 86 Fed. Reg. 7619, 7619 (Jan. 27, 2021).

Nation resilient in the face of this threat.”⁶ The Executive Order establishes the goals of “net-zero emissions, economy-wide, by no later than 2050”⁷ and “a carbon pollution-free electricity sector no later than 2035.”⁸

Environmental justice is a defining feature of the government-wide response to the climate crisis. The Executive Order commands that the Federal government “must deliver environmental justice in communities all across America.”⁹ That requires “investing and building a clean energy economy that creates well-paying union jobs, turning disadvantaged communities—historically marginalized and overburdened—into healthy, thriving communities, and undertaking robust actions to mitigate climate change while preparing for the impacts of climate change across rural, urban, and Tribal areas.”¹⁰ All federal agencies must “make achieving environmental justice part of their missions.”¹¹

In Executive Order 13990, President Biden directed all executive departments and agencies to “immediately review” and “take action” to address any Federal “actions during the last 4 years that conflict with these important national objectives [including the reduction of greenhouse gas emissions and advancement of environmental justice], and to immediately commence work to confront the climate crisis.”¹² The order reestablishes the Interagency Working Group on the Social Cost of Greenhouse Gases and instructs agencies to use the Social Cost of Carbon to “capture the full costs of greenhouse gas emissions as accurately as possible, including by taking global damages into account.”¹³ Executive Order 13990 also makes clear that TVA should look to the Council on Environmental Quality’s 2016 guidance on climate change analysis during NEPA review.¹⁴ That guidance recommends that agencies quantify greenhouse gas emissions and provide “a qualitative summary discussion of the impacts of GHG emissions.”¹⁵

⁶ *Id.* at 7622.

⁷ *Id.*

⁸ *Id.* at 7624.

⁹ *Id.* at 7622.

¹⁰ *Id.* at 7629.

¹¹ *Id.*

¹² Exec. Order 13990, 86 Fed. Reg. 7037, 7037 (Jan. 25, 2021).

¹³ *Id.* at 7040.

¹⁴ *See id.* at 7042. This Executive Order rescinds Trump-era draft guidance, which itself rescinded CEQ’s 2016 guidance. While CEQ reviews, revises, and updates the 2016

Facing the urgent climate crisis and a clear mandate from the President to rapidly decarbonize the grid, TVA proposes to build new fossil-fuel plants. These are not minor additions TVA can easily walk away from whenever it pleases. Gas plants represent a major investment, often lasting more than forty years¹⁶ and requiring extensive new infrastructure like the gas compressor, transmission lines, and additional gas pipelines TVA proposes.¹⁷ Investing hundreds of millions of ratepayer dollars in fossil fuels now would generate avoidable and dangerous greenhouse gas emissions for decades to come, giving TVA no chance to meet Executive Order 14008's deadline to decarbonize the grid by 2035. TVA's generation decision comes at a critical moment when substantial reductions in greenhouse gas emissions are both necessary and feasible. TVA projects flat or declining load,¹⁸ and only 5% of its energy portfolio is from renewables and energy efficiency.¹⁹ TVA has no need for new fossil fuels. Instead, TVA should replace existing generation with carbon-free alternatives to align with President Biden's 2035 decarbonization mandate and to do its part in addressing the climate crisis, achieving environmental justice, and fulfilling its statutory duty as an environmental steward²⁰ for the Tennessee Valley.

guidance, it remains a useful reflection of the Administration's priorities in the interim—particularly as to the 1978 CEQ NEPA regulations on which the 2016 guidance was based.

¹⁵ Council On Environmental Quality, Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews 10 (2016) [hereinafter "CEQ Climate Guidance"] (**Att. 2**).

¹⁶ TVA, Paradise and Colbert Combustion Turbine Plants Draft Environmental Assessment 1–2 (Feb. 2021) (describing TVA's active CT units, which range from approximately twenty years to more than forty years in age) [hereinafter "Draft EA"].

¹⁷ *Id.* at 10–18.

¹⁸ TVA, 2019 Integrated Resource Plan, Vol. 1 – Final Resource Plan 6-4 (2019) [hereinafter "2019 IRP"].

¹⁹ TVA, Our Power System, <https://www.tva.com/energy/our-power-system>.

²⁰ TVA's "objectives and missions" include "being a national leader in technological innovation, low-cost power, and environmental stewardship." 16 U.S.C. § 831a(b)(5).

II. TVA’s analysis of impacts and alternatives in the Draft EA violates NEPA.

To comply with the National Environmental Policy Act (NEPA), TVA must “take a ‘hard look’ at the environmental effects of [its] planned action”²¹ to build gas plants. NEPA is our “basic national charter for protection of the environment,”²² and it promotes efforts which “will prevent or eliminate damage to the environment.”²³ NEPA’s twin aims obligate TVA to (1) consider significant aspects of the environmental effects of proposed actions and (2) inform the public that it has indeed considered environmental concerns in its decision-making process.²⁴ Accordingly, NEPA requires TVA to prepare an environmental impact statement (EIS) for “major Federal actions significantly affecting the quality of the human environment.”²⁵ An environmental assessment (EA) is a “highly significant ‘first step’” that helps an agency determine whether impacts are significant and require an EIS.²⁶

TVA’s Draft EA fails to take a hard look at the impacts of building new gas plants at Colbert and Paradise. TVA has not accurately disclosed the greenhouse gas emissions from these plants, and it has not mentioned the effects of accelerating the climate crisis. Nor has TVA considered the environmental injustice of building a new fossil-fuel plant at Colbert, near the overburdened, predominately Black community of Red Rock/Barton, or at Paradise, near overburdened, low-wealth communities. TVA’s failure to consider a single carbon-free alternative to combustion turbine gas plants means neither TVA nor the public is able to make a reasonable, informed decision. Because of the significant harms to climate change and environmental justice, TVA must prepare an EIS to more rigorously analyze this proposal’s effects and alternatives.

²¹ *Marsh v. Or. Nat. Res. Council*, 490 U.S. 360, 374 (1989).

²² 40 C.F.R. § 1500.1(a) (2019).

²³ 42 U.S.C. § 4321.

²⁴ *Kern v. Bureau of Land Mgmt.*, 284 F.3d 1062, 1066 (9th Cir. 2002) (citing *Baltimore Gas & Elec. Co. v. Natural Res. Def. Council, Inc.*, 462 U.S. 87, 97 (1983)).

²⁵ 42 U.S.C. § 4332(2)(C).

²⁶ 40 C.F.R. § 1508.9(a) (2019); *Friends of Fiery Gizzard v. Farmers Home Admin.*, 61 F.3d 501, 504 (6th Cir. 1995) (citation omitted).

A. TVA must disclose and analyze the climate impacts of building new gas plants at Colbert and Paradise.

Not only does the Draft EA propose the harmful policy choice to invest in fossil-fuel generation, but it fails TVA's obligation to take a hard look at the proposal's climate impacts.

Because “[t]he harms associated with climate change are serious and well recognized,”²⁷ carefully considering a project's climate impacts is critical to any NEPA review—particularly when the project's very purpose is the combustion of gas in power plants,²⁸ thereby emitting carbon dioxide and other greenhouse gases that drive climate change. TVA proposes to build new plants that will burn fossil fuels for decades, jeopardizing the dwindling opportunity to ward off the worst effects of climate change. Rapidly improving technologies for energy efficiency, demand response, battery storage, distributed energy resources, and utility-scale renewables equip power producers with affordable and reliable tools to reduce greenhouse gas emissions.

Despite the climate crisis and the many options to address it, TVA refuses to consider reasonable, carbon-free alternatives like energy efficiency, demand response, and battery storage. The Draft EA's quantitative analysis of the climate change emissions is misleading and incomplete. TVA must provide more accurate and meaningful analysis of those emissions, including through use of the Social Cost of Carbon. TVA must disclose the cumulative impacts of its proposed gas plants and the connected actions of its Combustion Turbine Gas Modernization program. Finally, TVA must disclose not only greenhouse gas emissions but also discuss their environmental effects.

1. TVA must accurately quantify the greenhouse gas emissions of the Colbert and Paradise gas plants, as well as the cumulative effects of its Combustion Turbine Gas Modernization program.

The Draft EA's quantification of greenhouse gas emissions is limited and misleading. TVA diminishes the impacts of the new gas plants by crediting itself for decreased emissions elsewhere. At its Paradise facility, TVA claims that 750 MW of new

²⁷ *Massachusetts v. EPA*, 549 U.S. 497, 521 (2007).

²⁸ *See Sierra Club v. FERC*, 867 F.3d 1357, 1372 (2017) (holding that FERC must analyze the climate change effects for a project whose purpose is to burn gas in power plants).

fossil fuel generation somehow reduces greenhouse gas emissions.²⁹ To conclude that there is a “net emission decrease,” TVA credits itself with the greenhouse gas emissions eliminated when it made the independent decisions to retire the Paradise coal plant, which closed in February 2020.³⁰ TVA points to its “commitment” to modestly decrease carbon emissions “system-wide” to find building new fossil-fuel plants at Paradise and Colbert somehow has no effect on climate change.³¹

First, TVA has refused to make a real commitment to decarbonize, despite the presidential mandate in Executive Order 14008 and the growing trend of decarbonization commitments from other electric utilities.³² Second, regardless of what happens “system-wide,” *these* fossil fuel plants would add more greenhouse gas to the atmosphere, exacerbating climate change. Even if other regulatory schemes allow for such offset accounting,³³ NEPA does not. TVA is not “excused from making emissions estimates just because the emissions in question might be partially offset by reductions elsewhere.”³⁴ Instead, TVA must accurately quantify and consider the greenhouse gas emissions of this proposed action.

²⁹ Draft EA 38 (“[O]peration of the CT units at Paradise would result in a net emission decrease of regulated pollutants, including GHGs.”).

³⁰ TVA already conducted NEPA review of that decision and took credit there for the related reduction in greenhouse gas emissions. *See* TVA, Potential Paradise Fossil Plant Retirement, Final Environmental Assessment 18 (Feb. 2019) (“In terms of GHG emissions, the PAF retirement would eliminate a relatively large source of CO₂ emissions.”).

³¹ “[T]he potential emissions from the [Colbert] CT plant would represent a 1.1 percent increase in state emissions and approximately 0.02 percent of emissions on a national scale. However, as noted in the 2019 IRP, during the decade following the CT retirements, i.e., 2021–2030, annual average system-wide emissions of CO₂ would decrease by 0.6 percent. Thus, the operation of the CT plant at Colbert would not negatively impact regional and national GHG emissions or climate change.” Draft EA 39.

³² Jeff St. John, *The 5 Biggest US Utilities Committing to Zero Carbon Emissions by 2050*, Green Tech Media (Sept. 16, 2020), <https://bit.ly/3tkNgpV> (Att. 3)

³³ The Draft EA anticipates that the decreased emissions from shutting down a coal-fired unit at Paradise make a Prevention of Significant Deterioration Clean Air Act permit inapplicable for the proposed gas plant. Draft EA 32.

³⁴ *Sierra Club v. FERC*, 867 F.3d at 1374–75.

For both gas plants, the Draft EA diminishes the greenhouse gas emissions of burning new fossil fuels by asserting that any emissions would represent “an insignificant increase in regional and national emissions” and “would not negatively impact regional and national GHG emissions or climate change.”³⁵ But if building new gas-fired power plants does not negatively impact climate change, nothing does.

Rather than dismiss the gas plants’ climate impacts as individually minor, TVA must quantify cumulative greenhouse gas emissions from its decision to build new fossil-fuel generation. A 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 . . . or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”³⁶ The “large-scale nature of environmental issues like climate change show why cumulative impacts analysis proves vital to the overall NEPA analysis. The cumulative impacts analysis was designed precisely to determine whether ‘a small amount here, a small amount there, and still more at another point could add up to something with a much greater impact.’”³⁷ If TVA “ever hopes to determine the true impact of its projects on climate change, it can do so only by looking at projects in combination with each other.”³⁸

CEQ has rejected TVA’s justification—that two gas-fired power plants do not significantly worsen climate change by themselves—as misunderstanding the climate analysis NEPA requires:

CEQ recognizes that the totality of climate change impacts is not attributable to any single action, but are exacerbated by a series of actions including actions taken pursuant to decisions of the Federal Government. Therefore, a statement that emissions from a proposed Federal action represent only a small fraction of global emissions is essentially a statement about the nature of the climate change challenge, and is not an appropriate basis for deciding whether or to what extent to consider climate change

³⁵ Draft EA 38, 39.

³⁶ 40 C.F.R. § 1508.7 (2019).

³⁷ *WildEarth Guardians v. U.S. Bureau of Land Mgmt.*, 457 F. Supp. 3d 880, 894 (D. Mont. 2020) (citation omitted).

³⁸ *Id.*

impacts under NEPA. Moreover, these comparisons are also not an appropriate method for characterizing the potential impacts associated with a proposed action and its alternatives and mitigations because this approach does not reveal anything beyond the nature of the climate change challenge itself: the fact that diverse individual sources of emissions each make a relatively small addition to global atmospheric GHG concentrations that collectively have a large impact.³⁹

Cumulatively, the electricity sector represents a 27 percent of the United States' greenhouse gas emissions.⁴⁰ TVA is the largest public power utility and among the nation's leading emitters of greenhouse gases. There is no action that contributes more significantly to climate change than building major fossil-fuel infrastructure like the gas plants TVA proposes.

To address cumulative impacts, TVA must provide data on the combined emissions of building new combustion turbine gas units at Paradise and Colbert. Further, TVA must analyze and disclose the climate impacts of its Combustion Turbine Gas Modernization program. NEPA requires analysis of the cumulative impacts of connected actions.⁴¹ Actions are connected when they "[a]re interdependent parts of a larger action and depend on the larger action for their justification."⁴² TVA justifies its decision to build new gas units as part of a program to modernize its combustion turbine gas fleet. "In Fiscal Year 2019, TVA completed a CT Modernization Study to evaluate the condition of TVA's current CT units and form recommendations for investments to ensure a reliable peaking fleet into the future."⁴³ Pursuant to that study, TVA determined that "it is prudent to replace [Allen and Johnsonville CT] units with more efficient frame CT technology available today."⁴⁴ TVA's decision to build new gas units at Paradise and Colbert is part of a broader Combustion Turbine Gas Modernization program, and TVA must take a hard look at the program's climate impacts. For example, TVA seems to

³⁹ CEQ Climate Guidance 11.

⁴⁰ EPA, *Sources of Greenhouse Gas Emissions*, <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions> (Att. 4).

⁴¹ 40 C.F.R. §§ 1508.7, 1508.25(a) (2019).

⁴² 40 C.F.R. § 1508.25(a)(1)(iii) (2019).

⁴³ Draft EA 1.

⁴⁴ *Id.* at 2.

unreasonably assume that it must replace at least as much combustion turbine gas generation as it retires. But what are the climate impacts of replacing all of the “Most Challenged” combustion turbine gas units with new gas? What about replacing the “Challenged” gas units, too? TVA must disclose and analyze these program-wide climate impacts.

2. TVA should use the Social Cost of Carbon to consider and disclose the climate impacts of its proposal, as compared to the status quo and reasonable alternatives.

To inform itself and the public about climate impacts, and to meet its hard look requirement, TVA must disclose the carbon costs of its decision to add new gas generation as compared to reasonable, carbon-free alternatives.

TVA should quantify those impacts using the Social Cost of Carbon. Developed in 2010 and updated in 2016, the Social Cost of Carbon is a scientifically derived metric to “provide a consistent approach for agencies to quantify [climate change] damage in dollars.”⁴⁵ The Social Cost of Carbon translates a one-ton increase in carbon dioxide emissions into changes in atmospheric greenhouse concentrations, consequent changes in temperature, and resulting economic damages.⁴⁶ Those harms include “changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services.”⁴⁷ The 2016 update estimated that every additional ton of carbon dioxide released from anywhere on Earth will cause an additional \$42 in climate damages.⁴⁸ Not only will the Social Cost of Carbon convey the harms of TVA’s proposal, but it allows TVA “to incorporate the social benefits of reducing carbon dioxide (CO₂) emissions”⁴⁹ in carbon-free alternatives to building new gas.

⁴⁵ *Fla. Se. Connection, LLC*, 162 FERC ¶ 61,233, at P 45 (Mar. 14, 2018).

⁴⁶ See Working Group on the Social Cost of Carbon, *Technical Support Document 5* (2010), available at https://www.epa.gov/sites/production/files/2016-12/documents/scc_tsd_2010.pdf (Att. 5).

⁴⁷ *Id.* at 2.

⁴⁸ Working Group on the Social Cost of Carbon, *Technical Support Document 3–4* (2016), available at https://www.epa.gov/sites/production/files/2016-12/documents/sc_co2_tsd_august_2016.pdf (Att. 6).

⁴⁹ Working Group on the Social Cost of Carbon, *Technical Support Document 1* (2010).

Executive Order 13990 instructed federal agencies to use the Social Cost of Carbon,⁵⁰ which has been widely endorsed by economists and scientists.⁵¹ The Social Cost of Carbon is useful and appropriate here to meaningfully convey the impacts of building new gas plants—and thereby adding decades of greenhouse gas emissions—in comparison to carbon-free alternatives like energy efficiency, demand response, renewable energy, or battery storage.

3. The Draft EA ignores the climate *impacts* of building the proposed new gas plants.

TVA has not discussed climate impacts. Under NEPA, TVA must “quantify *and consider*” a project’s downstream greenhouse gas emissions, or explain why it cannot.⁵² Even if TVA’s quantitative analysis were adequate, TVA must do more. “The key requirement of NEPA . . . is that the agency consider and disclose the *actual environmental effects* in a manner that . . . brings those effects to bear on decisions to take particular actions that significantly affect the environment.”⁵³ Therefore, in the context of greenhouse gas emissions, NEPA review must “include a discussion of the ‘significance’ of this indirect effect . . . as well as ‘the incremental impact of the action.’”⁵⁴

TVA includes a brief, general discussion of climate change and recognizes that it is caused by activities that burn fossil fuels like gas. TVA does not discuss the impacts of running gas-fired power plants for decades to come. TVA should include a “qualitative summary discussion of the impacts of GHG emissions based on authoritative reports.”⁵⁵ Those effects include “more frequent and intense heat waves, longer fire seasons and

⁵⁰ Exec. Order 13990, 86 Fed. Reg. 7037, 7040 (Jan. 25, 2021).

⁵¹ See Nat’l Acads. Sci., Eng’g & Med., *Valuing Climate Damages: Updating Estimates of the Social Cost of Carbon Dioxide* 3, 10–17 (2017) (**Att. 7**); Nat’l Acads. Sci., Eng’g & Med., *Assessment of Approaches to Updating the Social Cost of Carbon: Phase 1 Report on a Near-Term Update* 1 (2016) (**Att. 8**); Richard L. Revesz et al., *Best Cost Estimate of Greenhouse Gas*, 357 *Science* 655 (2017) (**Att. 9**).

⁵² *Sierra Club v. FERC*, 867 F.3d at 1375 (emphasis added).

⁵³ *Balt. Gas & Elec. Co. v. NRDC*, 462 U.S. 87, 96 (1983) (emphasis added). See 40 C.F.R. § 1502.16(a), (b) (2019) (requiring examination of effects and their significance).

⁵⁴ *Sierra Club v. FERC*, 867 F.3d at 1374.

⁵⁵ CEQ Climate Guidance 10.

more severe wildfires, degraded air quality, more heavy downpours and flooding, increased drought, greater sea-level rise, more intense storms, harm to water resources, harm to agriculture, ocean acidification, and harm to wildlife and ecosystems.”⁵⁶

These impacts are not theoretical, and burning fossil fuels is the problem, not the answer. Historically cold weather swept across the United States in February 2021,⁵⁷ devastating many Texans who were left without power due, in large part, to failing gas facilities.⁵⁸ The same historic weather deprived many TVA-area residents of clean, reliable water for days, as freezing temperatures wreaked havoc on the water infrastructure of Memphis Light Gas & Water, TVA’s largest customer.⁵⁹ For TVA, the past three years have been the wettest years in 131 years of record keeping, and 2020 set the single-year record with rainfall 139% above normal.⁶⁰ These climate impacts should be top of mind for TVA, given its mission to manage the Tennessee River watershed and control flooding in the Valley. A robust discussion of actual and worsening climate effects like these is essential for NEPA review of TVA’s generation decisions.

Considering reasonable alternatives, disclosing their greenhouse gas emissions, and discussing their environmental impacts, including through the Social Cost of Carbon, will ensure that TVA and the public have the information necessary to make a reasoned decision.

B. TVA must disclose and analyze the impacts of the new gas plants on local air quality and environmental justice communities.

1. TVA fails to take a “hard look” at impacts to local air quality.

TVA’s analysis of the impact of the proposed gas plants on air quality is premised on its assertion that the new plants will comply with permit limits set by “applicable state

⁵⁶ *Id.* at 9.

⁵⁷ Oliver Milman, *Heating Arctic May Be to Blame for Snowstorms in Texas, Scientists Argue*, *The Guardian* (Feb. 17, 2021), <https://bit.ly/3vij9kC> (Att. 10).

⁵⁸ Erin Douglas, *Texas Largely Relies on Natural Gas for Power. It Wasn’t Ready for the Extreme Cold*, *Texas Tribune* (Feb. 16, 2021), <https://bit.ly/3rWZgxD> (Att. 11).

⁵⁹ Samuel Hardiman, *Why Was Memphis’ Water Infrastructure in Such Bad Shape? Politics Didn’t Help*, *Memphis Commercial Appeal* (Feb. 22, 2021), <https://bit.ly/30FynCa> (Att. 12).

⁶⁰ *TVA Calls 2020 the Wettest Year on Record for Tennessee Valley Authority*, *WBIR* (Jan. 5, 2021), <https://bit.ly/3tg5xo5> (Att. 13).

and federal regulations.”⁶¹ Even though the new gas plants will “result in an increase in local emissions,” TVA concludes that these increases will not be significant because of these permit limits: “[C]ompliance with PSD requirements . . . ensures there is no significant impact to or deterioration of air quality due to the proposed project.”⁶² But permit compliance alone cannot justify a not significant finding under NEPA. Even the largest polluters must comply with the conditions of applicable permits, and yet their emissions may still be significant and warrant review in a NEPA document. Indeed, some air pollutants, like fine particulates, have harmful effects even when air quality standards are not violated.⁶³ TVA must actually perform *some analysis* of impacts to air quality to justify the conclusion presented in the Draft EA.⁶⁴ It failed to do so.

2. TVA fails to take a “hard look” at disproportionate impacts on environmental justice communities.

TVA’s cursory approach to assessing the impacts of the proposed gas plants on air quality is even more problematic in the context of its environmental justice analysis. People of color and low-wealth communities often bear a disproportionate burden of the pollution caused by power plants, compressor stations, and other industrial facilities.⁶⁵

⁶¹ Draft EA 31, 33.

⁶² *Id.* at 36.

⁶³ *Friends of Buckingham*, 947 F.3d 68, 92 (4th Cir. 2020) (“[E]ven when NAAQS are not violated as to this particulate matter, the record reflects that exposure to PM2.5 will increase the risk of asthma, heart attacks, and death.”); *Am. Trucking Ass’ns v. EPA*, 283 F.3d 355, 360 (D.C. Cir. 2002) (recognizing the “lack of a threshold concentration below which [particulate matter and ozone] are known to be harmless”).

⁶⁴ *Coal. to Protect Puget Sound Habitat v U.S. Army Corps of Eng’rs*, 417 F.Supp.3d 1354, 1361 (W.D. Wash. 2019) (observing that the analysis in an environmental assessment “‘must be more than perfunctory’ and must be based on ‘some quantified or detailed information’”) (quoting *Klamath-Siskiyou Wildlands Ctr. v. Bureau of Land Mgmt.*, 387 F.3d 989, 993-94 (9th Cir. 2004)).

⁶⁵ *Friends of Buckingham*, 947 F.3d at 87 (quoting Nicky Sheats, *Achieving Emissions Reductions for Environmental Justice Communities Through Climate Change Mitigation Policy*, 41 Wm. & Mary Env’tl. L. & Pol’y Rev. 377, 382 (2017) (“There is evidence that a disproportionate number of environmental hazards, polluting facilities, and other unwanted land uses are located in communities of color and low-income communities.”)).

Confronting this legacy is a priority of the federal government.⁶⁶ In January, President Biden declared that the federal government “must deliver environmental justice in communities all across America” and that federal agencies “shall make achieving environmental justice part of their missions.”⁶⁷ NEPA review is an important tool for reaching these goals, and it is critical that TVA do this analysis in the Draft EA for the Colbert and Paradise gas plants.

“The purpose of an environmental justice analysis is to determine whether a project will have a disproportionately adverse effect on minority and low income populations.”⁶⁸ Broadly speaking, this requires two steps. First, an agency must correctly identify the environmental justice communities in the vicinity of the proposed action.⁶⁹ But it should be circumspect when relying solely on desktop demographic tools like EPA’s EJSCREEN and census data. The analysis provided by these tools can often be too coarse to detect the presence of environmental justice communities concentrated in a small area.⁷⁰ As EPA itself has cautioned, “[t]he fact that census data can only be disaggregated to certain prescribed levels (*e.g.*, census tracts, census blocks) suggests that pockets of minority or low-income communities, including those that may be experiencing disproportionately high and adverse effects, may be missed in a traditional census tract-based analysis.”⁷¹ Outreach in potentially impacted areas to identify people

⁶⁶ See Exec. Order No. 14008, 86 Fed. Reg. 7619, 7629 (Jan. 27, 2021).

⁶⁷ *Id.* at 7622, 7629.

⁶⁸ *Friends of Buckingham*, 947 F.3d at 87 (quoting *Mid States Coal. for Progress v. Surface Transp. Bd.*, 345 F.3d 520, 541 (8th Cir. 2003)).

⁶⁹ *Standing Rock Sioux Tribe v. U.S. Army Corps of Eng’rs*, 255 F.Supp.3d 101, 136-37 (D.D.C. 2017) (citing Council on Env’tl. Quality, Environmental Justice Guidance Under the National Environmental Policy Act (Dec. 10, 1997)); *Friends of Buckingham*, 947 F.3d at 88 (“The minority EJ community designation is important because, if Union Hill is considered a minority EJ community, then information about African American populations having a greater prevalence of asthma and other health issues is an important consideration.” (internal quotation marks and brackets omitted)).

⁷⁰ *Friends of Buckingham*, 947 F.3d at 88; *cf. Standing Rock Sioux Tribe*, 255 F.Supp.3d at 137 (“[T]he unit of geographic analysis for the environmental-justice assessment should be chosen so as not to artificially dilute or inflate the affected minority population.”) (internal quotation marks and citation omitted).

⁷¹ EPA, Final Guidance for Incorporating Environmental Justice Concerns in EPA’s NEPA Compliance Analyses § 2.1.1 (1998), available at <https://bit.ly/3r7w7zj> (Att. 14).

of color and low-wealth communities is critical.⁷² EPA recommends supplementing census data with local demographic data and research,⁷³ and specifically notes that EPA staff does not use EJSCREEN “[a]s a means to identify or label an area as an ‘EJ community’” or “[a]s a basis for agency decision-making or making a determination regarding the existence or absence of EJ concerns.”⁷⁴

Second, once the agency has identified environmental justice communities, it must assess the impacts of the project on the people in those specific communities. In the air quality context, reliance on air quality standards alone is an insufficient basis for an environmental justice analysis. Instead, the agency must examine the impacts of the pollutants from the proposed facility with an analysis “tailored to [the] specific EJ community.”⁷⁵ As we noted above, some air pollutants, like fine particulates, have harmful effects even when air quality standards are not violated.⁷⁶ The Draft EA fails to present an appropriate environmental justice analysis for both the Colbert and Paradise gas plants.

TVA’s environmental justice analysis for the Colbert gas plants is flawed in two respects. First, the utility relied solely on a desktop demographics analysis using EJSCREEN and census block data which failed to identify the predominantly Black community of Red Rock/Barton located less than a mile from TVA’s facility. Residents in this community organized in 2015 and 2016 to oppose TVA’s plans to cap its coal ash lagoons and permanently store its waste ash on the Colbert site. They frequently communicated with TVA about its coal ash disposal plans, participated in filming a video entitled “Ashes to Ashes” documenting their experiences, and were the subject of local

⁷² Council on Env'tl. Quality, Environmental Justice Guidance Under the National Environmental Policy Act 4, 9-13 (Dec. 10, 1997) (“CEQ Environmental Justice Guidance”) (**Att. 15**).

⁷³ See Fed. Interagency Working Grp. on Env'tl. Justice, Promising Practices for EJ Methodologies in NEPA Reviews 21 (2016), available at <https://bit.ly/306MZdi> (**Att. 16**).

⁷⁴ EPA, How Does EPA Use EJSCREEN?, <https://www.epa.gov/ejscreen/how-does-epa-use-ejscreen> (last accessed Mar. 11, 2021).

⁷⁵ *Friends of Buckingham*, 947 F.3d at 90-92.

⁷⁶ *Id.* at 92.

news reporting.⁷⁷ Longtime residents expressed concern about particulates that covered their homes and cars from the stacks of the Colbert Fossil Plant before it was closed.⁷⁸ Yet TVA never acknowledges the existence of the Red Rock/Barton community in the Draft EA, despite the community's record of engagement with the utility.

The fate of the Red Rock/Barton community in the Draft EA is a problem faced by other environmental justice communities.⁷⁹ It is arbitrary for TVA to conclude that no communities of people of color will be affected by the proposed gas plants when it has evidence that one such community, on the boundary of the utility's property, has spoken up and raised concerns about other issues at the site. At a bare minimum, TVA must identify this community and any other environmental justice communities hidden beneath the coarse analytics of its desktop demographic analysis.

Second, TVA concludes—again without analysis—that because the proposed gas plants at Colbert would comply with the conditions of a Clean Air Act permit, there will be no disproportionate impacts to environmental justice communities. But the Fourth Circuit flatly rejected this approach in *Friends of Buckingham*, a case involving emissions from a gas-fired compressor station in the historic community of Union Hill, Virginia: “[B]lindly relying on ambient air standards is not a sufficiently searching analysis of air quality standards for an EJ community.”⁸⁰ The Fourth Circuit had good reason to dismiss the notion that mere compliance with NAAQS means there will be no disproportionate adverse health risks. Whether a facility would allow an area to comply with air quality standards is distinct from whether it would have a disproportionately high and adverse effect on environmental justice populations. Otherwise, consideration of disproportionate harm would be required only for facilities that would contribute to a violation of such air quality standards—and thus could not lawfully be built.⁸¹ TVA must

⁷⁷ Russ Corey, *Residents Suspect Cancer Tied to Steam Plant*, Times Daily (Sept. 4, 2016), <https://bit.ly/3rINaYJ> (Att. 17); Russ Corey, *Residents Considering Legal Action Against TVA*, Times Daily (Nov. 8, 2016), <https://bit.ly/2NdVNeT>; Southern Exposure, *Ashes to Ashes, a Film by Kaitlin McMurray*, <https://vimeo.com/293234406>.

⁷⁸ Southern Exposure, *Ashes to Ashes, a Film by Kaitlin McMurray*, <https://vimeo.com/293234406>.

⁷⁹ *Friends of Buckingham*, 947 F.3d at 88-89.

⁸⁰ *Id.* at 93.

⁸¹ EPA, Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis § 3.2.2 (1998), <https://bit.ly/3rV2SQJ> (explaining that even

assess the impact of the proposed gas-plant emissions on the specific environmental justice communities that live near the Colbert site, including the low-income communities identified in TVA’s desktop analysis and the Red Rock/Barton community.

TVA’s analysis of the impacts of emissions from the proposed gas plants at the Paradise location is also flawed. Here, TVA concludes that because it shuttered the Paradise Unit 3 coal plant in February 2020, low-wealth communities will actually experience less pollution once the gas plants are operational than they did in the past.⁸² TVA’s argument misdirects the focus of the analysis away from the proposed gas plants to an unrelated action—the closure of a different power plant not part of the Draft EA—that the utility took more than a year ago.⁸³ The question that TVA must address now, in 2021, is whether the emissions from the *new* gas plants—the three proposed combustion turbines—will cause a disproportionate impact on the neighboring low-wealth communities. TVA’s Draft EA does not attempt to answer that question.

Moreover, TVA’s approach to environmental justice here highlights the grave injustice faced by communities of people of color and low-wealth communities around the country for decades. The utility’s approach, in essence, asks the residents near Paradise to accept this reasoning: Because the air quality in your community has been poor in the past, you will not mind or be affected by more emissions from our new gas plants. But the historic, unfair burden of pollution is precisely what an environmental justice analysis is supposed to identify and correct. TVA must provide a meaningful analysis of the impacts of the Paradise gas plants on nearby environmental justice communities.

3. TVA ignores the cumulative impacts on environmental justice communities.

TVA unlawfully limited its cumulative impacts analysis to only “those resource issues potentially adversely affected by project activities.”⁸⁴ But the purpose of a cumulative impacts analysis is to identify the “incremental impact” of the proposed

harms that are not “significant” in NEPA context may disproportionately or severely harm environmental justice communities).

⁸² Draft EA 160.

⁸³ TVA, Paradise Fossil Plant, <https://www.tva.com/energy/our-power-system/coal/paradise-fossil-plant> (last accessed Mar. 12, 2021).

⁸⁴ Draft EA 168.

action, even when that action has “*individually minor*” impacts.⁸⁵ NEPA requires that the Draft EA contain “some quantified or detailed information” about cumulative impacts and that the “analysis must be more than perfunctory[.]”⁸⁶ TVA cannot wave off its obligation to conduct a meaningful analysis of cumulative impacts solely because it concludes that the direct and indirect impacts of its proposed gas plants are minor.

TVA’s Draft EA must examine the cumulative air quality impacts on environmental justice communities of the expansion of the Cherokee Industrial Landfill. Like the proposed gas plants, the landfill is located near the predominantly Black community of Red Rock/Barton.⁸⁷ The landfill is slated for a significant expansion, increasing its footprint by an additional eight acres, fourteen percent larger than its current size.⁸⁸ According to state records, the waste stream permitted at the landfill includes “nonhazardous industrial wastes, nonhazardous industrial sludge, construction and demolition wastes, rubbish . . . , asbestos, and tires” and contemplates the open burning of waste with a subsequent approval from state regulators.⁸⁹ Yet the Draft EA does not acknowledge, let alone assess, the potential cumulative impacts to local air quality for the Red Rock/Barton community next door to the proposed Colbert gas plants and does not satisfy NEPA.

⁸⁵ 40 C.F.R. § 1508.7 (2019) (defining “cumulative impacts” and recognizing that “[c]umulative impacts can result from individually minor but collectively significant actions taking place over a period of time”) (emphasis added).

⁸⁶ *Klamath-Siskiyou Wildlands Ctr.*, 387 F.3d at 993-94 (internal quotation marks omitted).

⁸⁷ Draft EA 168.

⁸⁸ *Id.*

⁸⁹ Ala. Dep’t of Env’tl. Mgmt., Preliminary Determination, Permit Renewal/Major Modification, Cherokee Industrial Landfill, Permit No. 17-10 at 6, 7 (Sept. 11, 2020), <http://adem.alabama.gov/newsEvents/notices/sep20/pdfs/9cherokee.pdf> (Att. 18).

C. TVA must consider reasonable alternatives in the Draft EA.

1. TVA’s narrow purpose and restricted alternatives analysis violates NEPA.

TVA ignores reasonable, carbon-free alternatives to the proposed gas plants, even though these alternatives could eliminate the project’s greenhouse gas emissions and its impacts on environmental justice communities.⁹⁰ These alternatives include:

- Retiring, but not replacing, the Allen and Johnsonville gas plants
- Energy efficiency, demand response, solar, and battery storage options
- Reasonable combinations of carbon-free technology, such as demand response or solar combined with battery storage

Under NEPA and the 1978 NEPA implementing regulations, federal agencies must evaluate reasonable alternatives to a proposed action in an environmental assessment.⁹¹ An agency need not evaluate every conceivable alternative; “[o]nly alternatives that accomplish the purposes of the proposed action are considered reasonable.”⁹² But a federal agency “cannot ‘define [a] project so narrowly that it foreclose[s] reasonable

⁹⁰ CEQ Climate Guidance 15 (counseling that “a comparison among these alternatives based on GHG emissions and any potential mitigation measures can be useful to advance a reasoned choice among alternatives and mitigation actions”); CEQ Environmental Justice Guidance at 10 (where a disproportionate effect on environmental justice communities is identified, urging agencies to “heighten agency attention to alternatives (including alternative sites)”).

⁹¹ 40 C.F.R. § 1508.9(b) (2019) (stating that an environmental assessment “[s]hall include brief discussions . . . of alternatives as required by section 102(2)(E)”; 42 U.S.C. § 4332(2)(E) (mandating that “all agencies of the Federal Government shall . . . study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources”); *Little Traverse Lake Prop. Owners Ass’n v. Nat’l Park Serv.*, 883 F.3d 644, 648-49 (6th Cir. 2018) (recognizing an agency’s obligation to consider alternatives in an environmental assessment).

⁹² *Little Traverse Lake Prop. Owners Ass’n*, 883 F.3d at 655-56 (quoting *Webster v. Dep’t of Agric.*, 685 F.3d 411, 422 (4th Cir. 2012)).

consideration of alternatives.”⁹³ Courts “may reject an agency’s statement of purpose and need as ‘unreasonably narrow’ if the statement ‘compels the selection of a particular alternative.’”⁹⁴ TVA’s Draft EA does not meet NEPA’s requirements.

TVA defines the purpose of its proposed action so narrowly that it gives the agency a perfunctory, binary choice: (1) do nothing or (2) replace old gas plants with new gas plants:

[T]he purpose of the proposed action is to replace the existing capacity from the retirement of 1,400 MW of frame CTs at the Allen and Johnsonville sites with the addition of 1,500 MW of CT capacity to be split between TVA’s Paradise and Colbert sites for commercial operation no later than December 31, 2023.⁹⁵

The Draft EA’s alternatives closely track this narrow purpose, never considering or even mentioning the possibility that TVA may not need to replace this peaking capacity *at all* or that clean, carbon-free alternatives to the proposed gas plants exist. TVA only considered “various gas asset types” to replace retired generation at Allen and Johnsonville, before settling on “gas-fired frame combustion turbines” because of their ability meet peak demand.⁹⁶ There is no analysis of an option in which TVA retires, but does not replace, the Allen and Johnsonville plants and no mention of energy efficiency, demand response, and battery storage, all viable peaking resources, or other carbon-free alternatives.

The Draft EA’s restricted analysis is not consistent with the 2019 IRP. To be sure, the IRP contemplates the addition of some gas-fired combustion turbines in the future. But it also emphasizes that the utility must have flexibility to adjust its plans to ongoing changes in the energy landscape of the Tennessee Valley. The IRP does not select a preferred scenario for energy development, instead opting to recognize that “a variety of

⁹³ *Id.* at 656 (quoting *Utah Envtl. Cong. v. Bosworth*, 439 F.3d 1184, 1195 (10th Cir. 2006)); *see also Nat. Res. Def. Council v. Nat’l Park Serv.*, 250 F.Supp.3d 1260, 1290 (M.D. Fla. 2017).

⁹⁴ *Id.* (quoting *Theodore Roosevelt Conservation P’ship v. Salazar*, 661 F.3d 66, 73 (D.C. Cir. 2011)).

⁹⁵ Draft EA 1.

⁹⁶ *Id.* at 7.

future scenarios are possible and each strategy has positive aspects.”⁹⁷ TVA went on to select *all* of the IRP results for its final recommendation “to provide flexibility for how the future evolves.”⁹⁸ For gas specifically, the IRP observes that the need for new gas generation will depend on “demand for electricity, solar penetration, and evolution of other peaking technologies.”⁹⁹ In other words, the IRP contemplates later analysis at the individual project stage to gauge the pace, scope, and cost of these changes and to determine the best manner and resources to address them. The Draft EA never acknowledges TVA’s commitment to resource flexibility, let alone offers a robust alternatives analysis of these options.

2. TVA must evaluate an alternative which retires, but does not replace, the Allen and Johnsonville gas plants.

One factor identified in the IRP—changes in the “demand for electricity”—raises significant questions about the need for the proposed gas plants. In the Draft EA, TVA assumes, again without acknowledgment, that it will need to replace the 1400 MWs of gas plants at Allen and Johnsonville that it plans to retire. But it is far from clear that TVA must replace this retiring capacity *at all*, let alone with another 1400 MW of gas generation that will pollute for decades into the future. Indeed, during the recent extreme weather event in February 2021, TVA touted the fact that it was not only able to meet its own three-year high of demand, but was also able to send excess electricity outside of the region to assist neighboring utilities who were suffering grid outages.¹⁰⁰ Further, while TVA credited the diversity of its generation for reliable service during the extreme

⁹⁷ 2019 IRP ES-1.

⁹⁸ *Id.*

⁹⁹ *Id.* at ES-4.

¹⁰⁰ Dave Flessner, *Winter Weather Pushes TVA Power Demand to 3-year High for Winter Peak*, Chattanooga Times Free Press (Feb. 17, 2021), <https://bit.ly/3bzZN2x> (**Att. 19**); Dave Flessner, *TVA Is More Prepared for Winter Weather than Texas Utilities*, Chattanooga Times Free Press (Feb. 26, 2021), <https://bit.ly/3esgvTv> (**Att. 20**); Samuel Hardiman, Daniella Medina & Brittany Crocker, *Why the Power in Tennessee Stayed on While Texas, Arkansas Had Rolling Blackouts*, Tennessean (Feb. 17, 2021), <https://bit.ly/315Rqiv> (“TVA expected to hit peak demand for the week on Tuesday morning with an estimated 28,500 megawatts, but that morning it reached only about 28,141 megawatts, the company said. TVA had 36,000 megawatts of capacity in anticipation of the spike.”) (**Att. 21**).

weather, adding more gas plants hardly increases the diversity of the utility's fleet.¹⁰¹ TVA also maintains a large reserve margin, one that is substantially larger than recommended by the North American Electric Reliability Corporation to maintain reliability,¹⁰² and expects demand "to be flat, or even declining slightly, over the next 10 years."¹⁰³

In addition, demand for TVA power may decline further because several customers are evaluating terminating their power supply contracts with the utility. These customers include four local utilities that filed a petition with the Federal Energy Regulatory Commission for unbundled access to TVA's transmission grid.¹⁰⁴ These four utilities represent roughly three to four percent of TVA's overall load. TVA's largest customer, Memphis Light, Gas & Water, representing another ten percent of TVA's load, has also actively considered other power supply options. While the CEO of the Memphis utility recently advised suspending that process, he also noted a number of uncertainties that may spur the utility to revisit the issue in the near future.¹⁰⁵ TVA has been so concerned about the defection of its distribution utility customers and the corresponding load loss that, in 2019, it made a dramatic change in its power supply contracts in an attempt to forever lock in as much of its load as possible.¹⁰⁶

These details, and their implication that TVA has excess generating capacity, are specifically the types of changes in the energy landscape that TVA pledged, in the 2019

¹⁰¹ Cf. Erin Douglas, *Texas Largely Relies on Natural Gas for Power. It Wasn't Ready for the Extreme Cold*, Texas Tribune (Feb. 16, 2021), <https://bit.ly/3l6EMQh>.

¹⁰² N. Am. Electric Reliability Corp., *2020 Long-Term Reliability Assessment* 117 (Dec. 2020), <https://bit.ly/3qFPBdh> (Att. 22).

¹⁰³ 2019 IRP 1-4.

¹⁰⁴ Compl. and Pet. for Order Under Federal Power Act Sections 210 and 211A Against TVA., *Athens Util. Bd. v. TVA*, Nos. EL21-40-000 & TX21-1-000 (FERC Jan. 21, 2021).

¹⁰⁵ Jeni Diprizio, *MLGW President Recommends Staying with TVA, Suspending Search for Another Power Supplier, for Now*, Local Memphis (Mar. 3, 2021), <https://bit.ly/3t9guYC> (Att. 23).

¹⁰⁶ Several of the signatories to these comments have filed litigation against TVA for adopting illegal perpetual contracts in violation of the TVA Act and NEPA. Compl., *Protect Our Aquifer v. Tenn. Valley Auth.*, No. 2:20-cv-02615 (W.D. Tenn. Aug. 17, 2020).

IRP, to evaluate.¹⁰⁷ They raise serious questions about whether there is even a need to replace the 1400 MW of gas generation that TVA is retiring, but the Draft EA never grapples with them. TVA must evaluate an alternative that retires, but does not replace, the Allen and Johnsonville plants.

Another alternative potentially affecting demand that TVA has failed to discuss is the proposed Southeast Energy Exchange Market (SEEM), currently pending before the Federal Energy Regulatory Commission.¹⁰⁸ The SEEM was not part of the 2019 IRP, nor is it mentioned in the Draft EA. TVA must analyze whether SEEM could provide an alternative to building the proposed new gas plants.

3. TVA must evaluate the use of carbon-free options, alone or in combination, as alternatives to the proposed gas plants.

A second factor identified in TVA's 2019 IRP—"the evolution of other peaking technologies"—also warrants review in the Draft EA's alternatives analysis. The TVA Act requires the utility to consider energy efficiency and "to treat demand and supply resources on a consistent integrated basis."¹⁰⁹ And TVA's own sensitivity analysis in the 2019 IRP identified the value of these resources: when artificial caps are removed, the planning model picks energy efficiency and demand response instead of new gas generation.¹¹⁰ Specifically, the sensitivity analysis revealed that 1900 MW of energy efficiency and demand response displace the need for new gas-fired combustion turbines like the plants proposed for Colbert and Paradise.¹¹¹

The IRP also identifies demand response and battery storage options as peaking technologies with the potential to provide the same reliability and flexibility as the proposed gas plants.¹¹² For batteries, TVA goes so far as to express the goal of gaining

¹⁰⁷ 2019 IRP ES-3.

¹⁰⁸ Revisions to Joint Open Access Transmission Tariff to Implement Non-Firm Energy Exchange Transmission Service, *Duke Energy Carolinas, LLC and Duke Energy Progress, LLC*, FERC Docket No. ER21-1115-000, (Feb. 12, 2021).

¹⁰⁹ 16 U.S.C. § 831m-1(2).

¹¹⁰ TVA, 2019 IRP Working Group Presentation 52-57 (May 13, 2019).

¹¹¹ *Id.* at 55.

¹¹² 2019 IRP ES-1 ("Gas, storage and demand response additions provide reliability and/or flexibility."); Draft EA 1 (identifying the proposed combustion turbines as a type of peaking resource that provides reliability and flexibility).

“early experience with battery storage on its system” to understand how this new technology can be used “to provide economic benefit and system flexibility”¹¹³ and notes that “the trajectory and timing of [battery storage] additions” are in flux as the technology evolves.¹¹⁴ TVA also committed to “continue to monitor rapidly evolving battery storage technologies for improving economics.”¹¹⁵

Yet while the IRP identifies these carbon-free options, the Draft EA does not carry forward the analysis. TVA simply leaves unanswered any questions about whether energy efficiency, demand response, battery storage—or any other carbon-free option—is today, in 2021, a competitive alternative to the proposed gas plants. Can energy efficiency and demand response replace the proposed gas plants? Are the Colbert or Paradise locations suitable sites for the utility to gain early experience with battery storage? Has battery technology evolved since 2019 as contemplated by the IRP? The Draft EA is silent, conflicting with TVA’s own assessments in 2019.

TVA’s restricted analysis also does not track the evolving facts on the ground. In 2020, TVA announced two battery storage projects, including a solar plus storage Green Invest project in Mississippi (50 MW for four hours) and a storage-only project owned by TVA in East Tennessee (40 MW).¹¹⁶

¹¹³ 2019 IRP ES-4.

¹¹⁴ *Id.*

¹¹⁵ *Id.* at § 8.2.2. TVA’s IRP planning mandate requires TVA to plan “to provide adequate and reliable service to electric customers of the Tennessee Valley Authority at the lowest system cost.” 16 U.S.C. § 831m-1. This requirement does not necessarily mean TVA must select the cheapest option to provide power. *See Ky. Coal Ass’n v. Tenn. Valley Auth.*, 804 F.3d 799, 802 (6th Cir. 2015) (acknowledging that in the context of the TVA Act, “the term ‘costs’ . . . means more than dollars and cents,” and can include, for example, costs to human health and the environment); *see also* 16 U.S.C. 831n-4(f) (in setting rates, TVA should have “due regard for the primary objectives of the chapter”); *see id.* § 831a(b)(5) (requiring Board members to affirm “support for the objectives and missions of the Corporation, including being a national leader in technological innovation, low-cost power, and environmental stewardship”).

¹¹⁶ *See* Press Release, TVA, First TVA-owned Battery Storage to Shape Energy Future (Sept. 21, 2020), <https://www.tva.com/newsroom/press-releases/first-tva-owned-battery-storage-to-shape-energy-future>; Press Release, TVA, TVA Grows Solar Portfolio by 44% in December, January (Feb. 11, 2020), <https://www.tva.com/Newsroom/Press-Releases/TVA-Grows-Solar-Portfolio-by-44-in-December-January>.

TVA does not—and indeed cannot—claim that carbon-free alternatives to the proposed gas plants are policy-based options that it can summarily dismiss. Rather, they are alternatives that the utility must consider because they are “within the ambit” of TVA’s statutory mission.¹¹⁷ Again, TVA fails to meet this standard in the Draft EA. TVA’s mission is “serving the Tennessee Valley through energy, environmental stewardship, and economic development.”¹¹⁸ In describing its mission, the agency’s website announces, among other things, that the utility is “generating . . . more renewable energy” contributing to a large reduction in greenhouse gas emissions.¹¹⁹ Moreover, the 2019 IRP explicitly contemplates the addition of options like battery storage and demand response—all alternatives are on the table for future consideration.¹²⁰ When TVA reaches project-specific decision points, like the proposed construction of new gas plants, it must include alternatives that fall within the ambit of its statutory mission and the 2019 IRP.

Even if replacing the retired gas plants at Allen and Johnsonville with carbon-free alternatives were inconsistent with the 2019 IRP—which it is not—the IRP is a broad planning document and “does not dictate a specific series of actions . . . at particular plants.”¹²¹ The IRP “sets nothing in stone about the particular amount, or even the particular range” of a given generation source across TVA’s system, much less at specific facilities.¹²² Because TVA demurred on selecting a specific capacity addition portfolio in the 2019 IRP, it must again evaluate a full range of carbon-free alternatives, alone or in

¹¹⁷ *Motor Vehicles Mfrs. Ass’n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 51 (1983) (“But the airbag is more than a policy alternative to the passive restraint standard; it is a technological alternative within the ambit of the existing standard” and “may not be abandoned without any consideration whatsoever[.]”); *Save Our Cumberland Mountains v. Kempthorne*, 453 F.3d 334, 347 (6th Cir. 2006) (quoting *Cent. S.D. Coop. Grazing Dist. v. Sec’y of the U.S. Dep’t of Agric.*, 266 F.3d 889, 898 (7th Cir. 2003)).

¹¹⁸ Draft EA 1.

¹¹⁹ TVA, *TVA at a Glance*, <https://www.tva.com/about-tva/tva-at-a-glance> (last accessed Mar. 12, 2021).

¹²⁰ 2019 IRP ES-1 (announcing that, in addition to other resources, TVA will add up to five GW of battery storage over the next twenty years and continue to reduce its greenhouse gas emissions).

¹²¹ *Ky. Coal Ass’n, Inc.*, 804 F.3d at 803 (quoting from TVA’s 2011 IRP and holding that TVA acted reasonably when exceeding the IRP’s range of projected coal retirements).

¹²² *Id.*

combination, for meeting the purported capacity need asserted in the Draft EA for the Colbert and Paradise gas plants.

4. TVA’s alternatives analysis must address unresolved conflicts related to climate change and environmental justice.

While courts accept that an agency’s obligation to evaluate alternatives is lessened in an environmental assessment, TVA cannot just fall back on its conclusion that the impacts of the proposed gas plants are not significant to wave off meaningful consideration of carbon-free options. As we wrote above, the agency simply did not take a hard look at the project’s greenhouse gas emissions or its impacts on environmental justice communities.

But even accepting—and commenters do not—TVA’s conclusion that the impacts of the proposed gas plants would be insignificant, NEPA is clear: an environmental assessment, standing alone, must contain a meaningful consideration of alternatives.¹²³ Under § 4332(2)(E), federal agencies must “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources.”¹²⁴ Here, unresolved conflicts exist concerning how TVA should use the Paradise and Colbert properties to generate electricity for the Tennessee Valley, how TVA should use the resources of the atmosphere to discharge climate-warming greenhouse gases from gas-fired plants, and the impacts of its proposal on people of color and low-wealth communities.

The climate crisis and environmental justice are priorities for every federal agency.¹²⁵ NEPA’s alternatives requirement takes on special importance in this context. TVA’s conclusory analysis fails to meaningfully address these conflicts and violates NEPA.

¹²³ 42 U.S.C. § 4332(2)(E).

¹²⁴ *Id.*; *Bob Marshall All. v. Hodel*, 852 F.2d 1223, 1228-29 (9th Cir. 1998) (recognizing that, in light of § 4332(2)(E), “consideration of alternatives is critical to the goals of NEPA even where a proposed action does not trigger the EIS process”); *Cherokee Forest Voices v. U.S. Forest Serv.*, 182 F. App’x 488, 496 (6th Cir. 2006) (“An agency must follow § 4332(2)(E) even when it prepares an [environmental assessment].”).

¹²⁵ Exec. Order No. 14008, 86 Fed. Reg. 7619, 7619, 7629 (Jan. 27, 2021).

III. TVA must prepare an environmental impact statement.

Because building new gas-fired power plants is a major federal action with significant environmental effects, TVA must prepare an environmental impact statement (EIS).

An agency must prepare an EIS if “there are “substantial questions whether a project may have a significant effect.”¹²⁶ Significance is determined by the impacts’ context and intensity. Significance “must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality.”¹²⁷ Significance also accounts for “intensity,” or the severity of the impact. Intensity includes the following factors, any one of which may require an EIS¹²⁸:

The degree to which the proposed action affects public health or safety.¹²⁹

The degree to which the effects on the quality of the human environment are likely to be highly controversial.¹³⁰

The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.¹³¹

Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment.

¹²⁶ *Center for Biological Diversity v. Nat’l Hwy. Safety Admin.*, 538 F.3d 1172, 1219 (9th Cir. 2008) (citing *Idaho Sporting Cong. v. Thomas*, 137 F.3d 1146, 1150 (9th Cir. 1998)). Multiple Sixth Circuit district courts have applied this standard. *See, e.g., Anglers of the Au Sable v. Forest Service*, 402 F. Supp. 2d 826, 831 (E.D. Mich. 2005) (plaintiffs raised substantial question as to significant effects of oil and gas drilling in national forest).

¹²⁷ 40 C.F.R. § 1508.27(a) (2019).

¹²⁸ *Barnes v. U.S. Dept. of Transp.*, 655 F.3d 1124, 1140 (9th Cir. 2011) (“Any one of these factors may be sufficient to require preparation of an EIS in appropriate circumstances.”).

¹²⁹ 40 C.F.R. § 1508.27(b)(2) (2019).

¹³⁰ *Id.* § 1508.27(b)(4).

¹³¹ *Id.* § 1508.27(b)(6).

Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.¹³²

Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.¹³³

The impacts of TVA's proposed Colbert and Paradise gas plants are significant under each of these factors, whether analyzed in the context of the local, regional, or global level. We discuss each below.

First, the decision to build the proposed gas plants is likely to affect "public health and safety."¹³⁴ Local air pollution, even if in compliance with air permits, can harm local health by increasing risks of asthma, heart attacks, and death. The fact that TVA has harmed public health in the past at Colbert and Paradise—TVA recently closed coal plants at both sites—does not make new emissions in these communities any less significant. Instead, the decades of pollution and the ongoing health risks of coal ash impoundments at Colbert create "cumulatively significant impacts"¹³⁵ for the overburdened, predominately Black community of Red Rock/Barton. As discussed, public health, biodiversity, and economic well-being are also severely impacted by the "cumulatively significant impacts" of TVA's decision to build new fossil-fuel plants, thereby emitting decades' worth of greenhouse gases and accelerating climate change.

Second, because burning fossil fuels worsens climate change and threatens local air quality for overburdened communities, the new gas plants' impacts are also "highly controversial."¹³⁶ This factor "refers to cases where a substantial dispute exists as to the size, nature or effect of the major federal action rather than to the existence of opposition to a use, the effect of which is relatively undisputed."¹³⁷ Climate change effects are controversial where there is a dispute regarding the scope and incremental effects of continued greenhouse gas emissions, particularly when the agency can *further* reduce

¹³² *Id.* § 1508.27(b)(7).

¹³³ *Id.* § 1508.27(b)(10).

¹³⁴ *Id.* § 1508.27(b)(2).

¹³⁵ *Id.* § 1508.27(b)(7).

¹³⁶ *Id.* § 1508.27(b)(4).

¹³⁷ *Hanly v. Kleindienst*, 471 F.2d 823, 830 (2d Cir. 1972).

those emissions.¹³⁸ We have disputed the “size, nature, and effect” of TVA’s decision to build new gas. The “size” does not include the offset accounting for “system-wide reductions.” The “nature” of this generation decision is not so limited that TVA must blindly choose combustion turbine gas without considering reasonable alternatives. The “effect” of incremental greenhouse gas emissions—particularly as compared with carbon-free alternatives—includes incremental climate impacts that TVA fails to acknowledge. What’s more, courts find effects controversial when other federal agencies raise serious concerns.¹³⁹ There are important and unresolved policy conflicts between TVA’s proposal and the Biden Administration’s recent mandates to decarbonize the electricity sector and ensure environmental justice.¹⁴⁰ The serious concerns raised by Executive Order 14008 render controversial TVA’s decision to add new carbon emissions and further overburden Red Rock/Barton.

Third, TVA’s proposal to build new gas plants is likely to “establish a precedent for future actions,”¹⁴¹ particularly if TVA performs only an Environmental Assessment and issues a Finding of No Significant Impact (FONSI). A decision may set a precedent for future actions when the agency “may feel bound to the conclusions reached in the FONSI issued in these cases, thereby allowing the FONSI to serve as precedent for future [actions].”¹⁴² As discussed, this proposal represents the first part of the utility’s Combustion Turbine Modernization plan. Without considering alternatives, TVA assumes its only option to replace old combustion turbine gas plants is with new combustion turbine gas plants, and it finds that doing so creates no significant effects on

¹³⁸ In *Center for Biological Diversity v. Nat’l Hwy. Traffic Safety Admin.*, 538 F.3d 1172, 1222–23 (9th Cir. 2008), environmental groups challenged NHTSA’s decision to issue an EA for its new fuel efficiency standards. Even though the fuel efficiency standards decreased projected greenhouse gas emissions, the court found that a controversy existed as to NHTSA’s finding that “a 0.2 percent decrease in carbon emissions (as opposed to a greater decrease) is not significant.” *Id.* at 1223. Like TVA’s analysis, NHTSA’s conclusion that there would be no significant climate impacts “was unaccompanied by any analysis or supporting data.” *Id.*

¹³⁹ *California v. U.S. Dep’t of Trans.*, 260 F. Supp. 2d 969, 973 (N.D. Cal. 2003).

¹⁴⁰ Exec. Order No. 14008, 86 Fed. Reg. 7619 (Jan. 27, 2021).

¹⁴¹ 40 C.F.R. § 1508.27(b)(6) (2019).

¹⁴² See *Friends of the Earth, Inc. v. U.S. Army Corps of Eng’rs*, 109 F. Supp. 2d 30, 43 (D.D.C. 2000) (holding that the Army Corps must perform an EIS, partly because of the precedential value of its decision to issue permits to casinos along the Mississippi River).

air pollution, climate change, or environmental justice. This is also the first proposal for new fossil-fuel power generating facilities since the 2019 IRP and Executive Order 14008. Because the issue of fossil-fuel retirements will continue to arise, TVA may feel bound to the conclusions reached in this NEPA process, thereby allowing this decision to serve as precedent for future decisions regarding the replacement of gas plants and other fossil-fuel generation assets.

Finally, TVA’s proposal “threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.”¹⁴³ In Executive Order 14008, President Biden declared that the federal government “must deliver environmental justice in communities all across America” and that agencies “shall make achieving environmental justice part of their missions.”¹⁴⁴ The Executive Order calls on the electricity sector to completely eliminate carbon emissions by 2035.¹⁴⁵ TVA’s decision to build new gas plants at Colbert imposes an unjust burden on the Red Rock/Barton community, and TVA does not so much as consider what delivering environmental justice to the overburdened community means. New gas plants would ensure decades of additional greenhouse gas emissions, jeopardizing TVA’s and the entire electric industry’s ability to decarbonize by 2035. Because these unexplained inconsistencies threaten to violate the Federal requirements set out in Executive Order 14008, the proposal’s environmental effects are significant.

Building new gas plants at Colbert and Paradise has significant effects, harming the environmental justice community of Red Rock/Barton and accelerating the climate crisis. TVA must take a hard look at this decision through an EIS.

CONCLUSION

For these reasons, we urge TVA to prepare a full environmental impact statement for the proposed Colbert and Paradise gas plants that resolves the critical deficiencies described here and complies with NEPA.

¹⁴³ 40 C.F.R. § 1508.27(b)(10).

¹⁴⁴ Exec. Order No. 14008, 86 Fed. Reg. 7619, 7622, 7629 (Jan. 27, 2021).

¹⁴⁵ *Id.* at 7624.

From: [Jack Keeling](#)
To: [Pilakowski, Ashley Anne](#)
Subject: TVA Seeks Public Input on New Combustion Turbine Units
Date: Monday, February 1, 2021 1:24:04 PM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

I suggest following policy of the Administration and spend the money instead on renewables.

Sent from [Mail](#) for Windows 10

From: [Carroll-Brown](#)
To: [Pilakowski, Ashley Anne](#)
Subject: Paradise -Muhlenberg County KY-EA response
Date: Saturday, February 6, 2021 2:24:00 PM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

Madam/Sir:

Thank you for the opportunity to comment regarding TVA's future proposals in my county of residence. While I am not a direct TVA customer, Paradise has a significant effect on my county's economy. The consideration and justification for any new project must meet the current and future needs of the people it serves, while also fulfilling federal policy and regulations.

Kentucky has historically been maligned as a coal only entity; however, history shows that our state has and is well diversified in power generation. To continue that history, we must innovate and not become a slave to one fuel source. It is inevitable that natural gas will not stay at a sub \$3.00 per cubic feet. As demand increases, regardless of how plentiful we believe our nations supply is, the price will once again reach untenable levels where profits are negated. For that reason and that reason alone, to propose a project that is natural gas only would mean the project is not forward looking or innovative enough for Energy leadership. Science has already proposed hybrid split systems, such as solar H2 productions coupled with natural gas, as a way to hedge against future rising costs. This consideration would start the move to an all H2 facility. These projects would meet the US directives for cleaner energy. Other systems that could be considered are modular nuclear, pump storage (air or water) in and out of abandoned mines. All are forward thinking and that is all I ask for our county is to lead, not follow or become complacent.

For our county, job creation is always a significant consideration when new projects are considered. As you well know, Paradise is significant, historically and economically to our county. Any project that employs or retains personnel is a project we will be proud to endorse. To that end, ensuring a resilient network of power that is innovative and meets the policy and regulation demands required for our future, would be an asset to our area.

Placing a significant project at Paradise would allow TVA to hedge against the other inevitable, when the Madrid Fault erupts again and Shawnee completely fails. A project at Paradise, projected to be unscathed by the Madrid, would ensure the resiliency required in Energy generation.

I am sure TVA always considers load shaping and is aware that as customers utilize energy efficiency in their everyday lives, power demand will fall, not linearly, but in zig/zag shaped curves. As a hedge against this, power generation that utilizes stored energy, particularly green energy, should also be considered.

Respectfully submitted,
Terri Brown

From: [RUSS KRUL](#)
To: [neda](#)
Subject: Input on new Combustion Turbine Units....good deal...new jobs, etc...
Date: Sunday, February 14, 2021 6:52:17 AM
Attachments: [QUALITY.pdf](#)

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

I say go for it. You guys at TVA have been supplying us with good "quality" clean electricity for a fair price for years and years.
Please do what you have to do to keep the current flowing. Keep the coal burners going at full steam too. I used to work for Thermo Environmental Instrument [iQ Series Gas Analyzers | Thermo Fisher Scientific - US](#) and did a lot of work for you guys...all up and down the river.
I'm glad we have TVA for our supplier. "Quality Electricity at a fair price"

PS. I attached a certified original copy of an old document called "Quality". I found it taped to a wall at my late Uncle John's workshop in Pittsburgh, Pa. It's the real deal. You can tell its age by the old zipcode and ancient telephone number. Drop lite used to make (In America) mechanic's 120 volt trouble lights. I know. I had a few in my lifetime.
Keep the coal burning. It's good for our economy.

Russ Krul
Retired Field Service Engineer
Cummins Power Generation



QUALITY...

**IS LIKE BUYING OATS.
IF YOU WANT NICE CLEAN
FRESH OATS, YOU MUST
PAY A FAIR PRICE.**

HOWEVER!!

**IF YOU CAN BE SATIS-
FIED WITH OATS THAT
HAVE ALREADY BEEN
THRU THE HORSE...**

**THAT COMES
A LITTLE CHEAPER**

February 16, 2021

Mr. Jeffrey Lyash
President and CEO
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

Via Email

Dear Mr. Lyash:

The undersigned organizations respectfully request that the Tennessee Valley Authority (TVA) issue a 30-day extension – until April 5, 2021 – of the ongoing public comment period for the Paradise and Colbert Combustion Turbine Plants Draft Environmental Assessment. The public requires additional time to comment on this proposal because it:

- Involves 300 pages of technical and complex analysis with far reaching implications;
- Covers actions in multiple locations each of which may have unique environmental issues related to the proposal;
- Fails to include a reasonable evaluation of alternatives, forcing commenters to independently develop the technical details of other alternatives that must be considered, such as demand-side and solar and battery storage options;
- Advances controversial fossil-fuel policies that are inconsistent with the climate change objectives of the Biden administration; and
- Did not initially include TVA's combustion turbine modernization study, a critical document foundational to the proposal.

For these reasons, the current limited comment period will sharply curtail the public's ability to participate in this decision process, one that will decide whether and where new gas plants, accompanying transmission, and pipeline infrastructure would be sited. The current comment period is insufficient for a project of this scope, size, and technical complexity.

Consistent with TVA's mission to care for and serve the over 10 million people across the Tennessee Valley, we ask that you extend the public comment for this project by 30 days to ensure adequate public engagement.

Please contact the undersigned with any questions and provide us with a timely response to this request. Thank you for your consideration.

Sincerely,

Brianna Knisley
Appalachian Voices

Daniel Tait
Energy Alabama

Michael Hansen
Gasp

Charles L. Rose
Shoals Environmental Alliance

Jonathan Levenshus
Sierra Club

Dr. Stephen Smith
Southern Alliance for Clean Energy

Amanda Garcia
Southern Environmental Law Center

Adam Hughes
Statewide Organizing for Community eMpowerment (SOCM)

cc: Ms. Ashley Pilakowski, TVA NEPA Specialist

From: [Nathan Ottinger](#)
To: [Pilakowski, Ashley Anne](#)
Subject: Comments on Proposed Paradise and Colbert Combustion Turbine Plants
Date: Saturday, February 20, 2021 8:54:15 AM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

Dear TVA,

I would like you to reconsider the proposal to construct additional natural gas generating facilities which will undoubtedly cost more to construct and operate than renewable sources would cost to operate. Your proposal will result in higher electricity rates than necessary, which will then result in large metro areas (e.g., Memphis) leaving TVA and purchasing electricity from lower cost providers sourcing electricity from lower cost renewables, which will further result in higher electric rates for customers of small utilities that can't get out of costly TVA contracts such as my parents, customers of Greeneville Light and Power. Please consider the construction of renewable generating sources instead of additional CT plants.

Thank you for considering a better option for your customers,
Nathan Ottinger



From: [Marie Mainil](#)
To: [Pilakowski, Ashley Anne](#)
Subject: Re: TVA comments on new natural gas plants
Date: Monday, February 22, 2021 11:50:29 PM
Attachments: [image.png](#)

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

Hello Ms. Pilakowski,

I am writing to let you know that I think that the TVA proposing to build 3 new natural gas plants in Kentucky and Alabama is a bad idea.

This is why:

----- Forwarded message -----

From: **adrian reif** [REDACTED]
Date: Mon, Feb 22, 2021 at 1:10 PM
Subject: Re: TVA comments on new natural gas plants

Below is a short article on the cost of electricity from NatGas plants, onshore wind, and PV plants. I try to focus on electricity rates, since I think that's the biggest pain point for the most folks. TVA is shooting themselves in the foot with this investment. Their rates are going to keep increasing while neighboring generators, investing in renewables, will have lower rates. Eventually, Memphis, Chattanooga, Nashville, etc. will buy their electricity from a generator with lower rates.

<https://www.eia.gov/todayinenergy/detail.php?id=43095>

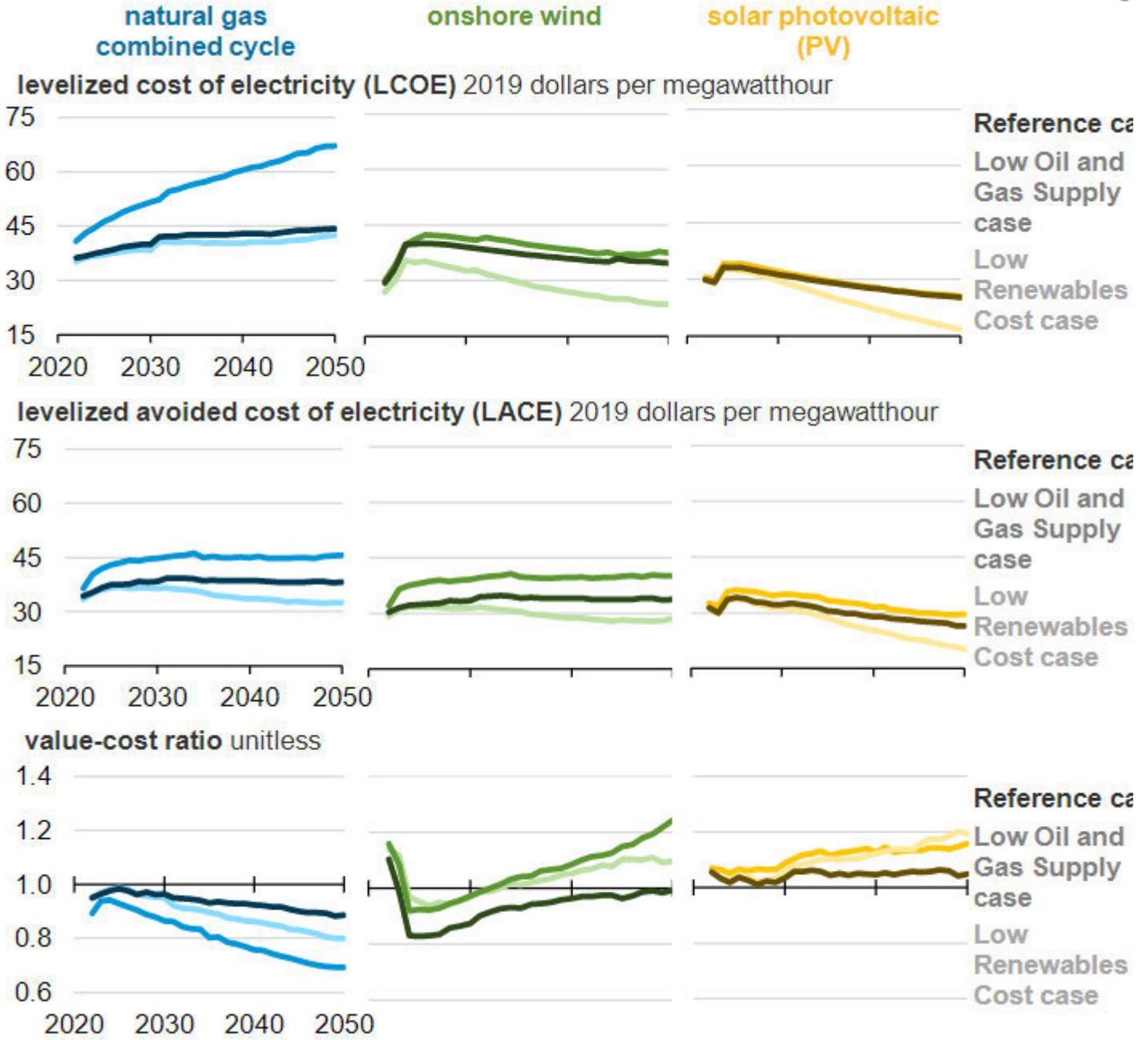


TVA requests your comments on its draft Environmental Assessment (EA) for the construction and operation of three new natural gas-fueled frame CT units (750 MW total) at TVA's Paradise Reservation in Drakesboro, Kentucky, and three natural gas-fueled frame CT units (750 MW total) at TVA's Colbert Reservation in Tuscumbia, Alabama, for a system total of 1,500 MW to replace the capacity lost due to the proposed retirement of Allen and Johnsonville CTs. Please submit your comments by March 13, 2021.

Submitting Comments

Submit your comments by March 13, 2021 by email or mail to Ashley Pilakowski at the addresses below. Please note that any comments received, including names and addresses, will become part of the project administrative record and will be available for public inspection.

Levelized costs of electricity, levelized avoided costs, and value-cost ratios (2022-2050)



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2020*

TVA requests your comments on its draft Environmental Assessment (EA) for the construction and operation of three new natural gas-fueled frame CT units (750 MW total) at TVA’s Paradise Reservation in Drakesboro, Kentucky, and three natural gas-fueled frame CT units (750 MW total) at TVA’s Colbert Reservation in Tuscumbia, Alabama, for a system total of 1,500 MW to replace the capacity lost due to the proposed retirement of Allen and Johnsonville CTs. Please submit your comments by March 13, 2021.

Ashley Pilakowski

NEPA Specialist

aapilakowski@tva.gov

865-632-2256

<https://www.tva.com/environment/environmental-stewardship/environmental-reviews/nepa-detail/paradise-and-colbert-combustion-turbine-plants>



Move your fans, make impact, grow business

Social and environmental good passionate about music, art and rockonomics

From: [adrian reif](#)
To: [Pilakowski, Ashley Anne](#)
Subject: Comments: Paradise and Colbert Combustion Turbine Plants
Date: Monday, February 22, 2021 12:10:45 PM
Attachments: [image.png](#)

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the “Report Phishing” button located on the Outlook Toolbar at the top of your screen.

Dear TVA —

Your proposal to build 3 new natural gas plants is a bad deal for your rate payers. There are more cost-effective solutions now (and by the time that construction is permitted and finished there will be even more).

Caps and costs on carbon are coming, making these new projects poor decisions for a carbon-constrained future.

According to the EIA, rates are going to keep increasing while neighboring generators, investing in renewables, will have lower rates. Eventually, Memphis, Chattanooga, Nashville, etc. will buy their electricity from a generator with lower rates.

<https://www.eia.gov/todayinenergy/detail.php?id=43095>



Please think more diligently about the future you are building for your rate payers.

Adrian Reif
CEO, UMANA Venture Studio

<https://www.tva.com/environment/environmental-stewardship/environmental-reviews/nepa-detail/paradise-and-colbert-combustion-turbine-plants>

From: [Grace Yanagida](#)
To: [Pilakowski, Ashley Anne](#)
Subject: Comments regarding the Paradise and Colbert Combustion Turbine Plants
Date: Tuesday, February 23, 2021 12:32:41 PM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

Hello Ashley Pilakowski,

Below is my feedback regarding the Paradise and Colbert Combustion Turbine Plants

Please don't build these. In order for these to be financially viable, they must stay in operation for decades! I believe the average life span is about 40 years for these types of units, but internationally it has been agreed that we must phase out fossil fuels much sooner than the full lifespan of these proposed units. Surely, if we have the resources to build two new CT plants, we can divest and shift to a clean energy option

Question, is there any further input or action that can be done to aid in this decision-making process?

Sincerely,
Grace McPherson
Concerned Tennessee resident



Tennessee Valley Resident Comments on TVA's Plans to Expand Use of Gas

Submitted via Sierra Club

The following document contains 441 signatures, 177 of which are accompanied by additional personal messages. These signatures indicate broad and diverse support for TVA to decarbonize its power system, not increase the Tennessee Valley's dependence on gas.

The following spreadsheet contains names and contact information of people who signed the letter below:

I am writing to ask TVA to abandon plans to build new gas infrastructure in the Tennessee Valley.

The environmental, public health, and economic impacts of gas will not go away, and we cannot affordably meet our nation's carbon reduction goals with expanded or even current levels of reliance on gas.

That is why the last thing we need to do is build new, expensive gas infrastructure that would be around for decades. We should be winding down our use of gas to power our homes and buildings, not ramping it up.

Clean, more efficient, and affordable alternatives, like energy efficiency, renewable energy, and storage can meet our energy needs. Effectively integrating clean technologies onto the grid will significantly reduce the need for polluting gas infrastructure.

Enough is enough. TVA must take climate change and public health seriously before it is too late. Please reject these plans to increase the Tennessee Valley's dependence on gas.

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Christine Garcia	[REDACTED]	[REDACTED]	Dickson	37055	TN	We need to move toward renewable energy, not fossil fuels
Dave Batten	[REDACTED]	[REDACTED]	Knoxville	37922	TN	It's time to transition to clean energy, not double down on pollution.
Richard Tittle	[REDACTED]	[REDACTED]	Kingsport	37663	TN	Tennessee is green, get it green and keep it green! We are not the sharpest state in the Union, but we could be. Let's start honing!!!
Michael Pardee	[REDACTED]	[REDACTED]	Knoxville	37919	TN	Protect our environment.
Russell Kennedy	[REDACTED]	[REDACTED]	Knoxville	37912	TN	I live in Knoxville and I was so excited last year when TVA decided to close the Bull Run steam (coal) plant. We need to distance ourselves from burning fossil fuels. Let's change our path forward and incorporate renewables like wind and solar. Together we can take some load off of the infrastructure that is in place now and put in some storage like batteries or pumped hydro. Take some of the money used to build a new gas fired plant to put solar on homes and businesses. There are so many opportunities for our region other than polluting fossil fuels. My family has switched to electric cars, we signed up for the green power switch through KUB and we want to invest in our local economy by sourcing our energy right here with the sun and wind. Let's lead the way in clean renewable energy and put the Tennessee Valley to work building wind turbines and putting solar on our roofs. Make this region cleaner for ourselves and future generations to come.
Susan Hathcock	[REDACTED]	[REDACTED]	Lenoir City	37771	TN	This is literally the last thing we need.

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Christina Norris			Nashville	37205	TN	As the parents of two daughters, my husband and I are concerned for our daughters' futures. Climate change is threatening our very existence. Experts say we need to end our reliance on fossil fuels and replace such fuels with renewable resources. Building more gas plants is going in the wrong direction. Please stop creating more gas infrastructure and, instead, expand renewable resources.
Dick /// Lacy Bell /// Frint			Jacksonville	36265	AL	Please leave fossil fuel in the past. Solar and wind are your future!!!!
DAVID RIAL			Chattanooga	37412	TN	This is B.S. we don't need fossil fuels any more!!!!
Christie Walters			Nashville	37205	TN	TVA must begin to invest in clean energy now. More pipelines for oil and drilling by cracking only ruin the environment. We all must live on this Earth and must protect it before it's too late.
Mark Doyle			Nashville	37206	TN	Please, please, please recognize that more fossil fuels are the last thing the world needs. I'd like my children to grow up in a world where this sort of thing is as outdated as the powdered wig.
Elizabeth Barger			Summertown	38483	TN	The gas lines in TN are in terrible shape. We don't need to add to expense of polluting gas for our electricity. Let's put our American energy into sustainable energy. It is the efficient and most profitable way to go.
Susan O'Connor			Cookeville	38506	TN	It is time to increase wind and solar energy production.

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Cassandra Gronendyke	[REDACTED]	[REDACTED]	Cookeville	38506	TN	I am a Tennessee resident who uses TVA-generated power. I want to see new development in renewable energy, not fossil fuels.
Sonja Hunter	[REDACTED]	[REDACTED]	Lebanon	37090	TN	Rather than continuing to poison people with heavy metals and particulates in the air, toxics seeping from coal ash ponds into our drinking water and spewing CO2 into the atmosphere, use more solar and wind!!!
Casper Kittle	[REDACTED]	[REDACTED]	Chattanooga	37421	TN	I've lived in Chattanooga all my life- what Tennessee and the South and the WORLD needs now is to move away from non-renewables. We can't keep putting short-term profits or economic successes above the longevity and well-being of ourselves and those we care about. I really love TVA and have been to TVA-Raccoon Mountain so many times in my youth, but I'm really disheartened to hear about the natural gas pipeline plans- I urge you as a recent Chattanooga college grad and as a Tennessean and as a TVA supporter and as a concerned human on this planet that cares for sustainable energy initiatives, please don't do this!
Jennifer Ivey	[REDACTED]	[REDACTED]	Johnson City	37604	TN	Our planet and in particular the state of TN can't afford to keep fracking operations going with concomitant pollution and poisoning of drinking water. Also earthquakes are not needed. The state is already situated on fault lines. We owe it to our children to ensure safe drinking water and safe world to live in.
Roger Hampshire	[REDACTED]	[REDACTED]	Sevierville	37876	TN	Tennessee is beautiful. Let's keep it that way. All these gas infrastructures will hurt tourism.

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Lynn Seeger			Red Bank	37415	TN	Please. We must be good guardians of the earth. Human beings must stop being so greedy and reckless. Where are we going to live if we keep ruining our precious planet? Humans have no right to rape and pillage our planet. We will pay heavily for these sins.
Paul Rowney			Liberty	37095	TN	Please wake up to the 21st century and the inescapable facts about fossil fuels and the effect on the environment. Do something for your children's future that is good for their health not the benefit of the oil industry's profit.
Jane Morris			Gatlinburg	37738	TN	Please, help TN and the southeast, look to the future. Clean energy is here, available and we need you to help push this way of life. Fossil fuels are no longer necessary. Gas kills. The sooner you go this direction, the better for you, us and this earth.
Anna Blair			Huntsville	35801	AL	Maybe you don't live here in TVA land but lots of us do. Please protect us and our fossils from destruction which will surely happen if you pursue these life-threatening plans. Use your powers to save and improve not to damage and destroy. Remember. Whatever happens to us, good or bad, happens to you and your families. Thank you!
Scott Sheaffer			Knoxville	37917	TN	stop poisoning the air and water

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Barbara Johnson	[REDACTED]	[REDACTED]	Chattanooga	37408	TN	<p>As grandparents of two, my husband and I moved to Tennessee to do everything we can to help secure the well-being of our daughter's family. Nothing is more important to us than their health and future opportunities.</p> <p>Please show the citizens of our state that you have the same concern for their future. Make the choice to use power sources that do not contribute to the warming of our planet and pollution of our air and water. Those sources exist. Please use them instead. Please make your choices as if human well-being is your highest value? why else was the TVA even begun? Maybe those choices aren't the easiest? but they're the best for my grandchildren and the world they will inherit and inhabit.</p> <p>Thank you.</p>
Sheryl Mustain	[REDACTED]	[REDACTED]	Nashville	37206	TN	This is a man-made disaster for our planet. Do not expand fracking and gas burning!
Gary Moser	[REDACTED]	[REDACTED]	Cookeville	38506	TN	Enough of fossil fuel destroying the planet. Use your brains not your greed.
Paul Bienhoff	[REDACTED]	[REDACTED]	Kingsport	37663	TN	Please stop adding more climate change debt to your/our children's accounts!
Donna Hester	[REDACTED]	[REDACTED]	Arley	35541	AL	Please stop. When is enough, enough? When will our leaders start caring about the environment?

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Emily Freeman			Hickman	42050	KY	Pipelines cross my family farm in a cluster of five. The topography is flat as we are in the flood plains of the Mississippi River. Since consyruction time during my childhood my father has worked around that slash with livestock and rpw cropping. Safety and health concerns have been heeded successfully in our tenure as landowners. We are concerned about future land use over those five pipelines.
Linda Utley			Camden	38320	TN	Go to renewable energy sources. Stop harming our planet.
Carol Villaverde			Knoxville	37931	TN	I value the health of our ecosystem and want to leave a thriving planet for future generations. This means developing and utilizing sustainable energy sources and technologies and phasing out those that damage the environment.
Bob Carlough			Butler	37640	TN	Please come into the 21st century and focus on renewable energy sources!
Samuel Robinson			Chattanooga	37405	TN	We must reduce, not increase, our carbon footprint as rapidly as possible.
Walter Woods			Nashville	37209	TN	We do not need more archaic energy sources. The TVA should invest in solar, wind, and nuclear power.
Cindy Hatcher			Bumpus Mills	37028	TN	It is passed time to move beyond fossil fuels. Focusing on innovative alternative energy sources should be the goal of all energy cooperatives.
Mary Beaty			Nashville	37217	TN	It's clear that in order to slow climate change we need to be working towards more renewable energy. Please stop plans for more gas infrastructure and fracking.

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Lea Alexander			Kodak	37764	TN	TVA should be leading the way toward green energy, not staying mired in technologies that harm people and the planet. Please make me proud. TVA behavior has shown a disregard for life. I know of people still suffering in the aftermath of the coal ash spill. Do better with funds you receive from us!
Emilee Null			Chattanooga	37405	TN	I moved to TN for it's natural beauty! Why would you want to ruin that by adding gas lines? Move forward into the future with clean energy instead of reverting to the old way of fossil fuels!
Teresa Carr			Kingston	37763	TN	Please consider the air that we breath. We have destroyed enough of the ozone layer. Surely i dont need to get into details over that. I am more interested in renewable energy.
Linda Smithyman			Knoxville	37934	TN	More cracked gas is NOT the smart answer to our needs. Wind and solar power are less expensive all around. This is the better way to go. Please give this serious thought for the future of our children and those coming after them.
Cynthia Waters			Powell	37849	TN	I care about the future of planet Earth. It's time to put our environment and personal safety ahead of personal profit and power.

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Thomas Hilton	[REDACTED]	[REDACTED]	Mt Juliet	37122	TN	As a life-long Tennessee resident (both in Middle and Western Tennessee), I understand the value that TVA brings to our communities. TVA's mindset has helped us through power situations that other states *coughTexascough* wouldn't be able to handle. There are other avenues that TVA should consider taking, including renewables and nuclear, before fossil fuels.
Jane Herron	[REDACTED]	[REDACTED]	Franklin	37064	TN	As a customer, I implore you to consider the long range damage instead of the short term gains. Our children and grandchildren deserve better.
Jeannine Blalock Horton	[REDACTED]	[REDACTED]	Greeneville	37743	TN	Good Lord, TVA haven't we done enough damage to our planet! We have the technology to move forward with Green Non-Fossil Fuel energy!!! Stop letting the oil industry buy you!!! We need new energy not old fossil thinking!!! We don't want fracking and pipelines killing our waters and landscapes! Do better for the people and the environment that you propose to live so much! No pipelines, no fracking! Go Forward with Green Non-fossil fuels! Let's stop acting like we don't know any better! Other countries are doing this! If your can't figure out how to get we done please ask and let them show you the way!!! This matters to me because we only get one planet, one home, and it is no lack of evidence that fossil fuel energy use is destroying our planet, our climate and our home!!!

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Kurt Emmanuele	[REDACTED]	[REDACTED]	Chattanooga	37405	TN	These gas lines detract from the scenery, and I do not like their contribution to carbon pollution
Laura O'Reilly	[REDACTED]	[REDACTED]	Nashville	37220	TN	Our continuing dependence on fossil fuels is leading to an uninhabitable planet. Don't you care about your children and grandchildren?
Sarah Rowe	[REDACTED]	[REDACTED]	Nashville	37215	TN	Protect the environment by not adding more gas electricity plants!
John and Kathleen Harkey	[REDACTED]	[REDACTED]	Nashville	37205	TN	I've got solar panels on my roof and get 80-90 percent of my energy from them. We don't need more natural gas. It will be a transition fuel that dies a natural death.
Curtis Tomlin	[REDACTED]	[REDACTED]	Chattanooga	37421	TN	GO GREEN NOW!
Kitty Williams	[REDACTED]	[REDACTED]	Bristol	37620	TN	Please consider the alternatives to fracked gas that are far more reasonable than this, such as financially, climate, and safety. Thank you.
Joyce Coombs	[REDACTED]	[REDACTED]	Corryton	37721	TN	Stop poisoning our environment, our children!!
Jenna Henderson	[REDACTED]	[REDACTED]	Nashville	37206	TN	Fracking is bad for the environment and for people! Please put resources towards a sustainable energy infrastructure for TN! (solar, wind)
David Ostermeier	[REDACTED]	[REDACTED]	Knoxville	37919	TN	Renewable energy is our future. Future energy investments should NOT include fossil fuel infrastructure. For our kids & future generations, please invest in renewables!!
Jack Boyles	[REDACTED]	[REDACTED]	Kingsport	37664	TN	For the future of our country, please do not support a declining industry, abandon your plans for a gas infrastructure.

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Charlene Nash	[REDACTED]	[REDACTED]	Chattanooga	37401	TN	i can't believe with all the information about how toxic fracking is that we are still having this conversation! HHow stupid humans are-especially corporations. Crazy to be driving the planet into total destruction.
Popi Missios	[REDACTED]	[REDACTED]	Huntsville	35803	AL	Please, respect our environment Spend the money for something good not worse.
Kristy Wilhoite	[REDACTED]	[REDACTED]	Sevierville	37876	TN	As the Mama to 2 young Tennesseans, I implore you to move ahead instead of going backwards. We are educating our children to be aware and inventive STEM citizens. Let's rise to the challenge of providing them with an infrastructure that is ready for the future instead of one that is useless. TVA can lead the way!
Angie Kincaid	[REDACTED]	[REDACTED]	Heiskell	37754	TN	Let's move forward, NOT backwards in the past.
Christine Macdonnell	[REDACTED]	[REDACTED]	Niota	37826	TN	Please please please consider alternative sources of energy to help save our planet. I have two young grandchildren and not a day goes by that I don't think, with fear, about their futures on this big beautiful planet we all call home. Please think of the future and the damage that will be done if you continue on the path you are on!!!!

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
						As a Kentucky native who lives near the Paradise TVA plant, let me start by saying thank you for the jobs you provide to the region. To keep providing jobs, we must make proactive investments in renewable energy and keep up with an ever-shifting energy economy. Increasing the TVA's dependence on gas in this day and age only creates needless environmental harm while actively putting the Kentuckians employed at TVA at an economic disadvantage when our energy economy shifts away from gas. For the sake of the land, for the sake of the workers, and for the sake of TVA's economic vitality for years to come, we need proactive steps on renewable energy, not a further commitment to an extractive economy that has already taken so much from the land I call home and from the people who reside in it.
Benjamin Carter			Oakland	42159	KY	
Chris Chapman			Murray	42071	KY	Please don't stick my family and children with an outdated and costly polluting power source that will saddle us with higher prices for the next 40 years.
Don Craft			Huntsville	35801	AL	Let's look ahead! Switch to climate friendly sources for power!
Patsy Coats			Florence	35630	AL	Fracking I?d devastating for the environment. Don't use framed gas!
Stephanie Salazar			Knoxville	37914	TN	Please instead work on alternative energy such as more solar and wind power options. We need to work to be more sustainable.
Julie Brown			Springville	38256	TN	I am asking you to please vote against any plans to build new gas frack plants. It is time to make the move to clean energy!

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Timothy Kent			Knoxville	37934	TN	Be part of the solution, not the problem! Global warming is no joke and we're all taking it seriously! TVA can set an example for the rest of the country by scrapping plans for gas infrastructure and investing in clean energy!
Bonita Mccay			Sheffield	35660	AL	My father was in the CCC and worked at TVA camps to build roads, grow produce and plant trees. TVA always stood for forward movement that was beneficial to the lives of the people who live along the Tennessee Valley as my family has since the early 1700's. Please be leaders of our way forward in clean and sustainable energy, and not stuck in the past with the dinosaurs.
John Noel			Nashville	37215	TN	Cheap energy is good but a failed climate and planet diminishes humanity.
Tharon Kirk			Antioch	37013	TN	We need to protect our environment. I don't want to see more fracking. Explore other energy sources
Nathaniel Bass			Oak Ridge	37831	TN	Hello TVA Board. Gas plants, for real? Let's instead please build some modern, clean power in the 2020's.
Joseph Payne			New Tazewell	37825	TN	I recommend that Tennessee Valley Authority take advantage of the programs that other utilities see as a path to the future and quit relying on old policy. New jobs will come with reduced carbon energy alternatives and TVA could be in the forefront. Please head the signs of an impending climate catastrophe.
Nancy Mott			Knoxville	37914	TN	I heat with gas. But gas is no longer the clean energy it was.
Richard Gillaspie			Nashville	37209	TN	We need move away from fossil fuels, and focus on renewables.

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Andrew Hamlett			Nashville	37221	TN	Board of Directors Please stop investing in natural gas. Switch to solar and wind which cost less and do not accelerate global temperature rise. Andrew Hamlett
George Cash			Harvest	35749	AL	Fracking endangers our water supply. Consider safer alternatives such as wind, solar, or hydro!
William H. Etter III			Mount Juliet	37122	TN	How about getting a jump on renewable energy sources and take a giant step towards some kind of energy independence?
Carol Martin			Nashville	37220	TN	Please no more fracking!!!.
Helen Debus			Franklin	37067	TN	I can't express the deep concern for this short-sighted move on TVA's part. Please look for sustainable fuel sources that will not continue to damage our planet. The message written below by the Sierra Club says it all. Helen DeBuse
Graham Marema			Norris	37828	TN	I live on CCC Camp Road, where the CCC camp was stationed to build Norris Dam, one of TVA's first projects. I believe in the history of innovation and leadership at the TVA to build a better future, and I know that you can embody that leadership now by leaving behind energy sources that will pollute our environment and threaten the future of our planet.
Kristin Tubb			Arrington	37014	TN	As a life-long resident of Tennessee, TVA was always a source of pride to the area. I hope that you'll continue to explore clean, green new ways to provide for our community, AND create new jobs in the process.

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Linda McClendon	[REDACTED]	[REDACTED]	Arab	35016	AL	Cut the demand for fracked gas. The use of harmful chemicals in fracking should ban fracking in USA. TVA should support clean energy.
Amanda Schenlcer	[REDACTED]	[REDACTED]		35754	AL	As a seventh-generation Alabamian, I beg you to please move into this century and think of how our beautiful state - like too many others - is still being impacted by harmful practices like fracking. Please act responsibly, so that at least seven more generations of Alabamians will be able to live healthily and happily.
J Woodruff	[REDACTED]	[REDACTED]	Oak Ridge	37830	TN	Stop polluting our beautiful Tennessee! We should be using renewable energy, not fossil fuels. Don't you people care about the planet? You're killing it. Stop this now!
Stella Hurley	[REDACTED]	[REDACTED]	Newport	37821	TN	It is time to consider the risks of such energy sources, it has been proven to have very negative effects on the environment and health. Please let your conscience guide you to to bringing forth safer and environmentally sensitive sources for energy. Thank you.
Irene W. Dowdell	[REDACTED]	[REDACTED]	Chattanooga	37421	TN	Dear Decision Makers: This issue is important because of my children and grandchildren. I want to advocate for a world that is without pollution. Please work to clean up our planet.

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
						Hello, hope this message finds you well. Around the world, other countries and communities are utilizing new technologies to provide cheaper and cleaner energy. Often in a way that creates jobs. Renewable energy sources are obviously better for the environment which I hold dear and depend on. But if it is also cheaper, a source of jobs, and a better long-term investment... what possible reason could we have to stick burning gas for our energy. Are we so foolish? Or so corrupt? That we would stunt the future of our children? Please consider the points the Sierra Club is presenting below.
David Williford			Nashville	37211	TN	
Horst Stollberg			Blountville	37617	TN	Go solar wind and Nuclear. Less impact on the environment.
John Meyer			Maryville	37801	TN	This dirty polluting energy source has no place in our valley. Please reconsider this option and go with renewal sources of energy.
Kendall Wimberley			Knoxville	37916	TN	I urge TVA not to build new gas which we will be stuck paying for after we transition away from fossil fuels as people and the planet need and want.
Kent Minault			Knoxville	37917	TN	All gas infrastructure is harmful, due to the severe impacts of methane leakage. Carbon reduction goals are not really serious if at the same time one expands natural gas.
Barbara Cloud			Nashville	37212	TN	I have asthma. I value clean air. I believe science. The smart thing is to increase clean ways to generate electricity, now, not waiting until sometime in the future.

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Caleb Haynes			Nashville	37210	TN	We can't continue to go backward as an economy and society... the infrastructure that we invest in today will have ramifications for our children's children. Please do not invest more money, time, resources in this non-renewable, pre-historic means of energy.
William McCabe			Eidson	37731	TN	instead of fossil fuels, develop wind and solar, allowing individuals, small businesses, and YOUR ELECTRIC PROVIDERS to move into the safer and more sustainable power users.
Gail Henley			Madisonville	37354	TN	I thought everyone agreed that we should be reducing our carbon output. Doesn't TVA agree? Then why add to it?
Gloria Griffith				37683	TN	Please reject plans for more gas.
Angeline Mahe			New Market	37820	TN	I am a Tennessee resident and I strongly oppose the plans to build new gas infrastructure in this beautiful state. The way forward should be renewable energy to protect our planet now and for our future. Please consider my plea, and keep our state moving toward a clean future.
Polly Partridge			Decatur	35601	AL	Please consider a cleaner, safer method of providing power for the Tennessee Valley. A cleaner fuel is available! Please use it!
David Hegseth			Kodak	37764	TN	Let's start looking at rooftop solar. Be a leader!!
Lisa Burtis			Oak Ridge	37830	TN	It's time to move forward, not backwards.
Patricia Glenn			Florence	35630	AL	TVA is m energy provider. As a customer, I can assure you the last thing I need from you is additional natural gas. It is time for TVA to look to energy sources that don't damage the environment and don't endanger native plants and animals. There is no Planet B.

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Renee Edwards	[REDACTED]		Jacksonville	36265	AL	The Tennessee Valley area is beautiful! Please preserve it, keep it clean and pursue alternate methods for energy! Thank you.
DAVID WILLIAMS	[REDACTED]		Elkmont	35620	AL	We have the technology to transform our energy economy to renewable sources. Solar and wind are cost competitive with fossil fuels, and can be put closer to the point of use, reducing the impact of severe weather, earthquakes, and other disasters. Geothermal and hydroelectric plants are already contributing where hot springs and flowing water exist. Alabama is one of the leading states in the country for solar energy potential, which when paired with storage options, is a good, clean alternative to smog-creating fossil fuels.
Barbara Mott	[REDACTED]		Knoxville	37920	TN	Recent research shows that chemicals used in fracking are dangerous for young children and infants. Moving ahead with fracking plans in the face of these findings, TVA will need to pull attorneys off the coal ash lawsuits to focus on extensive, time consuming, and enormously expensive investigations and court litigation. Be sure to keep your officers and directors insurance up to date!
Sonya Zaremba	[REDACTED]	[REDACTED]	Killen	35645	AL	Please invest in the wind and solar energy for all of us and the future generations.
Guerry McConnell	[REDACTED]		Rogersville	37857	TN	No more destroying land. No more pipelines transporting across lands and waters. There is no need to continue with fossil fuels!

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
						NO MORE FOSSIL FUELS. SOLAR SOLAR SOLAR
Mark Koppel	[REDACTED]	[REDACTED]	Paducah	42002	KY	WIND WIND WIND
Fran Ansley	[REDACTED]	[REDACTED]	Knoxville	37920	TN	As a customer and consumer of TVA power for the past fifty years, I implore you to get on the right side of history and do it now. You control our grid. You set the terms for your customers, their children and their grandchildren when it comes to energy use. Please help us prevent climate catastrophe by committing to the kind of smart, strong change that we so desperately need.
Michelle Housen	[REDACTED]	[REDACTED]	Murfreesboro	37130	TN	Stop killing people for profit
Catherine Mcgavin	[REDACTED]	[REDACTED]	Paris	38242	TN	It's beyond time to be utilizing clean renewable energy. Stop the madness of destroying our planet. (Even big automakers are going with electric vehicles.)
Louis Laub	[REDACTED]	[REDACTED]	Nashville	37205	TN	Every step we take towards carbon reduction goals brings us closer to achieving these goals.
Mary Lasater	[REDACTED]	[REDACTED]	Franklin	37064	TN	I started a plan with Middle Tennessee Electric to use all renewable resource energy. I am investing in the future.
Donna Brian	[REDACTED]	[REDACTED]	Knoxville	37914	TN	Let's move toward wind farms instead!
Kayleigh Walker	[REDACTED]	[REDACTED]	Huntsville	35811	AL	Fracking is dirty, dangerous, and poisonous to the communities it happens in. The TVA is better than this. As leaders in energy solutions, the TVA should be looking at renewable sources.

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Michelle Haverland	[REDACTED]	[REDACTED]	Thorn Hill	37881	TN	As a resident of the Tennessee Valley, this issue matters to me. As a mother, grandmother, daughter, sister, aunt, niece and friend this issue matters to me. As a member of my community this issue matters to me. As a citizen of this planet responsible for the well-being of generations to come, this issue matters to me. It's time to turn away from our reliance on fossil fuels.
Bob Bates	[REDACTED]	[REDACTED]	Tullahoma	37388	TN	Replace old coal plants with renewable energy. Don't be ass-backwards towards the environment. Be bold for the future: promote renewables.
Linda Orth	[REDACTED]	[REDACTED]	Rutledge	37861	TN	Why?? Why invest millions/billions on infrastructure that will be obsolete in 10 years? Burning fossil fuels causes environmental damage and in an era where green technologies are an available viable alternative. Government subsidies should be for green energy only to encourage divestment in fossil fuels.
Eleanor Shippen	[REDACTED]	[REDACTED]	Nashville	37204	TN	I have lived here in Tennessee all my life. I want Tennessee to work towards the future, and that means embracing cleaner energy sources.
Vincent Harrman	[REDACTED]	[REDACTED]	Rutledge	37861	TN	TVA started with renewable power. Time to return to its roots.
Vance Sterling	[REDACTED]	[REDACTED]	Tallassee	37878	TN	Global warming is very real, and any kind of pollution is not something you should be promoting.

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Lawrence Clark	[REDACTED]	[REDACTED]	Smyrna	37167	TN	Do we have to destroy every semblance of logic in the believe of science being correct for our children and grandchildren of the United States.
Carrie Bailey	[REDACTED]	[REDACTED]	Goodlettsville	37072	TN	The health and well-being of our planet is more at risk everyday. Please help our beautiful country.
Katherine Nelson	[REDACTED]	[REDACTED]	Nashville	37215	TN	Clean energy is the best choice to combat climate change while still providing the energy the Tennessee needs. I hope your decisions will move towards wind and solar.
Ron Shrieves	[REDACTED]	[REDACTED]	Knoxville	37938	TN	TVA should not fall back on it's historical decisions on hydro and nuclear as a justification for not being aggressive on "renewable" energy. All utilities should do their share to move away from carbon emmissions,
Jason Batey	[REDACTED]	[REDACTED]	Huntsville	35802	AL	It is time to move away from fossil fuels. We cannot continue to harm our environment and think that we won't reap the consequences. Let's phase out our dependence on dirty energy and, most certainly, not add new sources of it. Solar and wind power has become increasingly affordable and over time easily pays for itself and then some. Please take these pleas from concerned citizens seriously and don't allow more gas plants in the Tennessee Valley. Thank you for taking the time reading my message!

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Kim Young	[REDACTED]	[REDACTED]	Kingston Springs	37082	TN	<p>As a customer I have great concerns about ANY increase in the use of gas power plants to supply power. Tennessee and the entire nation needs to vastly increase our use of renewal energy sources ASAP!! There needs to be a very strong push to expand alternative energy sources NOW, not later, the health of our state and our planet cannot wait!! PLEASE do the correct thing for everyone concerned and move away from coal AND gas now. Climate change is beginning to increase faster and faster and we can't wait any longer to attempt to mitigate these horrible effects!!!</p> <p>Thank you!</p>
Sarah Denslow	[REDACTED]	[REDACTED]	Huntsville	35806	AL	<p>We need to focus on restarting the economy and providing jobs by investing in renewable energy plants. We have the technology. Renewable energy will provide jobs for our citizens and keep our country safe - all while helping to keep Americans healthy and protect the natural beauty of our country.</p>
Bart Munyan	[REDACTED]	[REDACTED]	New Concord	42076	KY	<p>there's enough gas being wasted into the atmosphere without having to ruin the Earth by fracking. There are alternatives to gas anyway</p>
Jane Shoun	[REDACTED]	[REDACTED]	Brentwood	37027	TN	<p>Can you not build clean energy, wind mills and solar instead? I just feel there are young engineers chomping at the bit to get innovative with cleaner energy.</p> <p>Jane Shoun Brentwood, TN</p>

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
James Marziotti	[REDACTED]	[REDACTED]	Andersonville	37705	TN	I moved into East Tennessee in order to enjoy the natural beauty of this area. I live in a rural area and depend on a well for my drinking water. I do not want my well compromised for the quick profits of a fracking company. They will take their money and run and I will potentially be left with the contamination in my drinking water. When the environmental hazards of fracking are factored in, there are safer and less expensive way to generate energy. Please choose green energy.
John Todd Waterman				37716	TN	None of TVA's mandate to provide affordable, reliable power to build our region's economy while protecting our environment can be fulfilled by burning fossil fuels. The climate crisis is the transcendent environmental and economic challenge of our time. Rapidly shifting public and political opinion supporting carbon pricing will also inevitably make new gas plants stranded assets in the near future, wasting ratepayer money that could have been spent directly on the renewable generation and energy storage that must soon replace them. Thank you!
Kenneth Clark	[REDACTED]	[REDACTED]	Unionville	37180	TN	The U.S. Department of Energy reported that recent wind farms have gotten so cheap that you can build and operate them for less than the expected cost of buying fuel for an equivalent gas plant. We must STOP polluting the atmosphere.

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Carol Antoniewicz	[REDACTED]	[REDACTED]	Dandridge	37725	TN	I oppose fracking for natural gas - it's bad for the environment and thus for people. I support solar and wind - please do more of those, and stop fracking!!
Guerry McConnell	[REDACTED]	[REDACTED]	Rogersville	37857	TN	Stop running backwards! It only makes sense to embrace the campaign for renewable energy energy!
Eleanor Bower	[REDACTED]	[REDACTED]	Bowling Green	42103	KY	As an indirect customer of TVA through my local co-op - it would bring me great satisfaction to see TVA promoting more roof top and co-op type solar installations. In the long run - more cost effective. The days of using fossil fuels should be numbered.
Nancy Bell	[REDACTED]	[REDACTED]	Rogersville	37857	TN	In Rogersville we have a large coal ash dump along our river, and now we have a new energy plant, but it, too, sends carbon into the air we breathe and harms the health of our planet. After all these years and recent climate disasters, it is time to find a new path forward -- that is, away from fossil fuels.
Romulus Wright Iii	[REDACTED]	[REDACTED]	Walling	38587	TN	Please consider reducing dependance on fracking and coal for our energy needs in TN!
Alleia Bakker	[REDACTED]	[REDACTED]	Memphis	38104	TN	I am 13 years old, and I don't want to live in a world that has been destroyed. We don't need or want new gas infrastructure.
John Wojtowicz	[REDACTED]	[REDACTED]	Knoxville	37931	TN	Time to protect Tennessee's environment.
Barbara Wolff	[REDACTED]	[REDACTED]	Telford	37690	TN	We need to get our energy from renewable sources, not destroy our earth with fracking.
Mike Murphy	[REDACTED]	[REDACTED]	Murray	42071	KY	Let's harvest energy using renewables.
K Melton	[REDACTED]	[REDACTED]	Butler	37640	TN	Fossil fuels are proven excessively poor for the Climate. We are in the midst of a climate crisis and it is past time for TVA to clean up its energy.

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Richard Gilbert	[REDACTED]	[REDACTED]	Franklin	37067	TN	Fossil fuels are not good for the future of TVA, only for a few executives bonuses.
Louise Mallory-Elliott	[REDACTED]	[REDACTED]	Sparta	38583	TN	Fracking damages the environment and all creatures who live nearby! it must be done more responsibly if it is used at all.
Donald Plunk	[REDACTED]	[REDACTED]	Nashville	37211	TN	Fracked gas is dirty energy. We need more clean energy. Global warming is a serious threat to everyone. We need leaders with vision. Unlike what we've had in the past. Please do the right thing for your kids and grandkids.
Allison Stillman	[REDACTED]	[REDACTED]	Nashville	37215	TN	What in the world are you thinking? Stop living in the past and start moving into green renewables, you are throwing money away and endangering people's health. Shame on you for even considering this!!
Christina Norris	[REDACTED]	[REDACTED]	Nashville	37205	TN	As a grandparent, I am especially concerned about the dangerous impact of climate change on future generations. We must stop relying on fossil fuels now.
Geneva Andrews	[REDACTED]	[REDACTED]	Dayton	37321	TN	No New Fracking! Please! Invest in clean energy source instead!

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Shirley Hull	[REDACTED]	[REDACTED]	Gaylesville	35973	AL	<p>The Tennessee/Alabama/Georgia plateau is one of the most beautiful areas in the world and should be left alone. Driving through either area can bring tears to my eyes as I remember comments made by my late father about his days of driving an 18 wheeler through this beautiful part of the world and I am blessed now to live close to both the awesome Tennessee River and the Coosa also. Although we appreciate TVA for giving us the electric power we need here we don't need for terrible gas use to both change the beauty of this place but also the future of both the land but the air. There are so many apelial places on this planet and it if our responsibility to protect it and manage well for the future of all.</p>
Eileen Koesy	[REDACTED]	[REDACTED]	Nashville	37221	TN	Listen to your children & grandchildren, if not your constituents.
Cristina Vazquez	[REDACTED]	[REDACTED]	Waynesville	28786	NC	We must protect nature!!

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
richard phelps	[REDACTED]	[REDACTED]	Tullahoma	37388	TN	<p>The great environmental impact of hydrofracking must be considered in any expansion. The pollution generated by HF is enormous and affects air, groundwater and the land itself. Earthquakes have resulted and nearby resident have been exposed to known toxins. The fluids used are of undisclosed composition but are known to migrate from the wells and potentially contaminate drinking water supplies.</p> <p>As fracking is largely unregulated currently, frackers can freely avoid environmental safeguards and avoid site remediation.</p> <p>The high rate of extraction of oil and gas will soon deplete these fields leaving stranded assets and polluted soils, water and strata.</p> <p>TVA should be proactive in leaving hydrofracking and investing in non polluting, sustainable energy sources : solar, wind, small nukes and improved turbine efficiency and distribution lines. TVA should expand incentives for users to economize and insulate as well.</p>
Sharon Hart	[REDACTED]	[REDACTED]	Butler	37640	TN	<p>TVA has always been a leader in affordable energy. Now it needs to be a leader into the 21st century, by doubling down on green energy and leaving fossil fuels where they do the most good--in the ground.</p>
Margaret Mann	[REDACTED]	[REDACTED]	Clarksville	37043	TN	<p>Coal ash plus this...please consider health of community.</p>

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Patricia Post	[REDACTED]	[REDACTED]	Nashville	37205	TN	<p>Almost one-quarter of global greenhouse gas emissions are from electricity generation. These emissions must be reduced to near zero if we are to avoid the worst effects of climate change. It is important to ?decarbonize? the electricity sector as rapidly as possible while maintaining a reliable and affordable electric supply. TVA should be focusing on reduction of new natural gas installations rather than increasing them and minimizing carbon emissions from existing installations, primarily through methane leaks. If hydrogen is blended with (or replaces) natural gas to fuel remaining gas plants when they do operate, it could reduce their carbon emissions. I strongly urge the TVA Board to be proactive in transforming energy dependence in the Southeastern United States by transitioning to carbon-free electricity as rapidly as possible.</p>

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Robert Mcgahey	[REDACTED]	[REDACTED]	Burnsville	28714	NC	<p>As a faith leader, I implore you to rethink employing more fracked gas in the TVA area. We need to move rapidly towards a zero-carbon world, utilizing solar, wind, and nuclear for baseload. I know that latter is expensive, but done with care, it can provide a bridge to a non-carbon future. Natural gas sure beats coal, but it's still safely sequestered carbon that should be burned as sparingly as possible.</p> <p>God be with you in your deliberations. He is sharing this precious world with your hands, minds, and hearts.</p> <p>Robert McGahey, Presiding Clerk, Southern Appalachian Yearly Meeting Burnsville, NC</p>
Lynn Learch	[REDACTED]	[REDACTED]	Louisville	37777	TN	<p>I, as a TVA, consumer want TVA to invest more in renewable energy sources and division gas and coal.</p>
Gaea Mitchel	[REDACTED]	[REDACTED]	Waynesville	28786	NC	<p>We need to focus on renewable, clean energy. Fossil fuels are a dead-end energy source that not only promotes climate change but requires hazardous infrastructure for transport. Instead, renewable energy can often be produced closer to the point of use, and doesn't promote global warming.</p>
Jerry Brown	[REDACTED]	[REDACTED]	Lewisburg	37091	TN	<p>No more fossil fuel plants. Look to the future so you want be playing catchup.</p>

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Marilyn Williams			Cullman	35055	AL	TVA can do better to serve the public good by using solar and wind instead of fracking for meeting our energy needs. TVA has done so much to improve the lives of Appalachians, and now need to prevent disaster for so many as a result of our reliance on carbon. We must reduce our carbon footprint!
Patrick Conley			Murfreesboro	37128	TN	By the estimate of the IPCC we have little more than eight years before climate collapse in 2030. A CIA investigation of the climate crisis some years ago prediction social breakdown in the same year. The earth has lost a million species since 1970. Methane emissions from the northern latitudes as permafrost dissolves will be a juggernaut for temperature increases. What else do you need to know? That you are mortal and every living thing on the planet is mortal and that if we wipe ourselves out there is nothing in the rest of the universe that cares?
Scott Sheaffer			Knoxville	37917	TN	stop poisoning the valley
Don Sizemore			Muscle Shoals	35661	AL	Nobody wants this, nobody needs this.
Cathy Jobe			Nashville	37218	TN	This issue matters to me because the lives of us all (people) being able to live in a healthy environment.
Stephanie Davis			Wartrace	37183	TN	Our children deserve to have history
Marlene Clausen			Chattanooga	37404	TN	TVA needs to make a commitment to invest in ONLY clean, green energy. End the use of all sources of fossil fuels. Make the area you serve a clinic in how we can move to 100% clean energy and, at the same time, create thousands of high paying, quality jobs for the area TVA serves.

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
richard phelps	[REDACTED]	[REDACTED]	Tullahoma	37388	TN	<p>Fracked NG is a short time, extremely damaging method of extending our dependence of carbon extractin ! TVA must shift its long term energy generation to sustainable no or low carbon methods: Wind, solar, package nukes and improved generator and transmission efficiencies. Further incentives to users for economies must be provided as well.</p> <p>fracking has damaged critical water supplies, creates toxic waste and is implicated in earth quakes. Further, many HF companies are going bankrupt and leaving the equivalent of Brownfields. There is no current mandate to remediate these.</p> <p>TVA must not contribute to this extensive rape of our environment !!</p>
Anne Gielisse	[REDACTED]	[REDACTED]	Oak Ridge	37830	TN	<p>PLEASE!!! NO MORE GAS!!!</p> <p>Let's protect our CLIMATE AND OUR CHILDREN AND CHILDREN'S CHILDREN!</p> <p>LET'S PASS THE PRICELESS GIFT OF CLEAN ENERGY ON TO THEM!!!</p> <p>Thank you!</p>
Edwin Pyle	[REDACTED]	[REDACTED]	Nashville	37209	TN	<p>Please refocus on renewable sources. Stored energy such as Racoon Mountain should be replicated and solar should be expanded. TVA has been a leader. Be a leader again.</p>

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Dan Firth	[REDACTED]	[REDACTED]	Kingsport	37664	TN	TVA needs to move away from fossil fuels for electricity generation as rapidly as possible. 2030 is a critical milepost for decarbonizing the power supply. Adding and/or maintaining additional gas plants is expensive and polluting when compared to adding solar and storage. TVA should put its time and resources to implementing clean renewable power sources to provide power to the grid. Achieving climate decarbonization goals will result in the stranding of new and refurbished fossil fuel assets that will continue to serve as a drag on economic development in the Tennessee Valley and continue to disadvantage the communities where they are located. Customers and communities want the switch. Now is the time to end the use fossil fuels and leave them in the ground.
Rebecca Hunter	[REDACTED]	[REDACTED]	Morristown	37814	TN	Please protect our environment. Tennessee is such a beautiful state; please keep it that way
Rachel Elmore	[REDACTED]	[REDACTED]	Gurley	35748	AL	Gas is dead as dinosaurs and nobdoy should be clinging to the past. Move on and let oil die or die with it urself. TVA can use the dams instead.. how come we dont have power from the dams???
Erin Racine	[REDACTED]	[REDACTED]	Nashville	37206	TN	I have a 7 year old son. I am more concerned than ever about the impact of climate change on him and other children for generations to come. We need to invest in clean energy, not on older methods that end up harming the environment. Please move away from relying on gas and invest in our children's future. Thank you.

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Sharon S Kane			Nashville	37204	TN	It Pollutes and it's Ugly. Don't do It!!
Rebecca Mcurtry			Hendersonville	37075	TN	Its time to move into the future with sustainable, renewable energy sources. Protecting the environment for healthy human habitation in conjunction with nature is important.
Deborah Nygard			Gallatin	37066	TN	I live within 2 miles of a TVA plant that burns coal. This plant poses a health risk because of noise and air pollution, not to mention the coal ash disposal. While use of natural gas seems at first glance to be a viable alternative to coal, that solution is short sighted. Solar and wind power are obvious solutions that are cheaper and safer than natural gas, especially in AL and KY. I urge the Board to reject voting for fracked natural gas and instead vote for an energy solution that protects our planet's future.
Brian Sullivan			Bowling Green	42101	KY	Enough is Enough Already!
Haleigh S			Clarksville	37040	TN	
Kevin Vaught			Antioch	37013	TN	
Gary Lampman			Hendersonville	37075	TN	
Kevin Morris			Jacks Creek	38347	TN	
James Butler			Smyrna	37167	TN	
Sheri Hamel			Arab	35016	AL	
Paula Simmons			Cookeville	38501	TN	
Deanna Kane			Chattanooga	37412	TN	
Jennifer Brown-Hall			Greeneville	37745	TN	
Alan Hall			Nashville	37221	TN	
Berry Holt			Nashville	37203	TN	
Jackie Edmondson			Johnson City	37601	TN	
Pam Wallace			Greeneville	37743	TN	
Hiasaura Rubenstein			Nashville	37205	TN	

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Cindy Whitt			Franklin	37064	TN	
Ramadan Damiri			Knoxville	37923	TN	
Martin Ledvina			Bessemer	35020	AL	
Amy Dever			Knoxville	37938	TN	
Troy Bidwell			Knoxville	37934	TN	
John Fishman			Huntsville	35803	AL	
Melanie Young			Waterford	38685	MS	
Sandra Burnett			Nashville	37211	TN	
Robert Fingerman			Monteagle	37356	TN	
Karen Blanco			Harrison	37341	TN	
Tommy Bolles			Nashville	37204	TN	
Chris Drumright			Murfreesboro	37130	TN	
Chris Busby			Watertown	37184	TN	
Tina Tine'			Knoxville	37919	TN	
Cherie Haggard			Harrison	37341	TN	
Emily Ramsey			Mount Juliet	37122	TN	
David Jacques			Nashville	37206	TN	
Grady Warren			Lawrenceburg	38464	TN	
Whitney Ray-Dawson			Knoxville	37932	TN	
Paulette Walton			Butler	37640	TN	
Michael Costello			Knoxville	37931	TN	
Ken Parsons			Ooltewah	37363	TN	
Noelle Goodin			Mount Juliet	37122	TN	
Charles Rogers			Kingsport	37664	TN	
Cherie Swann			Spring Hill	37174	TN	
Susan Faulkner			Nashville	37217	TN	
Michael Lippard			Franklin	37064	TN	
Mary Bristow			Brentwood	37027	TN	
Robert Nolter			Knoxville	37923	TN	
Caroline Baginski			Franklin	37064	TN	
Nancy Beavers			Woodlawn	37191	TN	
Donald Keyser			Johnson City	37604	TN	
Chris Popp			Pulaski	38478	TN	

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Ruth Jackson			Knoxville	37920	TN	
Kala Chakradhar			Murray	42071	KY	
Linda Crawford			Loudon	37774	TN	
Peter Evans			Florence	35630	AL	
Pat Dawley			Morristown	37814	TN	
Catherine Kalinowski			Signal Mountain	37377	TN	
Bill Kornrich				37869	TN	
David Gayk			Knoxville	37918	TN	
Jim Barritt			Shelbyville	37160	TN	
Sheri Matascik			Louisville	37777	TN	
Katie Fultz			Knoxville	37920	TN	
Lucinda Gerlitz			Manchester	37355	TN	
Charleen Shelton			Crossville	38572	TN	
Jenea Tobin			Sevierville	37876	TN	
Karen Spradlin			Jacksonville	36265	AL	
Jeannine Dorroh			Huntsville	35811	AL	
Melissa Pearson			Kingsport	37660	TN	
Margaret Davitt			Nashville	37205	TN	
Yvonne Kornrich			Sneedville	37869	TN	
John Frederick			Huntsville	35811	AL	
Carol White			Scottsboro	35769	AL	
Rachael Bliss			Kingsport	37660	NC	
HERMAN FLETCHER			Sevierville	37876	TN	
Sarah E Hurd			Johnson City	37604	TN	
Robert Benson			Lebanon	37090	TN	
Tony Sax			Knoxville	37920	TN	
Sam Jennings			Clinton	37716	TN	
Darlene Deck			Crossville	38572	TN	
Jay Armbruster			Knoxville	37938	TN	
Valerie Crawford			Nashville	37221	TN	
Charles Mace			Nashville	37207	TN	
Sharon Royle			Limestone	37681	TN	
Jo Tilley Dortch			Paducah	42001	KY	

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Kent Gardner			Elizabethton	37643	TN	
Mary Reed			Lancing	37770	TN	
Barbara Prince			Johnson City	37604	TN	
Bettina Bowers			Nashville	37216	TN	
Freddie Sykes			Tennessee Ridg	37178	TN	
Susan Schuchard			Nolensville	37135	TN	
Aaron Butler			Nashville	37221	TN	
Jana Mayhall			Boaz	35957	AL	
William Davis			Shelbyville	37160	TN	
Anna McCurdy			Chattanooga	37415	TN	
Jeri Burgdorf			Brentwood	37027	TN	
Marianne Bentley			Nashville	37205	TN	
Bobby McCulley			Lebanon	37087	TN	
Stan Jacobs			Murfreesboro	37130	TN	
Hector Bertin			Whiteville	38075	TN	
Dottie Herendon			Clarksville	37043	TN	
Edward Jepson			Knoxville	37923	TN	
David Butler			Hermitage	37076	TN	
Patricia Dishman			Nashville	37221	TN	
Ashley Presley			Florence	35633	AL	
Pam Coe			Water Valley	38965	MS	
Veronica Bourassa			Evensville	37332	TN	
Dane Horn			Loretto	38469	TN	
C Rivas			Hermitage	37076	TN	
Carol Mackey			Gainesboro	38562	TN	
Rae Zehel			Madison	37115	TN	
Sharon Fanning			Murfreesboro	37129	TN	
Carrie Megill			Murfreesboro	37130	TN	
Sharon Turner			Gamaliel	42140	KY	
Pam Coe			Water Valley	38965	MS	
Tonda Bailey			Knoxville	37931	TN	
Sweatt Sweatt			Cookeville	38501	TN	
Jamie Teasley			Nashville	37216	TN	

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Christopher Patrick			Huntsville	35810	AL	
Beth Wallace			Thorn Hill	37881	TN	
Suzanne Senn Burke			Knoxville	37931	TN	
James Wilson			Verona	38879	MS	
Jakub Avramov			Loudon	37774	TN	
Rhonda Bradley			Crossville	38555	TN	
Kathryn Sullivan			Huntsville	35811	AL	
Linda Singer			Huntsville	35801	AL	
Sarah Raymer			Lenoir City	37771	TN	
Kelly Walker			Columbia	38401	TN	
Sarah Brockman			Clarksville	37043	TN	
Shelby Hood			Franklin	37064	TN	
Scott Banbury			Memphis	38107	TN	
JoAnn McIntosh			Clarksville	37043	TN	
Phil Upchurch			Talbott	37877	TN	
Nancy Griffith			Clarksville	37042	TN	
Katherine Crawford			Nashville	37203	TN	
Melvin Hughes			Sparta	38583	TN	
E Petrilla			Nashville	37203	TN	
Mary Ann Stanislowsky			Jonesborough	37659	TN	
Mary Kay Christophersen			Johnson City	37601	TN	
Carolyn Diamondcrest			Johnson City	37601	TN	
Brad Hutcheson			Chattanooga	37405	TN	
J. P.			Nashville	37203	TN	
J. P			Nashville	37203	TN	
Jason Nichols			Maryville	37803	TN	
Betty Anderson			Bowling Green	42103	KY	
Magdalena Craig			Cullman	35055	AL	
York Quillen			Knoxville	37923	TN	
J. P.			Nashville	37203	TN	
Catherine Gonzales			Cleveland	37323	TN	
Michele Villeneuve			Kingsport	37660	TN	
Rita Harris			Olive Branch	38654	MS	

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Irene Melomo			Knoxville	37938	TN	
Rocquelle Woods			Huntsville	35824	AL	
Chris Dacus			Bell Buckle	37020	TN	
John Carr			Nashville	37221	TN	
Patricia Vecchio			Del Rio	37727	TN	
Melonee Oatsvall			Woodbury	37190	TN	
Jill Pomeranke			Gurley	35748	AL	
Donna Duncan			Lebanon	37087	TN	
Chris and Miranda O'Shiel			Fort Payne	35967	AL	
Perry Chapdelaine			Ashland City	37015	TN	
Robert Galloway			Corryton	37721	TN	
Cheryl Harlow			Bristol	37620	TN	
Donna Gurliaccio			Hartselle	35640	AL	
Dianne Doochin			Nashville	37205	TN	
Helen Buckley			Chattanooga	37421	TN	
Ila Singh			Adairville	42202	KY	
Liz Murphy			Lafayette	37083	TN	
Alexander Whittle			Madison	37115	TN	
Christine Ackerson			Fairview	37062	TN	
Jan Mitchell			Hendersonville	37075	TN	
Craig Runciman			Athens	35611	AL	
Linda Doherty			Big Sandy	38221	TN	
Nathan Coles			Brentwood	37027	TN	
Brenda Lee			Kingsport	37660	TN	
George Lee				37660	TN	
William Franks			Nashville	37205	TN	
Gregory Chandler Jr			Huntsville	35803	AL	
Andrew Johnson			Franklin	37069	TN	
Robyn Hardie			Mountain City	37683	TN	
Kristy Ray			Johnson City	37604	TN	
JoAnn McIntosh			Clarksville	37043	TN	
Maureen May			Nashville	37212	TN	
Joanne Golden			Franklin	37067	TN	

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Vanessa Bartley			Huntsville	35802	AL	
Alexa Werling			Huntsville	35806	AL	
Margaret Feurer			Chattanooga	37411	TN	
Barbara Addis			Knoxville	37931	TN	
Cleve Wheeler			Lakesite	37379	TN	
Greg Hime			Louisville	37777	TN	
Laura Kramer			Hermitage	37076	TN	
Lynn Ellis			Knoxville	37918	TN	
Sabine Sedall			Johnson City	37601	TN	
Kathy Raper			Athens	37303	TN	
Sarah Richey			Chattanooga	37404	TN	
Wilfred Post			Powell	37849	TN	
Sarah Mcgee			Killen	35645	AL	
Cynthia Carlton			Greenbrier	37073	TN	
Gary Cookston			Whitwell	37397	TN	
Steven Lipson			Nashville	37212	TN	
Suzanne Peters			Knoxville	37934	TN	
Christopher Peters			Knoxville	37934	TN	
Robert Dornfeld			Athens	37303	TN	
Mark Klugiewicz			Jamestown	38556	TN	
Bonnie Swinford			Knoxville	37917	TN	
Evelyn Coltman			Waynesville	28786	NC	
Lisa Stalnaker			Knoxville	37932	TN	
Brenda Gamache			Seymour	37865	TN	
Cecilia Rivas			Hermitage	37076	TN	
Noel Beck			Florence	35630	AL	
Elizabeth Gassel			Knoxville	37919	TN	
Miranda O'Shields			Fort Payne	35967	AL	
Debra Arrington			Manchester	37355	TN	
Meredith DeVault			Nashville	37204	TN	
Tommy Allman			Brentwood	37027	TN	
Maren Bollinger			Huntsville	35811	AL	
Greg Loflin			Knoxville	37920	TN	

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Nikolas Ammons			Ripley	38063	TN	
Van Bunch			Chattanooga	37405	TN	
Judy Matheny			Lake Junaluska	28745	NC	
Marilyn Lee			Florence	35630	AL	
Leslie Smoot			Owens Cross Ro	35763	AL	
Liz Phillips			Crossville	38558	TN	
William R.			Huntsville	35814	AL	
Teresa Warner			Chapmansboro	37035	TN	
Lorie Buford			Cookeville	38506	TN	
Sarah Radcliff			Shannon	38868	MS	
Cindy Janac			Sevierville	37862	TN	
Rhonda Sherry			Franklin	37067	TN	
Robert And Sandra Dornfe			Athens	37303	TN	
Jennifer Campbell			Blue Springs	38828	MS	
Tiffany Bensen			Oxford	38655	MS	
Robin Happel			Johnson City	37604	TN	
Al Harrist			Brandon	39042	MS	
Peter Evans			Florence	35630	AL	
Ben Sugg			Maryville	37803	TN	
Brad Hutcheson			Chattanooga	37405	TN	
Deborah Whitson			Norris	37828	TN	
George Lee			Kingsport	37660	TN	
Tim Hacker			Fulton	42041	KY	
Jean Johnston			Decatur	37322	TN	
Llayla Solder			Canton	28716	NC	
Joanna Davis			Murfreesboro	37129	TN	
L Franklin			Waynesville	28786	NC	
Dale Wilson			Cookeville	38501	TN	
Caroline Duley			Nashville	37204	TN	
Mary Davis			Guntown	38849	MS	
Jacqueline Friederichsen			Knoxville	37917	TN	
Keb Wolfe			Knoxville	37921	TN	
Marianne Bentley			Nashville	37205	TN	

Name	Email	Phone	Mailing City	ZIP	State	Personal Message
Amanda Adams			Nashville	37209	TN	
Jacqueline Edmondson			Johnson City	37601	TN	
Roseann Ohanian			Alexander	28701	NC	
Karen Poole			Chattanooga	37404	TN	
Susan Denise			New Market	35761	AL	
Russ Manning			Knoxville	37919	TN	
PJ Newburn			Jackson	38303	TN	
Julia Jardine			Lebanon	37090	TN	
Genia Vookles			Knoxville	37922	TN	
Jeff Lehr			Memphis	38111	TN	
Jack Petrilla			Nashville	37203	TN	
Hunter Demster			Memphis	38112	TN	
Millicent Thapa			Oxford	38655	MS	
Charles Curtis			Canton	28716	NC	
Paul Brown			Murphy	28906	NC	
John Kozub			Mount Juliet	37122	TN	
Lisa Willis			Florence	35633	AL	
Shirley Brown			Maryville	37803	TN	
Rachel Solava			Nashville	37208	TN	
Brad Hutcheson			Chattanooga	37405	TN	

From: [Jim Steitz](#)
To: [Pilakowski, Ashley Anne](#)
Subject: RE: Environmental Assessment for Paradise and Colbert Combustion Turbine Plants
Date: Saturday, March 13, 2021 10:06:14 PM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

Dear Ms. Pilakowski,

I will keep my comment brief, and assert that the construction of new gas-fired generators at the Paradise, KY and Colbert, AL sites is not commensurate with the appropriate urgency that TVA should feel regarding our climate situation. New gas-fired generators, which demand a production life of several decades to be economically rational, reside rather discordantly against the future climate choice that we are today making. The deceleration of carbon emissions required to maintain a habitable climate is not compatible with new gas-fired generation, and by pursuing this choice, TVA is effectively stipulating that the Earth will surge beyond the 2C climate change threshold that represents a future we should never wish upon our children.

While I can appreciate that TVA has retired much of its coal-fired capacity and reduced its carbon emissions significantly over the last 15 years, we are so far behind the emissions curve demanded by rational climate management, that TVA must make every choice correctly, not some of them. I must also point out that recent data concerning methane leakage from the natural gas industry calls into question the climate advantages of this fuel, and therefore the past and future reduction of system-wide climate impact (as CO₂ heat-trapping equivalent) claimed by TVA pursuant to that fuel. I urge you to drop the plan for new gas-fired generators at Paradise, KY and Colbert, AL, and to build instead more solar, wind, and battery storage, whose short-term costs are higher but minuscule relative to the cost of continuing to push atmospheric carbon concentration beyond its present 410 ppm.

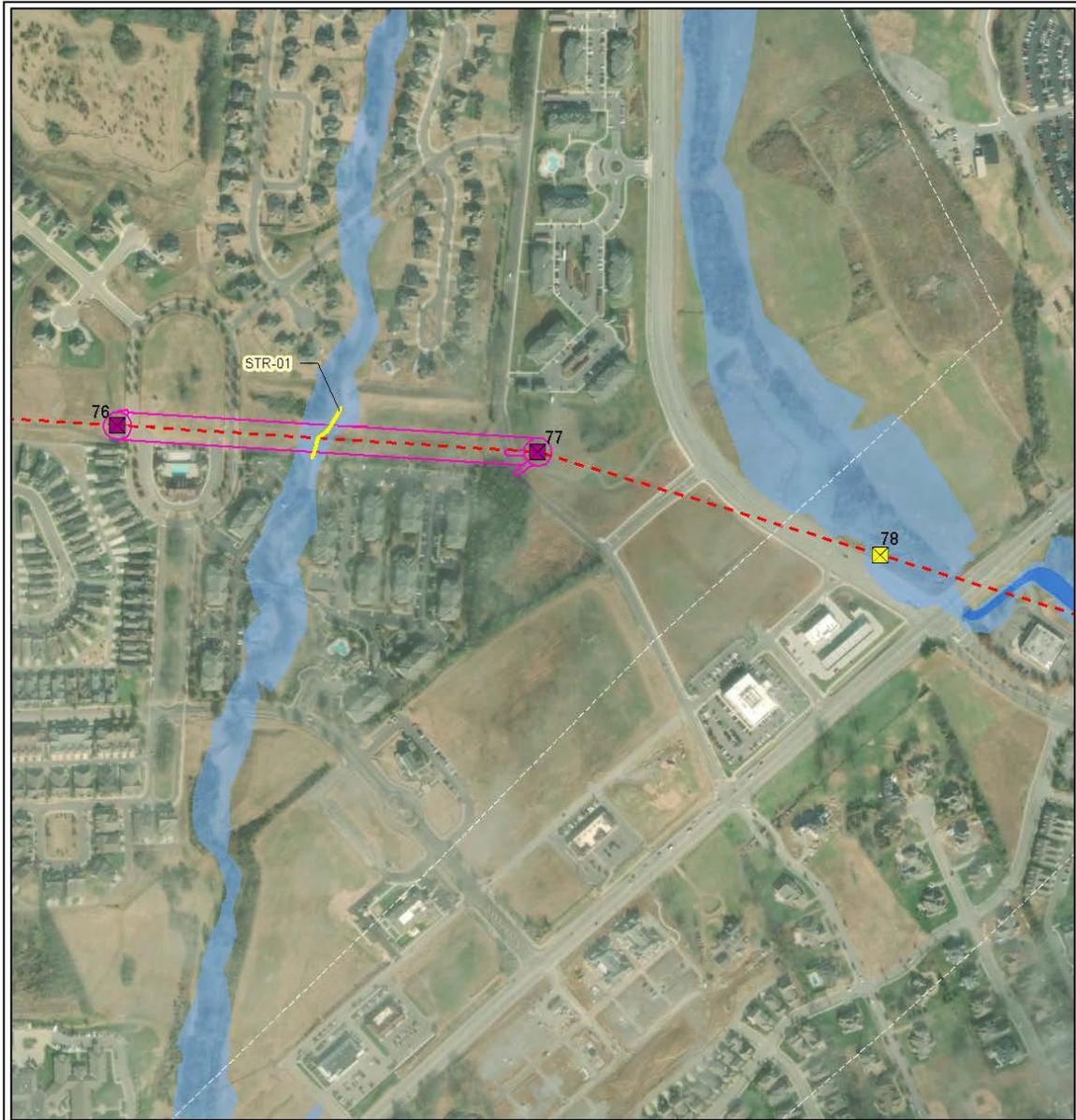
Jim Steitz



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**Appendix B – Figures B-1 to B-20: Water Resources Within Offsite
Transmission Line Upgrade Areas**

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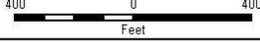
Legend

- TL5823 Structure
- TL5823 Surveyed Structure
- TL5823 Centerline
- Project Area
- Floodway
- Floodplain (100 year)
- Delineated Stream
- Ephemeral



TL5823
Water Resources
Sheet 1 of 3

Job No. 325220192
Date: 11/25/2020
Drawn By: BSM
Reviewed By: SJM



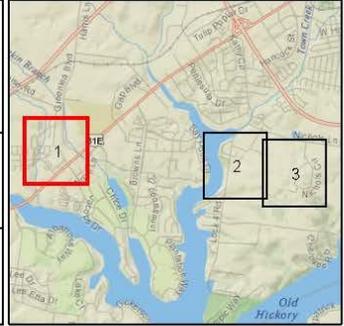


Figure B-1. Water Resources within TL5823



C:\GIS\TVA_TL5823a_MXD\TL5823a_WaterResource_201125.mxd

Legend

- TL5823 Structure
- TL5823 Surveyed Structure
- TL5823 Centerline
- Project Area
- Floodplain (100 year)

Delineated Wetland

- Emergent

TVA

**TL5823
Water Resources
Sheet 2 of 3**

Job No. 325220192
Date: 11/25/2020
Drawn By: BSM
Reviewed By: SJM

400 0 400
Feet

N

wood.

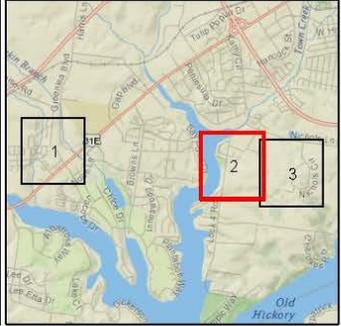


Figure B-2. Water Resources within TL5823



C:\GIS\TVA_TL5823a_MXD\TL5823a_WaterResource_201125.mxd

Legend

- TL5823 Structure
- TL5823 Surveyed Structure
- - - TL5823 Centerline
- Project Area
- - - Delineated Stream
- Intermittent

TVA

**TL5823
Water Resources
Sheet 3 of 3**

Job No. 325220192
Date: 11/25/2020
Drawn By: BSM
Reviewed By: SJM

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400 0 400

Feet

wood.

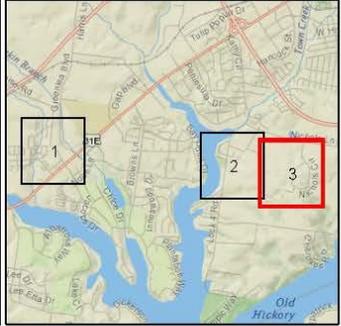
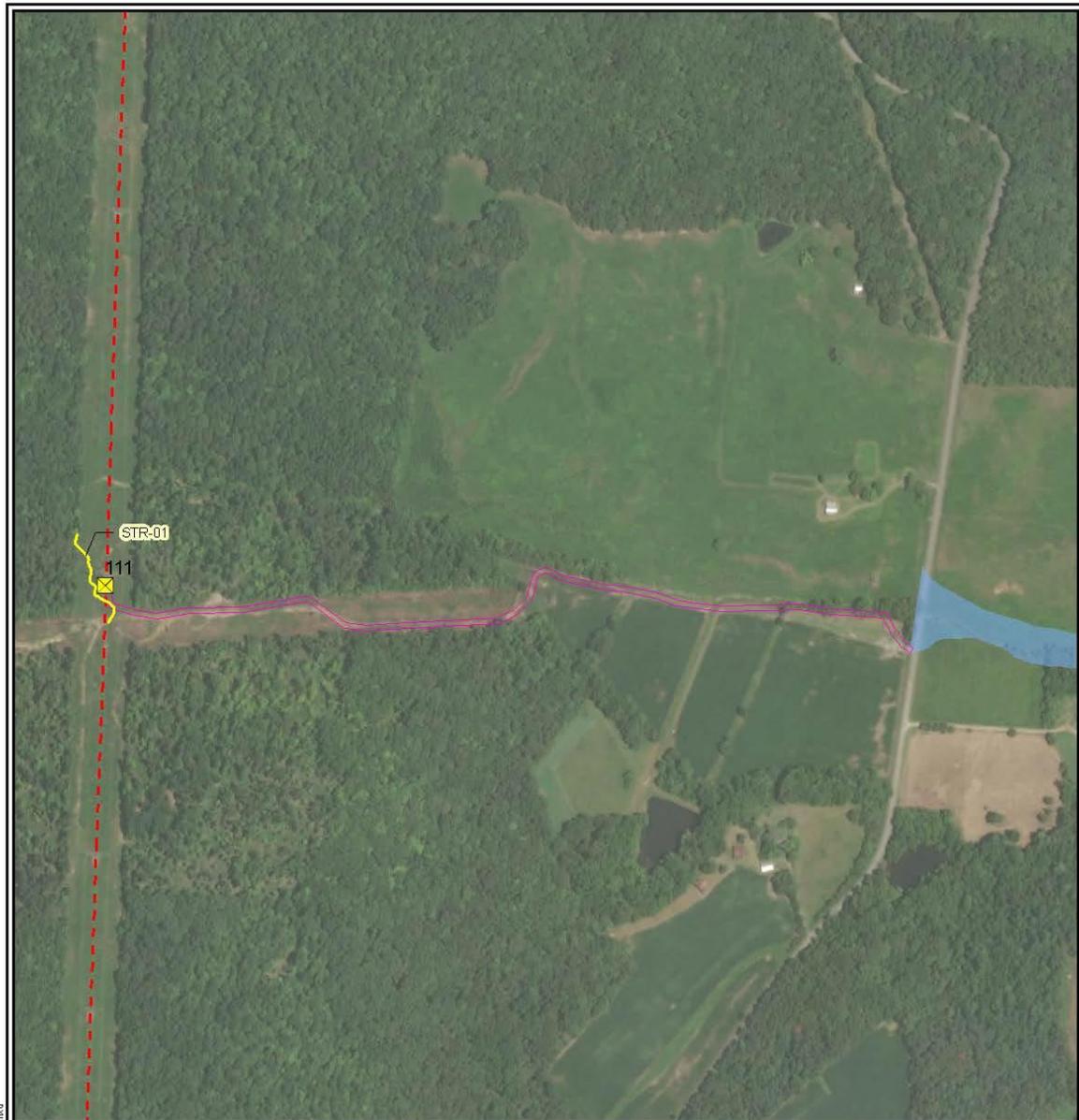


Figure B-3. Water Resources within TL5823



C:\1-01\TVA_TL6057a_MXD\01_Final\TL6057a_WaterResources_201130.mxd

Legend

- Structure
- Transmission Centerline
- Project Area
- Floodplain (100 year)

Delineated Stream

- Ephemeral



TL6057
Water Resources
Sheet 1 of 3

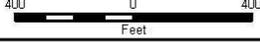
Job No. 325220192 Date: 11/30/2020 Drawn By: BSM Reviewed By: SJM	 
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Figure B-4. Water Resources within TL6057



C:\1-0181\VA_TL6057\MapDocs_Final\TL6057_WaterResources_201130.mxd

Legend

- Structure
- Transmission Centerline
- Project Area
- Delineated Stream
- Intermittent



TL6057
Water Resources
Sheet 2 of 3

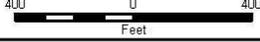
Job No. 325220192 Date: 11/30/2020 Drawn By: BSM Reviewed By: SJM	 
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Figure B-5. Water Resources within TL6057



C:\1-0181\TVA_TL6057a_MXD\01_Final\TL6057a_WaterResources_201130.mxd

Legend

- Structure
- - - Transmission Centerline
- Project Area
- Floodplain (100 year)

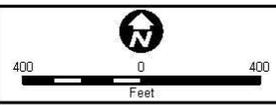
Delineated Wetland

- Emergent



**TL6057
Water Resources
Sheet 3 of 3**

Job No. 325220192
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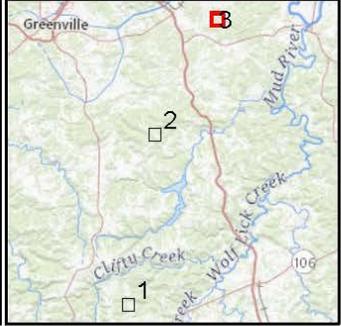


Figure B-6. Water Resources within TL6057



C:\GIS\TVA_TL5617\MapDocs_Final\TL5617_WaterResources_2011124.mxd

Legend

- Structure
- Transmission Centerline
- Project Area
- Delineated Stream**
- Perennial
- Delineated Wetland**
- Emergent Wetland

TVA

**TL5617
Water Resources
Sheet 1 of 4**

Job No. 325220192
Date: 11/25/2020
Drawn By: BSM
Reviewed By: SJM

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400 0 400

Feet

wood.

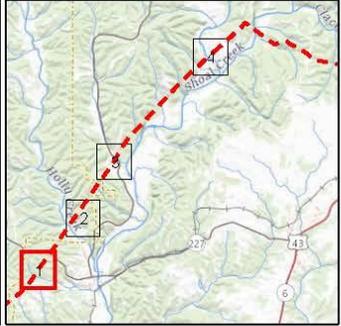
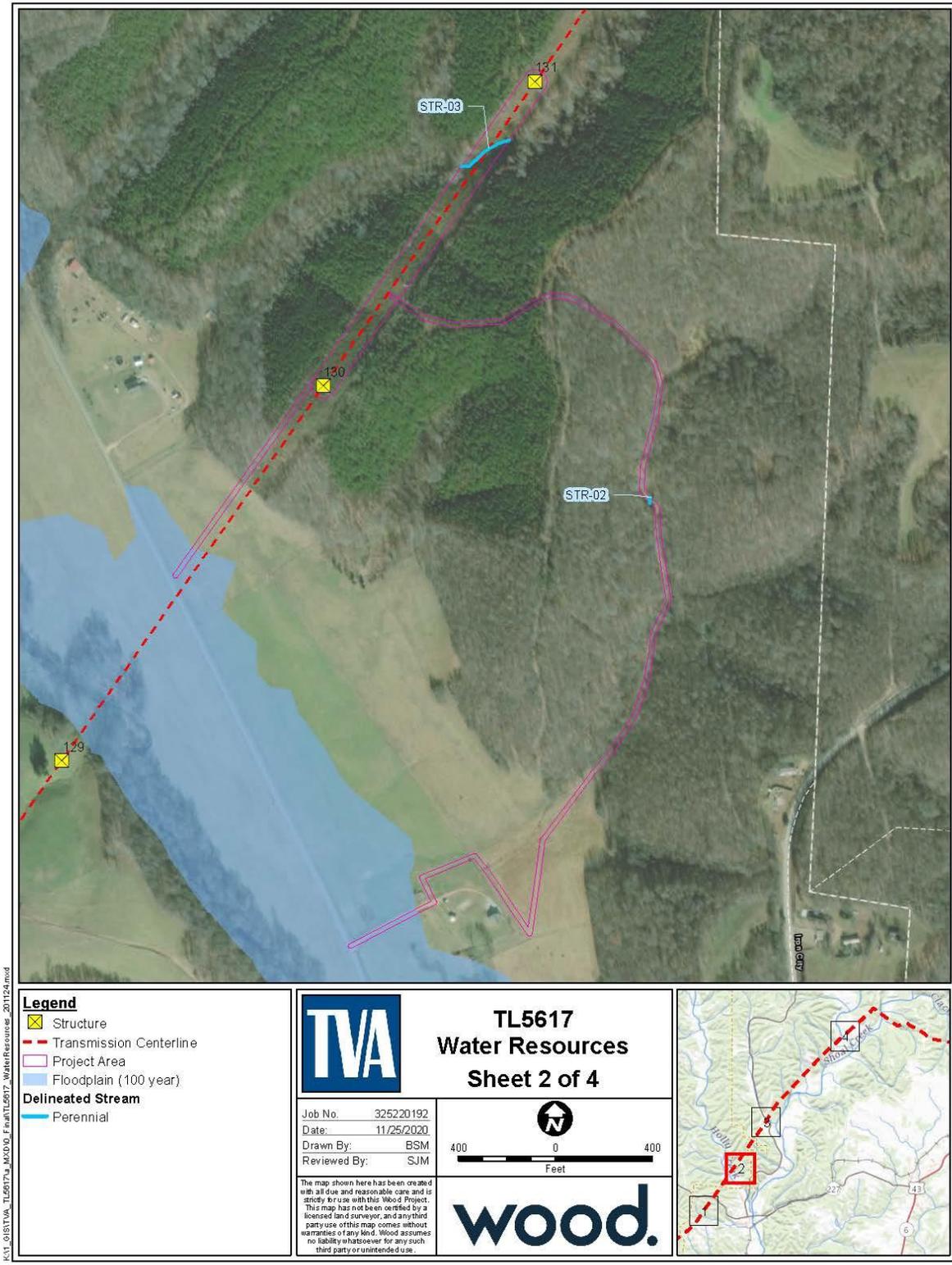


Figure B-7. Water Resources within TL5617



C:\GIS\TVA_TL5617\p_mxd\06_Final\TL5617_WaterResources_201124.mxd

Legend

- Structure
- Transmission Centerline
- Project Area
- Floodplain (100 year)

Delineated Stream

- Perennial

TVA

**TL5617
Water Resources
Sheet 2 of 4**

Job No. 325220192
Date: 11/25/2020
Drawn By: BSM
Reviewed By: SJM

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400 0 400

Feet

wood.

The locator map shows a larger geographic area with a red dashed line indicating the project's extent. It includes labels for "Holly" and "Shoals Creek" and shows a grid of roads and other regional features.

Figure B-8. Water Resources within TL5617



C:\GIS\TVA_TL5617\MapDocs_Final\TL5617_WaterResources_201124.mxd

Legend

- Structure
- Transmission Centerline
- Project Area
- Floodplain (100 year)

Delineated Stream

- Perennial

TVA

TL5617
Water Resources
Sheet 3 of 4

Job No. 325220192
Date: 11/25/2020
Drawn By: BSM
Reviewed By: SJM

400 0 400

Feet

wood.

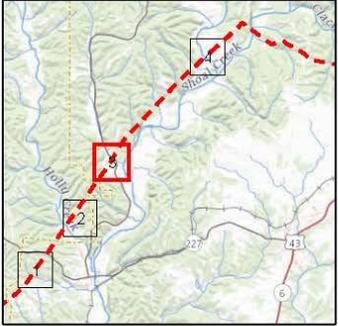
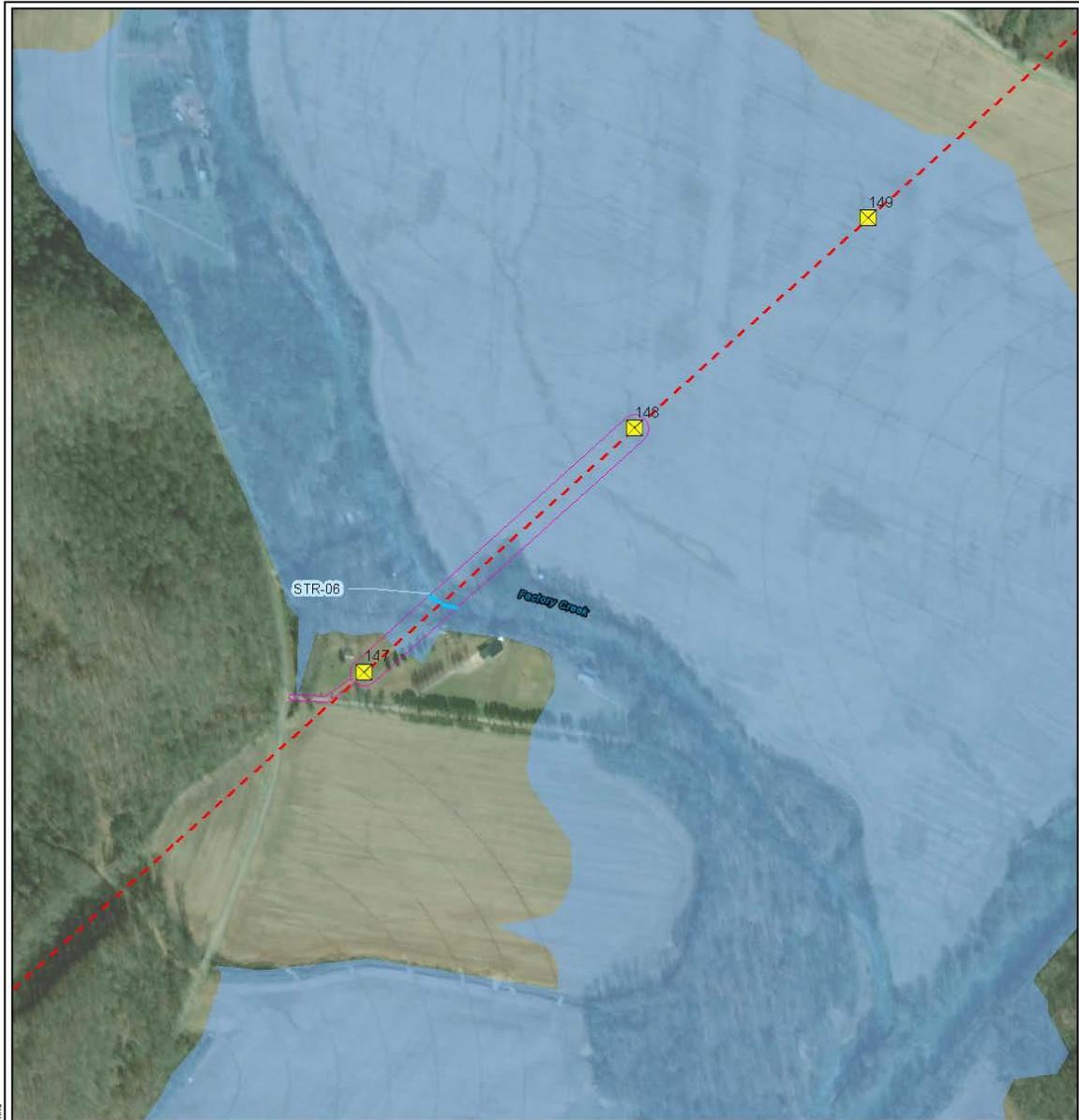


Figure B-9. Water Resources within TL5617



C:\GIS\TVA_TL5617\MapDocs_Final\TL5617_WaterResources_201124.mxd

Legend

- Structure
- Transmission Centerline
- Project Area
- Floodplain (100 year)

Delineated Stream

- Perennial

TL5617
Water Resources
Sheet 4 of 4

Job No. 325220192
Date: 11/25/2020
Drawn By: BSM
Reviewed By: SJM

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400 0 400

Feet

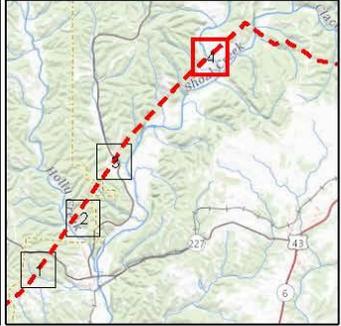


Figure B-10. Water Resources within TL5617



C:\1-01\TVA_TL5670a_MXD\06_Final\TL5670a_WaterResources_2011126.mxd

Legend

- TL5670 Structure
- TL5670 Centerline
- Project Area
- Floodplain (100 year)
- Delineated Stream**
- Ephemeral
- Delineated Wetland**
- Emergent



TL5670
Water Resources
Sheet 1 of 9

Job No. 325220192
Date: 11/25/2020
Drawn By: BSM
Reviewed By: SJM

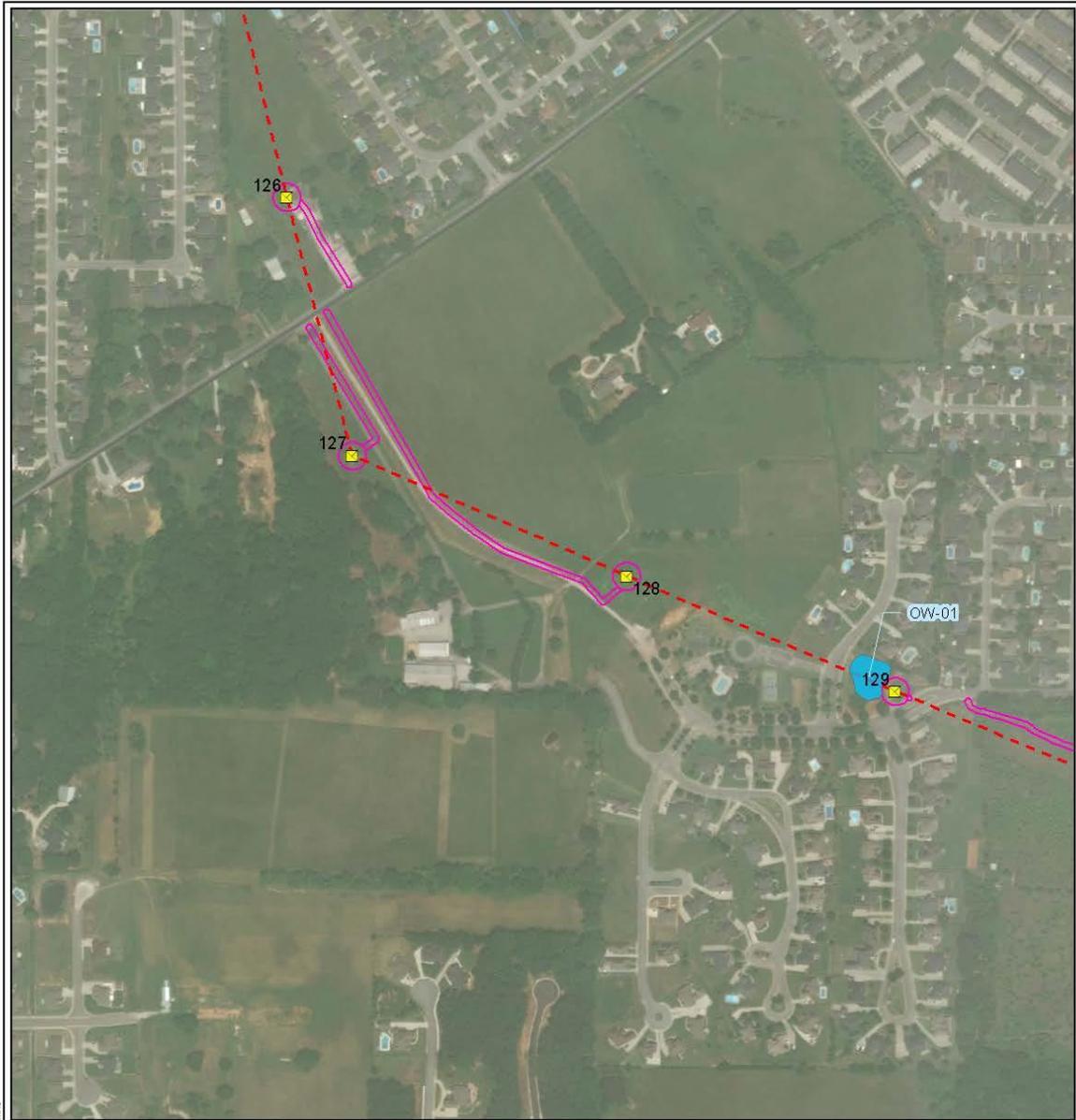


400 0 400
Feet





Figure B-11. Water Resources within TL5670



C:\1-0181\TVA_TL5670a_MXD\06_Final\TL5670a_WaterResources_2011126.mxd

Legend

- TL5670 Structure
- TL5670 Centerline
- Project Area
- Floodplain (100 year)

Delineated Wetland

- Open Water



TL5670
Water Resources
Sheet 2 of 9

Job No. 325220192
Date: 11/25/2020
Drawn By: BSM
Reviewed By: SJM



400 0 400
Feet





Figure B-12. Water Resources within TL5670



C:\1-0181\TVA_TL5670a_MXD\06_Final\TL5670a_WaterResources_2011126.mxd

Legend

- TL5670 Structure
- TL5670 Centerline
- Project Area
- Floodplain (100 year)

Delineated Wetland

- Emergent



TL5670
Water Resources
Sheet 3 of 9

Job No. 325220192
Date: 11/25/2020
Drawn By: BSM
Reviewed By: SJM



400 0 400
Feet





Figure B-13. Water Resources within TL5670



C:\1-0151\VA_TL5670\MapDocs_Final\TL5670_WaterResources_2011125.mxd

Legend

- TL5670 Structure
- TL5670 Centerline
- Project Area
- Floodplain (100 year)

Delineated Stream

- Intermittent



TL5670
Water Resources
Sheet 4 of 9

Job No. 325220192
Date: 11/25/2020
Drawn By: BSM
Reviewed By: SJM

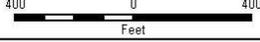







Figure B-14. Water Resources within TL5670



C:\1-GIS\TVA_TL5670a_MXD\06_Final\TL5670a_WaterResources_2011126.mxd

Legend

- TL5670 Structure
- TL5670 Centerline
- Project Area
- Floodplain (100 year)

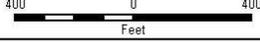
Delineated Stream

- Intermittent



**TL5670
Water Resources**

Sheet 5 of 9

Job No. 325220192 Date: 11/25/2020 Drawn By: BSM Reviewed By: SJM	 
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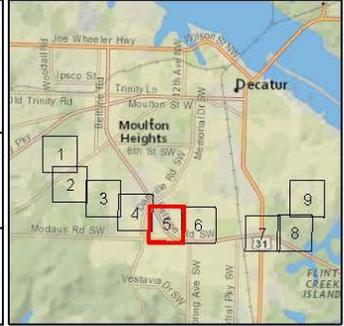


Figure B-15. Water Resources within TL5670



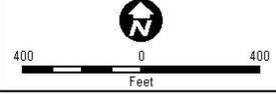
C:\1-01\TVA_TL5670a_MXD\06_Final\TL5670a_WaterResources_2011126.mxd

- Legend**
- TL5670 Structure
 - TL5670 Centerline
 - Project Area
 - Floodplain (100 year)
- Delineated Stream**
- Intermittent



**TL5670
Water Resources
Sheet 6 of 9**

Job No. 325220192
Date: 11/25/2020
Drawn By: BSM
Reviewed By: SJM



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Figure B-16. Water Resources within TL5670



C:\1-01\TVA_TL5670a_MXD\06_Final\TL5670_WaterResources_201126.mxd

Legend

- TL5670 Structure
- TL5670 Centerline
- Project Area
- Floodplain (100 year)

Delineated Stream

- Ephemeral



**TL5670
Water Resources**

Sheet 7 of 9

Job No. 325220192
Date: 11/25/2020
Drawn By: BSM
Reviewed By: SJM

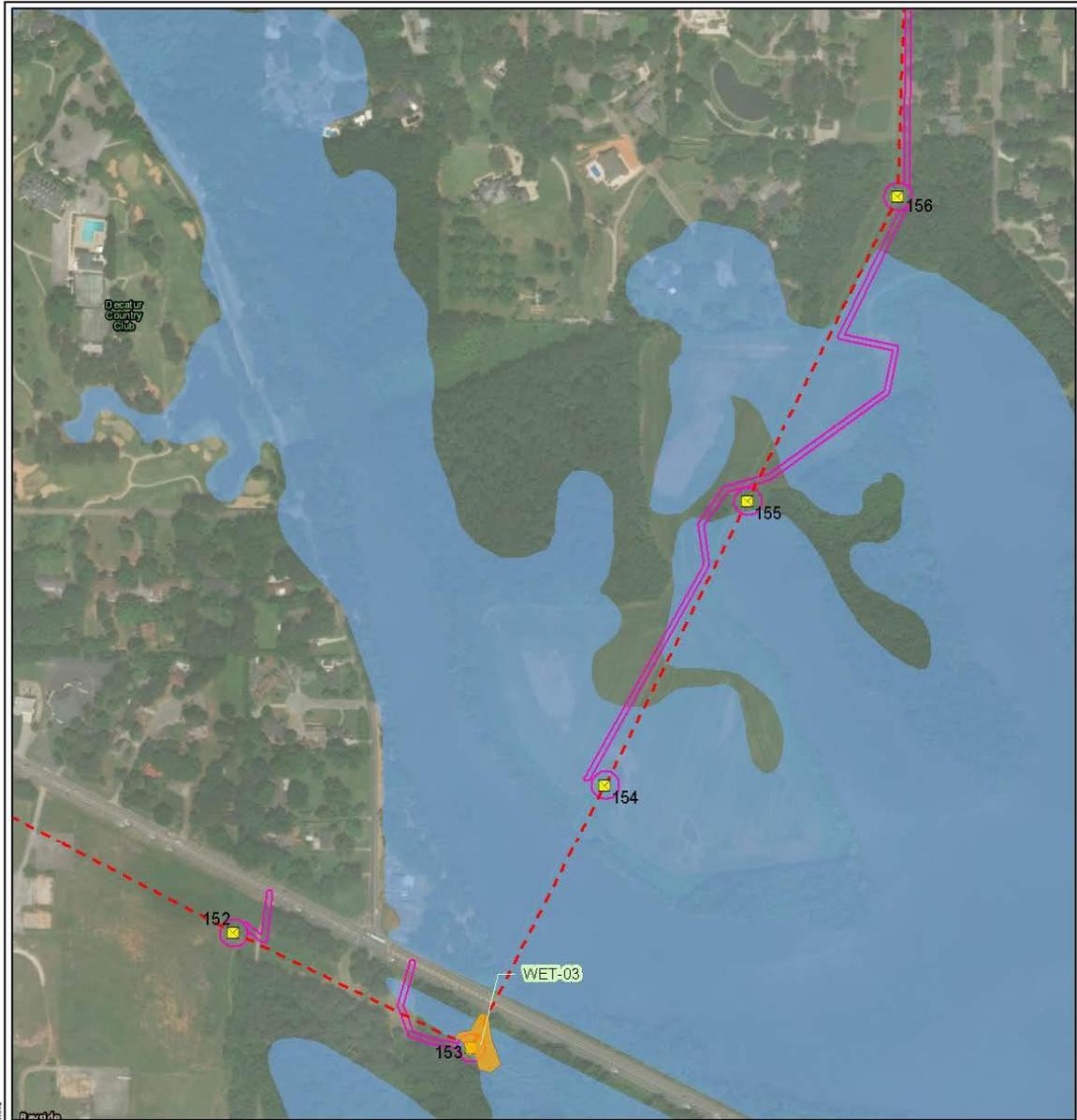


400 0 400
Feet





Figure B-17. Water Resources within TL5670



C:\GIS\TVA_TL5670a_MXD\06_Final\TL5670a_WaterResources_2011126.mxd

Legend

- TL5670 Structure
- TL5670 Centerline
- Project Area
- Floodplain (100 year)

Delineated Wetland

- Scrub-shrub



TL5670
Water Resources
Sheet 8 of 9

Job No. 325220192
Date: 11/25/2020
Drawn By: BSM
Reviewed By: SJM

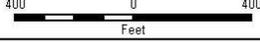
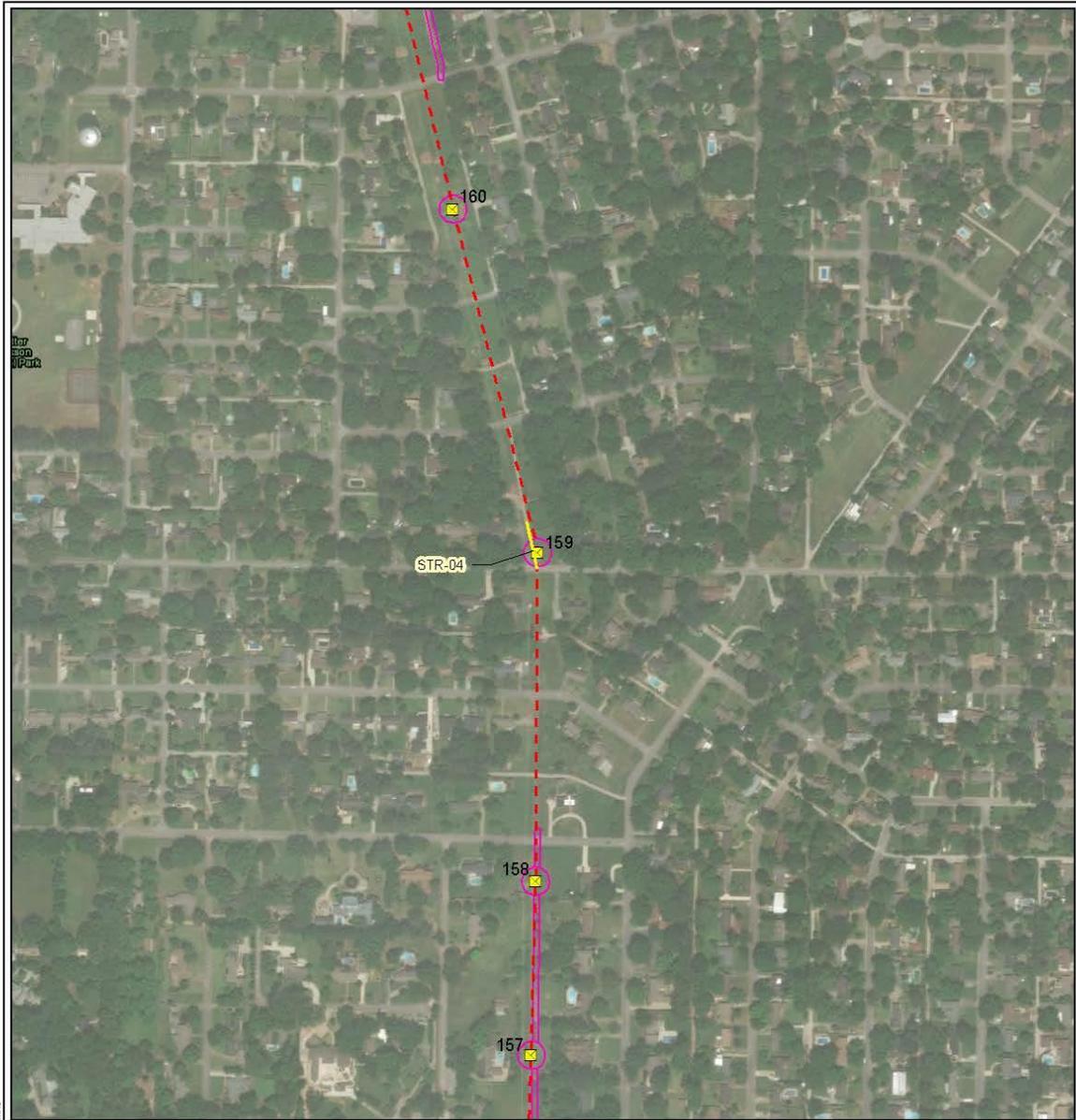







Figure B-18. Water Resources within TL5670



C:\1-01\TVA_TL5670a_MXD\06_Final\TL5670a_WaterResources_2011126.mxd

Legend

- TL5670 Structure
- TL5670 Centerline
- Project Area
- Delineated Stream**
- Ephemeral



TL5670
Water Resources
Sheet 9 of 9

Job No. 325220192
Date: 11/25/2020
Drawn By: BSM
Reviewed By: SJM



400 0 400
Feet





Figure B-19. Water Resources within TL5670

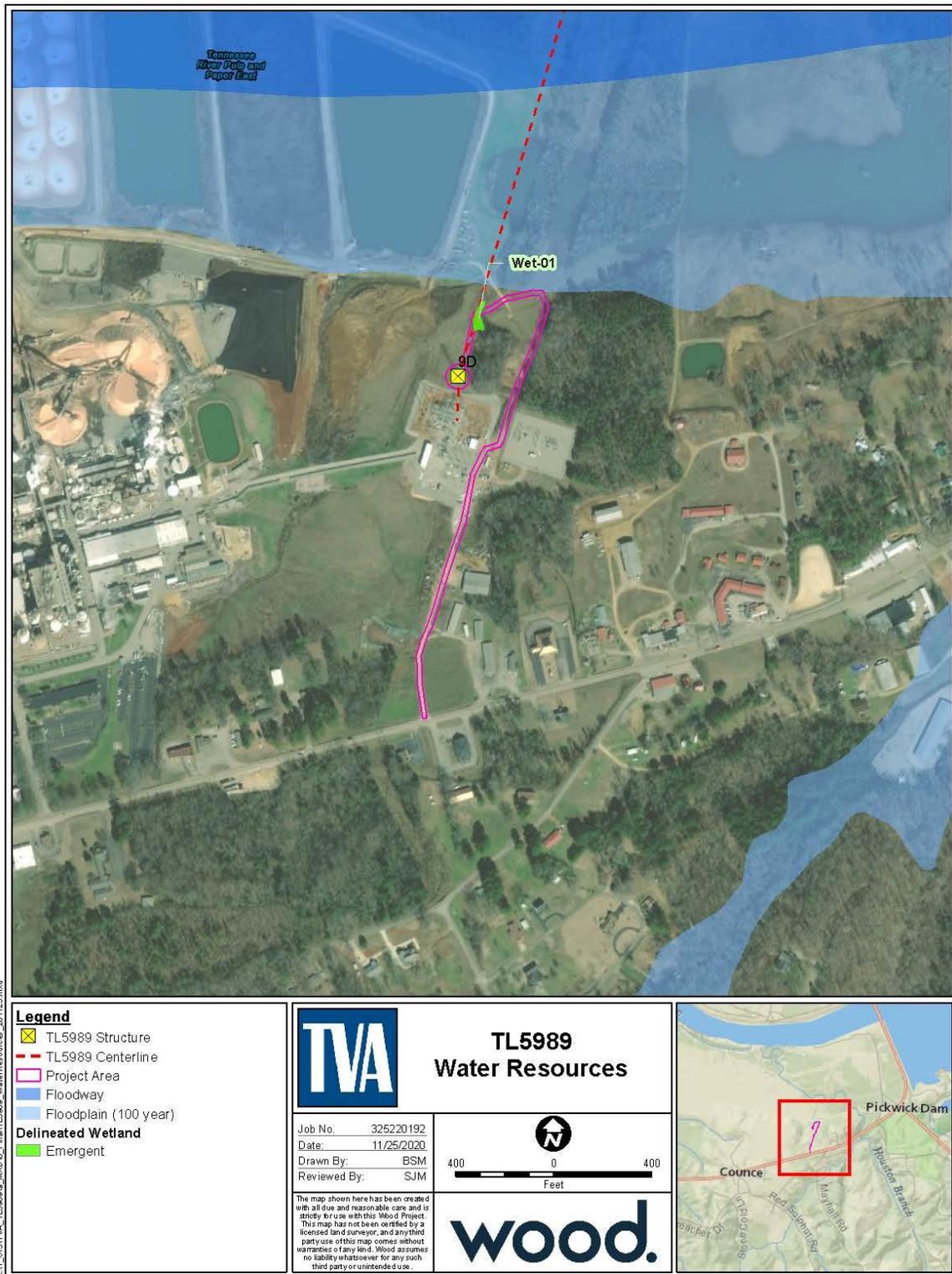


Figure B-20. Water Resources within TL5989

Appendix C – Bat Strategy Project Assessment

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Project Review Form - TVA Bat Strategy (06/2019)

This form should **only** be completed if project includes activities in Tables 2 or 3 (STEP 2 below). This form is not required if project activities are limited to Table 1 (STEP 2) or otherwise determined to have no effect on federally listed bats. If so, include the following statement in your environmental compliance document (e.g., add as a comment in the project CEC): "Project activities limited to Bat Strategy Table 1 or otherwise determined to have no effect on federally listed bats. Bat Strategy Project Review Form NOT required." This form is to assist in determining required conservation measures per TVA's ESA Section 7 programmatic consultation for routine actions and federally listed bats.¹

Project Name: Paradise and Colbert Combustion Turbine Plants **Date:** 12/15/2020
Contact(s): Ashley Pilakowski/Emily Willard **CEC#:** **Project ID:** 36502
Project Location (City, County, State): Colbert, Lauderdale, and Morgan Counties, Alabama; Hardin, Lawrence, Montgomery, S

Project Description:

The proposed action is to replace the existing capacity from the retirement of 1,400 MW of frame CTs at the Allen and Johnsonville sites with the addition of 1,500 MW to be split between TVA's Paradise and Colbert sites for commercial operation no later than December 31, 2023. Actions will include transmission upgrades and natural gas supply upgrades.

SECTION 1: PROJECT INFORMATION - ACTION AND ACTIVITIES

STEP 1) Select TVA Action. If none are applicable, contact environmental support staff, Environmental Project Lead, or Terrestrial Zoologist to discuss whether form (i.e., application of Bat Programmatic Consultation) is appropriate for project:

- | | |
|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| <input type="checkbox"/> 1 Manage Biological Resources for Biodiversity and Public Use on TVA Reservoir Lands | <input type="checkbox"/> 6 Maintain Existing Electric Transmission Assets |
| <input type="checkbox"/> 2 Protect Cultural Resources on TVA-Retained Land | <input type="checkbox"/> 7 Convey Property associated with Electric Transmission |
| <input type="checkbox"/> 3 Manage Land Use and Disposal of TVA-Retained Land | <input type="checkbox"/> 8 Expand or Construct New Electric Transmission Assets |
| <input type="checkbox"/> 4 Manage Permitting under Section 26a of the TVA Act | <input type="checkbox"/> 9 Promote Economic Development |
| <input checked="" type="checkbox"/> 5 Operate, Maintain, Retire, Expand, Construct Power Plants | <input type="checkbox"/> 10 Promote Mid-Scale Solar Generation |

STEP 2) Select all activities from Tables 1, 2, and 3 below that are included in the proposed project.

TABLE 1. Activities with no effect to bats. Conservation measures & completion of bat strategy project review form NOT required.

<input type="checkbox"/> 1. Loans and/or grant awards	<input type="checkbox"/> 8. Sale of TVA property	<input type="checkbox"/> 19. Site-specific enhancements in streams and reservoirs for aquatic animals
<input type="checkbox"/> 2. Purchase of property	<input type="checkbox"/> 9. Lease of TVA property	<input type="checkbox"/> 20. Nesting platforms
<input type="checkbox"/> 3. Purchase of equipment for industrial facilities	<input type="checkbox"/> 10. Deed modification associated with TVA rights or TVA property	<input type="checkbox"/> 41. Minor water-based structures (this does not include boat docks, boat slips or piers)
<input type="checkbox"/> 4. Environmental education	<input type="checkbox"/> 11. Abandonment of TVA retained rights	<input type="checkbox"/> 42. Internal renovation or internal expansion of an existing facility
<input type="checkbox"/> 5. Transfer of ROW easement and/or ROW equipment	<input type="checkbox"/> 12. Sufferance agreement	<input checked="" type="checkbox"/> 43. Replacement or removal of TL poles
<input type="checkbox"/> 6. Property and/or equipment transfer	<input type="checkbox"/> 13. Engineering or environmental planning or studies	<input checked="" type="checkbox"/> 44. Conductor and overhead ground wire installation and replacement
<input checked="" type="checkbox"/> 7. Easement on TVA property	<input type="checkbox"/> 14. Harbor limits delineation	<input type="checkbox"/> 49. Non-navigable houseboats

TABLE 2. Activities not likely to adversely affect bats with implementation of conservation measures. Conservation measures and completion of bat strategy project review form REQUIRED; review of bat records in proximity to project NOT required.

<input checked="" type="checkbox"/> 18. Erosion control, minor	<input type="checkbox"/> 57. Water intake - non-industrial	<input type="checkbox"/> 79. Swimming pools/associated equipment
<input type="checkbox"/> 24. Tree planting	<input type="checkbox"/> 58. Wastewater outfalls	<input type="checkbox"/> 81. Water intakes – industrial
<input type="checkbox"/> 30. Dredging and excavation; recessed harbor areas	<input type="checkbox"/> 59. Marine fueling facilities	<input checked="" type="checkbox"/> 84. On-site/off-site public utility relocation or construction or extension
<input type="checkbox"/> 39. Berm development	<input type="checkbox"/> 60. Commercial water-use facilities (e.g., marinas)	<input type="checkbox"/> 85. Playground equipment - land-based
<input type="checkbox"/> 40. Closed loop heat exchangers (heat pumps)	<input type="checkbox"/> 61. Septic fields	<input type="checkbox"/> 87. Aboveground storage tanks
<input type="checkbox"/> 45. Stream monitoring equipment - placement and use	<input type="checkbox"/> 66. Private, residential docks, piers, boathouses	<input type="checkbox"/> 88. Underground storage tanks
<input type="checkbox"/> 46. Floating boat slips within approved harbor limits	<input type="checkbox"/> 67. Siting of temporary office trailers	<input type="checkbox"/> 90. Pond closure
<input checked="" type="checkbox"/> 48. Laydown areas	<input type="checkbox"/> 68. Financing for speculative building construction	<input type="checkbox"/> 93. Standard License
<input checked="" type="checkbox"/> 50. Minor land based structures	<input type="checkbox"/> 72. Ferry landings/service operations	<input type="checkbox"/> 94. Special Use License
<input type="checkbox"/> 51. Signage installation	<input type="checkbox"/> 74. Recreational vehicle campsites	<input type="checkbox"/> 95. Recreation License
<input type="checkbox"/> 53. Mooring buoys or posts	<input checked="" type="checkbox"/> 75. Utility lines/light poles	<input type="checkbox"/> 96. Land Use Permit
<input type="checkbox"/> 56. Culverts	<input type="checkbox"/> 76. Concrete sidewalks	

Table 3: Activities that may adversely affect federally listed bats. Conservation measures AND completion of bat strategy project review form REQUIRED; review of bat records in proximity of project REQUIRED by OSAR/Heritage eMap reviewer or Terrestrial Zoologist.

<input type="checkbox"/> 15. Windshield and ground surveys for archaeological resources	<input checked="" type="checkbox"/> 34. Mechanical vegetation removal, includes trees or tree branches > 3 inches in diameter	<input type="checkbox"/> 69. Renovation of existing structures
<input type="checkbox"/> 16. Drilling	<input checked="" type="checkbox"/> 35. Stabilization (major erosion control)	<input type="checkbox"/> 70. Lock maintenance/ construction
<input checked="" type="checkbox"/> 17. Mechanical vegetation removal, does not include trees or branches > 3" in diameter (in Table 3 due to potential for woody burn piles)	<input checked="" type="checkbox"/> 36. Grading	<input type="checkbox"/> 71. Concrete dam modification
<input type="checkbox"/> 21. Herbicide use	<input type="checkbox"/> 37. Installation of soil improvements	<input type="checkbox"/> 73. Boat launching ramps
<input checked="" type="checkbox"/> 22. Grubbing	<input type="checkbox"/> 38. Drain installations for ponds	<input type="checkbox"/> 77. Construction or expansion of land-based buildings
<input type="checkbox"/> 23. Prescribed burns	<input checked="" type="checkbox"/> 47. Conduit installation	<input type="checkbox"/> 78. Wastewater treatment plants
<input checked="" type="checkbox"/> 25. Maintenance, improvement or construction of pedestrian or vehicular access corridors	<input type="checkbox"/> 52. Floating buildings	<input type="checkbox"/> 80. Barge fleeting areas
<input type="checkbox"/> 26. Maintenance/construction of access control measures	<input type="checkbox"/> 54. Maintenance of water control structures (dewatering units, spillways, levees)	<input type="checkbox"/> 82. Construction of dam/weirs/ levees
<input type="checkbox"/> 27. Restoration of sites following human use and abuse	<input type="checkbox"/> 55. Solar panels	<input checked="" type="checkbox"/> 83. Submarine pipeline, directional boring operations
<input type="checkbox"/> 28. Removal of debris (e.g., dump sites, hazardous material, unauthorized structures)	<input type="checkbox"/> 62. Blasting	<input type="checkbox"/> 86. Landfill construction
<input type="checkbox"/> 29. Acquisition and use of fill/borrow material	<input checked="" type="checkbox"/> 63. Foundation installation for transmission support	<input type="checkbox"/> 89. Structure demolition
<input type="checkbox"/> 31. Stream/wetland crossings	<input checked="" type="checkbox"/> 64. Installation of steel structure, overhead bus, equipment, etc.	<input type="checkbox"/> 91. Bridge replacement
<input type="checkbox"/> 32. Clean-up following storm damage	<input checked="" type="checkbox"/> 65. Pole and/or tower installation and/or extension	<input type="checkbox"/> 92. Return of archaeological remains to former burial sites
<input type="checkbox"/> 33. Removal of hazardous trees/tree branches		

STEP 3) Project includes one or more activities in Table 3?

YES (Go to Step 4)

NO (Go to Step 13)

STEP 4) Answer questions a through e below (applies to projects with activities from Table 3 ONLY)

- a) Will project involve continuous noise (i.e., ≥ 24 hrs) that is greater than 75 decibels measured on the A scale (e.g., loud machinery)? NO (NV2 does not apply) YES (NV2 applies, subject to records review)
- b) Will project involve entry into/survey of cave? NO (HP1/HP2 do not apply) YES (HP1/HP2 applies, subject to review of bat records)
- c) If conducting **prescribed burning (activity 23)**, estimated acreage: and timeframe(s) below; N/A

STATE	SWARMING	WINTER	NON-WINTER	PUP
GA, KY, TN	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Mar 31	<input type="checkbox"/> Apr 1 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
VA	<input type="checkbox"/> Sep 16 - Nov 15	<input type="checkbox"/> Nov 16 - Apr 14	<input type="checkbox"/> Apr 15 - May 31, Aug 1 - Sept 15	<input type="checkbox"/> Jun 1 - Jul 31
AL	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Mar 15	<input type="checkbox"/> Mar 16 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
NC	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Apr 15	<input type="checkbox"/> Apr 16 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
MS	<input type="checkbox"/> Oct 1 - Nov 14	<input type="checkbox"/> Nov 15 - Apr 14	<input type="checkbox"/> Apr 15 - May 31, Aug 1 - Sept 30	<input type="checkbox"/> Jun 1 - Jul 31

- d) Will the project involve vegetation piling/burning? NO (SSPC4/SHF7/SHF8 do not apply) YES (SSPC4/SHF7/SHF8 applies, subject to review of bat records)

- e) If **tree removal (activity 33 or 34)**, estimated amount: ac trees N/A

STATE	SWARMING	WINTER	NON-WINTER	PUP
GA, KY, TN	<input checked="" type="checkbox"/> Oct 15 - Nov 14	<input checked="" type="checkbox"/> Nov 15 - Mar 31	<input checked="" type="checkbox"/> Apr 1 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
VA	<input type="checkbox"/> Sep 16 - Nov 15	<input type="checkbox"/> Nov 16 - Apr 14	<input type="checkbox"/> Apr 15 - May 31, Aug 1 - Sept 15	<input type="checkbox"/> Jun 1 - Jul 31
AL	<input checked="" type="checkbox"/> Oct 15 - Nov 14	<input checked="" type="checkbox"/> Nov 15 - Mar 15	<input checked="" type="checkbox"/> Mar 16 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
NC	<input type="checkbox"/> Oct 15 - Nov 14	<input type="checkbox"/> Nov 15 - Apr 15	<input type="checkbox"/> Apr 16 - May 31, Aug 1 - Oct 14	<input type="checkbox"/> Jun 1 - Jul 31
MS	<input type="checkbox"/> Oct 1 - Nov 14	<input type="checkbox"/> Nov 15 - Apr 14	<input type="checkbox"/> Apr 15 - May 31, Aug 1 - Sept 30	<input type="checkbox"/> Jun 1 - Jul 31

- If warranted, does project have flexibility for bat surveys (May 15-Aug 15): MAYBE YES NO

*** For **PROJECT LEADS** whose projects will be reviewed by a Heritage Reviewer (Natural Resources Organization only), **STOP HERE**. Click File/Save As, name form as "ProjectLead_BatForm_CEC-or-ProjectIDNo_Date", and submit with project information. Otherwise continue to Step 5. ***

SECTION 2: REVIEW OF BAT RECORDS (applies to projects with activities from Table 3 ONLY)

STEP 5) Review of bat/cave records conducted by Heritage/OSAR reviewer?

- YES NO (Go to Step 13)

Info below completed by: **Heritage Reviewer** (name) Date

OSAR Reviewer (name) Date

Terrestrial Zoologist (name) Elizabeth Hamrick Date Dec 15, 2020

- Gray bat records: None Within 3 miles* Within a cave* Within the County
- Indiana bat records: None Within 10 miles* Within a cave* Capture/roost tree* Within the County
- Northern long-eared bat records: None Within 5 miles* Within a cave* Capture/roost tree* Within the County
- Virginia big-eared bat records: None Within 6 miles* Within the County
- Caves: None within 3 mi Within 3 miles but > 0.5 mi Within 0.5 mi but > 0.25 mi* Within 0.25 mi but > 200 feet* Within 200 feet*

- Bat Habitat Inspection Sheet completed? NO YES

- Amount of **SUITABLE** habitat to be removed/burned (may differ from STEP 4e): (ac trees)* N/A

STEP 6) Provide any additional notes resulting from Heritage Reviewer records review in Notes box below then
 **Go to Step 13**

Notes from Bat Records Review (e.g., historic record; bats not on landscape during action; DOT bridge survey with negative results):

STEPS 7-12 To be Completed by Terrestrial Zoologist (if warranted):

STEP 7) Project will involve:

- Removal of suitable trees within 0.5 mile of P1-P2 Indiana bat hibernacula or 0.25 mile of P3-P4 Indiana bat hibernacula or any NLEB hibernacula.
- Removal of suitable trees within 10 miles of documented Indiana bat (or within 5 miles of NLEB) hibernacula.
- Removal of suitable trees > 10 miles from documented Indiana bat (> 5 miles from NLEB) hibernacula.
- Removal of trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity roost tree.
- Removal of suitable trees within 2.5 miles of Indiana bat roost trees or within 5 miles of Indiana bat capture sites.
- Removal of suitable trees > 2.5 miles from Indiana bat roost trees or > 5 miles from Indiana bat capture sites.
- Removal of documented Indiana bat or NLEB roost tree, if still suitable.
- N/A

STEP 8) Presence/absence surveys were/will be conducted: YES NO TBD

STEP 9) Presence/absence survey results, on NEGATIVE POSITIVE N/A

STEP 10) Project WILL WILL NOT require use of Incidental Take in the amount of acres or trees proposed to be used during the WINTER VOLANT SEASON NON-VOLANT SEASON N/A

STEP 11) Available Incidental Take (prior to accounting for this project) as of

TVA Action	Total 20-year	Winter	Volant Season	Non-Volant Season
5 Operate, Maintain, Retire, Expand, Construct Power Plants	1,717.14	1,325.94	281.47	109.73

STEP 12) Amount contributed to TVA's Bat Conservation Fund upon activity completion: \$ OR N/A

TERRESTRIAL ZOOLOGISTS, after completing SECTION 2, review Table 4, modify as needed, and then complete section for Terrestrial Zoologists at end of form.

SECTION 3: REQUIRED CONSERVATION MEASURES

STEP 13) Review Conservation Measures in Table 4 and ensure those selected are relevant to the project. If not, manually override and uncheck irrelevant measures, and explain why in ADDITIONAL NOTES below Table 4.

Did review of Table 4 result in ANY remaining Conservation Measures in **RED**?

- NO** (Go to Step 14)
- YES** (STOP HERE; Submit for Terrestrial Zoology Review. Click File/Save As, name form as "ProjectLead_BatForm_CEC-or-ProjectIDNo_Date", and submit with project information).

Table 4. TVA's ESA Section 7 Programmatic Bat Consultation Required Conservation Measures

The Conservation Measures in Table 4 are automatically selected based on your choices in Tables 2 and 3 but can be manually overridden, if necessary. To Manually override, press the button and enter your name.

Manual Override

Name: Elizabeth Hamrick

Check if Applies to Project	Activities Subject To Conservation Measure	Conservation Measure Description
		<p>NV1 - Noise will be short-term, transient, and not significantly different from urban interface or natural events (i.e., thunderstorms) that bats are frequently exposed to when present on the landscape.</p>
		<p>NV2 - Drilling, blasting, or any other activity that involves continuous noise (i.e., longer than 24 hours) disturbances greater than 75 decibels measured on the A scale (e.g., loud machinery) within a 0.5 mile radius of documented winter and/or summer roosts (caves, trees, unconventional roosts) will be conducted when bats are absent from roost sites.</p>
		<p>SHF2 - Site-specific conditions (e.g., acres burned, transport wind speed, mixing heights) will be considered to ensure smoke is limited and adequately dispersed away from caves so that smoke does not enter cave or cave-like structures.</p>
		<p>SHF4 - If burns need to be conducted during April and May, when there is some potential for bats to present on the landscape and more likely to enter torpor due to colder temperatures, burns will only be conducted if the air temperature is 55° or greater, and preferably 60° or greater.</p>
		<p>SHF7 - Burning will only occur if site specific conditions (e.g. acres burned, transport wind speed, mixing heights) can be modified to ensure that smoke is adequately dispersed away from caves or cave-like structures. This applies to prescribed burns and burn piles of woody vegetation.</p>
		<p>SHF8 - Brush piles will be burned a minimum of 0.25 mile from documented, known, or obvious caves or cave entrances and otherwise in the center of newly established ROW when proximity to caves on private land is unknown.</p>
		<p>SHF9 - A 0.25 mile buffer of undisturbed forest will be maintained around documented or known gray bat maternity and hibernation colony sites, documented or known Virginia big-eared bat maternity, bachelor, or winter colony sites, Indiana bat hibernation sites, and northern long-eared bat hibernation sites. Prohibited activities within this buffer include cutting of overstory vegetation, construction of roads, trails or wildlife openings, and prescribed burning. Exceptions may be made for maintenance of existing roads and existing ROW, or where it is determined that the activity is compatible with species conservation and recovery (e.g., removal of invasive species).</p>
		<p>TR1* - Removal of potentially suitable summer roosting habitat during time of potential occupancy has been quantified and minimized programmatically. TVA will track and document alignment of activities that include tree removal (i.e., hazard trees, mechanical vegetation removal) with the programmatic quantitative cumulative estimate of seasonal removal of potential summer roost trees for Indiana bat and northern long-eared bat. Project will therefore communicate completion of tree removal to appropriate TVA staff.</p>
		<p>TR4* - Removal of suitable summer roosting habitat within potential habitat for Indiana bat or northern long-eared bat will be tracked, documented, and included in annual reporting. Project will therefore communicate completion of tree removal to appropriate TVA staff.</p>
		<p>TR7 (Existing Transmission ROW only) - Tree removal within 100 feet of existing transmission ROWs will be limited to hazard trees. On or adjacent to TLs, a hazard tree is a tree that is tall enough to fall within an unsafe distance of TLs under maximum sag and blowout conditions and/or are also dead, diseased, dying, and/or leaning. Hazard tree removal includes removal of trees that 1) currently are tall enough to threaten the integrity of operation and maintenance of a TL or 2) have the ability in the future to threaten the integrity of operation and maintenance of a TL.</p>

TR9 - If removal of suitable summer roosting habitat occurs when bats are present on the landscape, a funding contribution (based on amount of habitat removed) towards future conservation and recovery efforts for federally listed bats would be carried out. Project can consider seasonal bat presence/absence surveys (mist netting or emergence counts) that allow for positive detections without resulting in increased constraints in cost and project schedule. This will enable TVA to contribute to increased knowledge of bat presence on the landscape while carrying out TVA's broad mission and responsibilities.

SSPC1 (Transmission only) - Transmission actions and activities will continue to Implement A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities. This focuses on control of sediment and pollutants, including herbicides. Following are key measures:

- o BMPs minimize erosion and prevent/control water pollution in accordance with state-specific construction storm water permits. BMPs are designed to keep soil in place and aid in reducing risk of other pollutants reaching surface waters, wetlands and ground water. BMPs will undertake the following principles:
 - Plan clearing, grading, and construction to minimize area and duration of soil exposure.
 - Maintain existing vegetation wherever and whenever possible.
 - Minimize disturbance of natural contours and drains.
 - As much as practicable, operate on dry soils when they are least susceptible to structural damage and erosion.
 - Limit vehicular and equipment traffic in disturbed areas. Keep equipment paths dispersed or designate single traffic flow paths with appropriate road BMPs to manage runoff.
 - Divert runoff away from disturbed areas.
 - Provide for dispersal of surface flow that carries sediment into undisturbed surface zones with high infiltration capacity and ground cover conditions.
 - Prepare drainage ways and outlets to handle concentrated/increased runoff.
 - Minimize length and steepness of slopes. Interrupt long slopes frequently.
 - Keep runoff velocities low and/or check flows.
 - Trap sediment on-site.
 - Inspect/maintain control measures regularly & after significant rain.
 - Re-vegetate and mulch disturbed areas as soon as practical.
- o Specific guidelines regarding sensitive resources and buffer zones:
 - Extra precaution (wider buffers) within SMZs is taken to protect stream banks and water quality for streams, springs, sinkholes, and surrounding habitat.
 - BMPs are implemented to protect and enhance wetlands. Select use of equipment and seasonal clearing is conducted when needed for rare plants; construction activities are restricted in areas with identified rare plants.
 - Standard requirements exist to avoid adverse impacts to caves, protected animals, unique/ important habitat (e.g., cave buffers, restricted herbicide use, seasonal clearing of suitable habitat).

SSPC2 - Operations involving chemical/fuel storage or resupply and vehicle servicing will be handled outside of riparian zones (streamside management zones) in a manner to prevent these items from reaching a watercourse. Earthen berms or other effective means are installed to protect stream channel from direct surface runoff. Servicing will be done with care to avoid leakage, spillage, and subsequent stream, wetland, or ground water contamination. Oil waste, filters, other litter will be collected and disposed of properly. Equipment servicing and chemical/fuel storage will be limited to locations greater than 300-ft from sinkholes, fissures, or areas draining into known sinkholes, fissures, or other karst features.

SSPC3 (Power Plants only) - Power Plant actions and activities will continue to implement standard environmental practices. These include:

- Best Management Practices (BMPs) in accordance with regulations:
 - Ensure proper disposal of waste, ex: used rags, used oil, empty containers, general trash, dependent on plant policy
 - Maintain every site with well-equipped spill response kits, included in some heavy equipment
 - Conduct Quarterly Internal Environmental Field Assessments at each sight
 - Every project must have an approved work package that contains an environmental checklist that is approved by sight Environmental Health & Safety consultant.
 - When refueling, vehicle is positioned as close to pump as possible to prevent drips, and overfilling of tank. Hose and nozzle are held in a vertical position to prevent spillage
- Construction Site Protection Methods
 - Sediment basin for runoff - used to trap sediments and temporarily detain runoff on larger construction sites
 - Storm drain protection device
 - Check dam to help slow down silt flow
 - Silt fencing to reduce sediment movement
- Storm Water Pollution Prevention (SWPP) Pollution Control Strategies
 - Minimize storm water contact with disturbed soils at construction site
 - Protect disturbed soil areas from erosion
 - Minimize sediment in storm water before discharge
 - Prevent storm water contact with other pollutants
 - Construction sites also may be required to have a storm water permit, depending on size of land disturbance (>1ac)
- Every site has a Spill Prevention and Control Countermeasures (SPCC) Plan and requires training. Several hundred pieces of equipment often managed at the same time on power generation properties. Goal is to
 - Minimize fuel and chemical use Ensure proper disposal of waste, ex: used rags, used oil, empty containers, general trash, dependent on plant policy
 - Maintain every site with well-equipped spill response kits, included in some heavy equipment
 - Conduct Quarterly Internal Environmental Field Assessments at each sight
 - Every project must have an approved work package that contains an environmental checklist that is approved by sight Environmental Health & Safety consultant.
 - When refueling, vehicle is positioned as close to pump as possible to prevent drips, and overfilling of tank. Hose and nozzle are held in a vertical position to prevent spillage
- Construction Site Protection Methods
 - Sediment basin for runoff - used to trap sediments and temporarily detain runoff on larger construction sites
 - Storm drain protection device
 - Check dam to help slow down silt flow
 - Silt fencing to reduce sediment movement
- Storm Water Pollution Prevention (SWPP) Pollution Control Strategies
 - Minimize storm water contact with disturbed soils at construction site
 - Protect disturbed soil areas from erosion
 - Minimize sediment in storm water before discharge
 - Prevent storm water contact with other pollutants
 - Construction sites also may be required to have a storm water permit, depending on size of land disturbance (>1ac)
- Every site has a Spill Prevention and Control Countermeasures (SPCC) Plan and requires training. Several hundred pieces of equipment often managed at the same time on power generation properties. Goal is to minimize fuel and chemical use

SSPC4 (Transmission only) - Woody vegetation burn piles associated with transmission construction will be placed in the center of newly established ROWs to minimize wash into any nearby undocumented caves that might be on adjacent private property and thus outside the scope of field survey for confirmation. Brush piles will be burned a **minimum of 0.25 miles from documented caves** and otherwise in the center of newly established ROW when proximity to caves on private land is unknown.

Project Review Form - TVA Bat Strategy (06/2019)

<p>SSPC5 (26a, Solar, Economic Development only) - Section 26a permits and contracts associated with solar projects, economic development projects or land use projects include standards and conditions that include standard BMPs for sediment and contaminants as well as measures to avoid or minimize impacts to sensitive species or other resources consistent with applicable laws and Executive Orders.</p>
<p>SSPC7 - Clearing of vegetation within a 200-ft radius of documented caves will be limited to hand or small machinery clearing only (e.g., chainsaws, bush-hog, mowers). This will protect potential recharge areas of cave streams and other karst features that are connected hydrologically to caves.</p>
<p>L1 - Direct temporary lighting away from suitable habitat during the active season.</p>
<p>L2 - Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution when installing new or replacing existing permanent lights by angling lights downward or via other light minimization measures (e.g., dimming, directed lighting, motion-sensitive lighting).</p>

¹Bats addressed in consultation (02/2018), which includes gray bat (listed in 1976), Indiana bat (listed in 1967), northern long-eared bat (listed in 2015), and Virginia big-eared bat (listed in 1979).

Hide All Unchecked Conservation Measures

- HIDE
- UNHIDE

Hide Table 4 Columns 1 and 2 to Facilitate Clean Copy and Paste

- HIDE
- UNHIDE

NOTES (additional info from field review, explanation of no impact or removal of conservation measures).

STEP 14) Save completed form (Click File/Save As, name form as "ProjectLead_BatForm_CEC-or-ProjectIDNo_Date") in project environmental documentation (e.g. CEC, Appendix to EA) AND send a copy of form to batstrategy@tva.gov
Submission of this form indicates that Project Lead/Applicant:

(name) is (or will be made) aware of the requirements below.

- Implementation of conservation measures identified in Table 4 is required to comply with TVA's Endangered Species Act programmatic bat consultation.
- TVA may conduct post-project monitoring to determine if conservation measures were effective in minimizing or avoiding impacts to federally listed bats.

For Use by Terrestrial Zoologist Only

Terrestrial Zoologist acknowledges that Project Lead/Contact (name) has been informed of any relevant conservation measures and/or provided a copy of this form.

For projects that require use of Take and/or contribution to TVA's Bat Conservation Fund, Terrestrial Zoologist acknowledges that Project Lead/Contact has been informed that project will result in use of Incidental Take ac trees and that use of Take will require \$ contribution to TVA's Conservation Fund upon completion of activity (amount entered should be \$0 if cleared in winter).

For Terrestrial Zoology Use Only. Finalize and Print to Noneditable PDF.

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Appendix D – Coordination

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Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902

September 9, 2020

Mr. E. Patrick McIntyre, Jr.
Executive Director
and State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA), PARADISE COMBUSTION TURBINE (PCT)/COLBERT COMBUSTION TURBINE (CCT) MODERNIZATION PROJECT, COLBERT, LAUDERDALE, LAWRENCE, LIMESTONE, AND MORGAN COUNTIES, ALABAMA; MUHLENBERG AND TODD COUNTIES, KENTUCKY; AND CHESTER, GILES, HARDIN, LAWRENCE, MAURY, MCNAIRY, MONTGOMERY, SUMNER, WAYNE, AND WILSON COUNTIES, TENNESSEE – INITIATION OF CONSULTATION

In 2019, TVA completed a Combustion Turbine (CT) Modernization study to evaluate the condition of TVA's current CT power generation units and evaluate steps needed to ensure a reliable power peaking fleet into the future. CTs are designed to meet peaks in power demand very quickly. TVA's CT plants run on natural gas as a fuel, and they can be activated on very short notice. Natural gas serves an increasingly important role in TVA's mission to provide clean, reliable energy to the people and businesses of the Tennessee Valley.

The CT Modernization study identified CT units that are over 40 years old and require replacement to ensure electrical reliability in the TVA power grid. These include Units 1-20 at Allen CT plant in Memphis, Tennessee and Units 1-16 at Johnsonville CT plant in New Johnsonville, Tennessee. TVA proposes to retire these outdated CT units and construct new frame CTs to replace the lost capacity. TVA would construct three 250-MW frame CTs at PCT plant in Muhlenberg County, Kentucky and three 250-MW frame CTs at CCT plant in Colbert County, Alabama.

These changes will require updates to the TVA electrical power grid. Thus, as part of this project, TVA also proposes to complete uprates and reconductors of transmission lines in Tennessee, Alabama, and Kentucky. Uprates involve making changes to allow the operation of a transmission line at a higher voltage. These changes could include such activities as replacing and/or modifying existing structures, installing intermediate structures, replacing or modifying conductor to increase ground clearance, adding tower extensions, and replacing structures with new, taller ones. Reconductoring projects involve removing the old conductor (cables that carry the electricity) and pulling new conductor into place. The proposed

undertaking would affect segments of ten transmission lines scattered throughout Tennessee, Kentucky and northern Alabama. TVA proposes to upgrade approximately 50 miles of transmission lines in Tennessee, and to re-conductor approximately 155 miles of line in all three states. The total length of affected transmission lines is approximately 205 miles. However, not all of the lines would be affected throughout their extent. Activities with potential for ground disturbance would only take place at a limited number of locations within each transmission line. The scope would also include potential natural gas pipeline corridors within which a gas pipeline may need to be constructed and/or upgraded.

TVA has determined that the proposed CT Modernization Project is an undertaking (as defined at 36 CFR § 800.16(y)) with potential to cause effects on historic properties. Pursuant to §800.3(c), we are initiating consultation with your office and the State Historic Preservation Officers of Kentucky and Alabama. We are also initiating consultation with the federally recognized Indian tribes who have expressed an interest in the affected counties.

Based on current information about the project, TVA has determined that the area of potential effects (APE) should include the following areas (Figure 1):

- all areas at CCT and PCT plants where ground disturbance related to the undertaking would take place;
- all areas within proposed natural gas pipeline corridors;
- all areas within the right-of-way (ROW) of the affected transmission lines where ground disturbing activities would take place and/or work resulting in changes to the viewshed (such as tower extensions exceeding 20% of the height of the original tower structure) are proposed;
- any off-ROW access routes that are not surfaced in asphalt, concrete, or gravel; and
- the viewsheds within a one-half mile radius of those proposed activities that have potential for visual effects on above-ground historic properties.

The ground-disturbing portion of the undertaking's APE within the state of Tennessee would include the following:

- Upgrades of approximately 37 miles of transmission lines in Hardin, Wayne, Lawrence, Sumner, and Wilson Counties; and
- Reconductoring approximately 46 miles of transmission lines in Chester, McNairy, Giles, Lawrence, Maury, and Wilson Counties.

The APE would include areas within the following counties in Tennessee: Chester, Giles, Hardin, Lawrence, Maury, McNairy, Montgomery, Sumner, Wayne, and Wilson.

TVA does not anticipate the retirement and removal of outdated CT units at Allen and Johnsonville CT plants to require any ground disturbance outside of previously disturbed areas. TVA also expects that work would not result in visual effects on any above-ground historic properties, given the settings of those locations and that our offices have previously agreed that

Mr. E. Patrick McIntyre, Jr.
Page 3
September 9, 2020

both Allen Fossil Plant and Johnsonville Fossil Plant are ineligible for inclusion in the National Register of Historic Places (NRHP).

Project plans are still being developed. At this time, TVA is unable to completely determine the undertaking's APE. We will consult further with your office to fully determine the APE as project plans are developed.

Considering the scope and complexity of the proposed undertaking, TVA proposes to use a phased process to conduct identification and evaluation efforts, pursuant to 36 CFR Part 800.4(b)(2) and Stipulation III-D-3 of TVA's Section 106 Programmatic Agreement.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and are eligible for the NRHP.

Should you have any questions or comments, please contact Steve Cole at sccole0@tva.gov.

Sincerely,



Michaelyn Harle on Behalf of Clinton E. Jones
Manager
Cultural Compliance

SCC:ABM

Enclosures

cc (Enclosures):

Ms. Jennifer Barnett (Enclosure)
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

INTERNAL COPIES ONLY, NOT TO BE INCLUDED WITH OUTGOING LETTER:

S. Dawn Booker, WT 11B-K
Stephen C. Cole, WT 11C-K
Michael C. Easley, BR 2C-C
Bennie J. Foshee, Jr., LP 5D-C
Susan R. Jacks, WT 11C-K
Joseph E. Melton, MR 4G-C
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Nathan Schweighart, MR BA-C
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ECM, ENVRecords

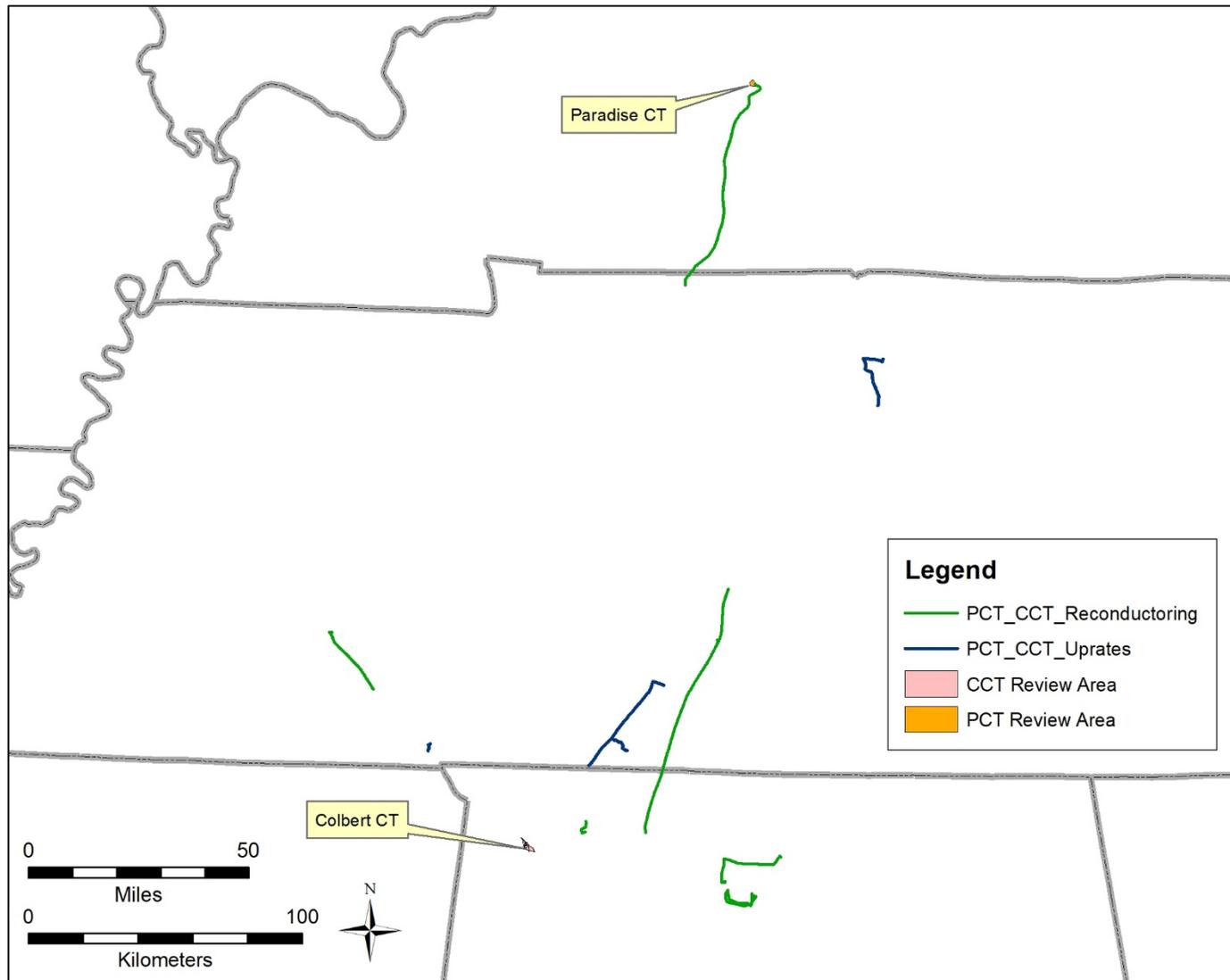


Figure 1. Overview of project APE.



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902

December 8, 2020

Mr. E. Patrick McIntyre, Jr.
Executive Director
and State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA), PARADISE COMBUSTION TURBINE/COLBERT COMBUSTION TURBINE (PCT/CCT) MODERNIZATION PROJECT, HARDIN, LAWRENCE, MONTGOMERY, SUMNER, WAYNE, AND WILSON COUNTIES, TENNESSEE – PHASE I SURVEY

We initiated consultation with your office in September regarding our Section 106 review of the above-cited multi-state project. Since that time, TVA has made progress in project design, which enabled us to further define the area of potential effects (APE). Figure 1 shows an updated map of the overall project's APE (which no longer includes any work in Chester, Giles, McNairy, or Maury counties). We have also completed a Phase I Archaeological survey in the project footprint, and have assessed the undertaking's potential for direct and indirect effects on historic properties. In this letter, we describe how we determined the APE, discuss the survey, and present our findings for the portion of the project within Tennessee. We continue to consult with the State Historic Preservation Officers of Alabama and Kentucky concerning the portion of the project in their respective states.

Project description

Project activities in Tennessee would consist of two types of work: 1) uprating three transmission lines (TL) (L5617-03, L5989-02, and L5823-01), and 2) installation of new fiber optic line along 3.3 miles of TL L6057-01. Uprates involve making changes to allow the operation of a TL at a higher voltage. These changes could include such activities as replacing and/or modifying existing structures, cutting and sliding conductor to increase ground clearance, adding tower extensions, and replacing structures with new ones. Each activity would affect only a small number of structures or spans in each TL. The new fiber optic line may be installed by helicopter. Designated pull points along the TL corridor would be used to set up reels of fiber optic cable for installation. The pull points would require use of a trailer-mounted cable reel. Table 1 lists the modifications that TVA would make to these four TLs as part of the uprates and fiber optic installation.

Table 1. TLs and structures to be affected by proposed uprates and fiber optic installation.

TL number	TL name	Structure(s)	Modification
L5617-03	Colbert-Lawrenceburg 161-kV	122, 124, 130, 135, 147	Conductor cut
L5617-03	Colbert-Lawrenceburg 161-kV	513/613	Replace structure
L5989-02	Pickwick-Counce 161-kV	9D, A-D, Ending	161kV Bus
L5823-01	Wilson-Gallatin 161-kV	76	16-foot extension and conductor cut
L5823-01	Wilson-Gallatin 161-kV	77	Conductor slide
L5823-01	Wilson-Gallatin 161-kV	79, 91	Conductor cut
L5823-01	Wilson-Gallatin 161-kV	86, 87	Replace structure
L6057-01	Paradise-Montgomery 500-kV	238-248, Ending	Fiber optic installation

APE

All of the proposed work could potentially require the use of large equipment such as heavy-duty bucket trucks or cranes. Therefore, TVA included the access routes for each of the work locations. Access routes outside of TVA’s TL right-of-way (ROW) consist of existing roads surfaced in dirt, gravel, or pavement. TVA would make no modifications to any of the roads and would keep vehicles on those roads during travel to and from the work locations. For access within the ROW, TVA considers the project footprint to include the width of the entire ROW (100 feet for 161-kV TLs; 150 feet for the 500-kV TL). TVA also included a 50-foot radius surrounding each work structure to account for potential ground disturbance at the work set-up locations. We refer to all locations of potential ground disturbance, including access routes, as the “project footprint”. We considered the undertaking’s potential physical effects on both archaeological sites and potentially historic TLs when reviewing this project. The project footprint encompasses approximately 35 acres (combined).

The fiber optic installation, and most of the TL uprate work, would not include any new visual elements. Any structure replacements would be carried out using similar structure types and the same material (steel). Therefore, that work has no potential for visual effects on any aboveground properties that may be in the viewshed. One possible exception is the proposed addition of a 16-foot extension to Structure 76 on L5823-01, which would result in a 22% increase in height of this tower structure. TVA included the viewshed within a half-mile radius of this structure as part of the APE (Figure 2).

Previous Section 106 reviews in the Project Footprint

TVA has no record of any prior historic architectural surveys for area within the half-mile radius of Structure 76 in L5823-01, which is located in Gallatin, Tennessee. We also have not previously evaluated any of the affected TLs for historic significance. A small part of one access road associated with L6057-01 falls within a corridor previously surveyed for archaeology (Robinson et al. 2015). However, we did not exclude that area from the current survey. The remainder of the project footprint has not been included in any previous archaeological surveys.

Potential for historic TLs

We consulted TVA’s TL index regarding the construction dates, structure types, and number of replacement structures for each of the affected TLs, in order to determine

whether any would meet criteria of historic significance. Table 2 shows the data. All of the affected TLs were built by TVA between 1948 and 1968 using steel lattice-type towers. The oldest of these (L5823-01) lacks historic integrity, as nearly all of its original structures have been replaced. All of the structures in these lines are of types that TVA still uses today. TVA does not consider these structures to have historic significance because these types of structures are ubiquitous throughout the US and are still being made today. Therefore, TVA does not consider any of the affected TLs to be eligible for inclusion in the National Register of Historic Places (NRHP).

Table 2. Age and composition of affected TLs

TL	Affected section	Construction Date	Structure type	Original structures remaining
L5617-03	Structures 117-152A	1954	Steel towers	94%
L5989-02	Structures 9A, 9B, 9C, 9D, and A-D	1960	Steel towers (6) and steel poles (2)	75%
L5823-01	Structures 72-97 and A-F	1948	Steel towers	6%
L6057-01*	Structures 1-237 (in Kentucky) and 238-248 (in Tennessee)	1968	Steel towers	100%

*Including the entire ca. 51-mile TL extending from Paradise Combustion Turbine plant to the Montgomery, TN Substation

Potential for visual effects on aboveground properties

As mentioned above, the only action related to this undertaking that has potential for visual effects on aboveground properties in Tennessee would be the addition of a 16-foot extension to tower 76 on the on line L5823-01. The tower is 74 feet tall, and the extension would result in a 22% increase in height. TVA carried out a desktop review of the half-mile radius surrounding this structure (see Figure 2) in order to identify any historic architectural properties. The review included the following sources: the Tennessee Historical Commission (THC) Online viewer; the NRHP; the 1956 and 2010 editions of the USGS Laguardo, TN 7.5-minute topographic quadrangle; current satellite imagery provided by Bing; Google Street View; and TVA's Integrated Cultural Database.

There are no NRHP listings within one-half mile of Structure 76. Six houses and eight barns are shown within the half-mile radius on the 1956 topographic quadrangle. Only two of the houses, and three of the barns, appear to be extant based on recent satellite imagery. The THC Online Viewer lists two structures in this review area, and these correspond with the two extant houses: SU-24 (900 Lock 4 Road), and SU-1001 (1033 Lock 4 Road). Based on current satellite imagery, SU-24 appears to be heavily modified and is located in a small lot in a modern subdivision. Maps, satellite images, and Google Street View all indicate that views to Structure 76 from this property are blocked by vegetation and other structures. SU-1001 is located approximately 0.21 miles west/northwest of Structure 76, at the southern edge of a modern subdivision (Figure 3). The TL tower does appear to be in view from SU-1001 currently, although the views are partially blocked by a line of trees (Figure 4). Google Street View

indicates SU-1001 has been modified, and the THC Online Viewer lists the construction date as 1880 and describes it as “ext. altered dwelling w/ original entrance.” The three extant barns are in proximity and are potentially associated with the house. The setting of this property has been extensively altered by the construction of a modern subdivision. The property is surrounded on three sides by modern homes and streets. TVA has not assessed the NRHP eligibility of SU-1001. However, given that its integrity of setting has been altered, and that the tower extension represents a relatively small increase in visibility of an existing visual element, TVA finds that the tower extension would not further diminish the property’s integrity, and therefore, that the undertaking would not result in an adverse effect, were this property to be found eligible for the NRHP.

Archaeological Survey

TVA contracted with Wood Environment and Infrastructure (Wood) for an archaeological survey of the project footprint in order to identify archaeological sites that could be affected by the undertaking. The total survey area encompassed approximately 35 acres of land. A low-resolution version of the report, titled, *Phase I Archaeological Survey, TVA, PCT/CCT Modernization Project, Hardin, Lawrence, Montgomery, Sumner, Wayne, and Wilson Counties, Tennessee*, is attached. A high-resolution version can be downloaded.

The survey consisted of pedestrian survey and systematic shovel testing. Background research carried out remotely using the Tennessee Division of Archaeology files indicated that one previously-recorded archaeological site (40MT1152) is located within the project footprint. This site was previously recommended ineligible for inclusion in the NRHP. The survey revisited this site and identified four previously-unrecorded sites (40LR212, 40LR213, 40LR214, and 40WY231). Wood recommends that sites 40MT1152, 40LR212, 40LR213, and 40LR214 are ineligible for the NRHP due to a lack of intact subsurface deposits. Wood recommends that site 40WY231 should be avoided or, if avoidance is not possible, that TVA should conduct additional investigations at the site to determine eligibility.

Although not mentioned in the attached report, the Paradise-Montgomery 500-V TL intersects known terrestrial routes of the Trail of Tears/Removal Route (TOT/RR) in Montgomery County. However, the route follows a modern road and the undertaking would not include any work within a 500-foot radius of the TOT/RR.

TVA has read the attached report, finds it meets survey standards, and agrees with the authors’ recommendations. Potentially-eligible site 40WY231 is located in a proposed access route to Structure 131 on L5617-01. TVA was unable to identify an alternate access route. TVA proposes to avoid project effects to site 40WY231 by creating a 30-meter buffer surrounding the site, indicating this buffer as “sensitive area” on project-related drawings and notes, and requiring Transmission to deploy wetland mats when moving or using heavy-duty equipment within the site buffer. TVA finds that with this condition on the work, the undertaking would result in no effects on any NRHP-listed or –eligible archaeological sites in Tennessee.

Mr. E. Patrick McIntyre, Jr.
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December 8, 2020

Conclusion

One inventoried aboveground property is located within view of a proposed 16-foot tower extension. TVA finds that adding the extension would not result in an adverse effect on this property, were the property to be found eligible for inclusion in the NRHP. TVA finds that all four of the affected TLs are ineligible for inclusion in the NRHP.

The project footprint contains five archaeological sites. TVA finds that four of these sites (40MT1152, 40LR212, 40LR213, and 40LR214) are ineligible, and one (40WY231) is potentially eligible, for inclusion in the NRHP. TVA proposed to avoid project effects on 40WY231 by creating a buffer and using wetland mats in the access route where the site is located. TVA finds that with this condition on the undertaking, the PCT/CCT Modernization Project would result in no effects on historic properties in Tennessee.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally-recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and are eligible for the NRHP.

Pursuant to 36 CFR Part 800.4(d)(1) we are notifying you of TVA's finding of no historic properties affected, providing the documentation specified in § 800.11(d); and inviting you to review the finding. Also, we are seeking your agreement with TVA's eligibility determinations and finding that the undertaking as currently planned will have no effects on historic properties.

Should you have any questions or comments, please contact Steve Cole by email at sccole0@tva.gov.

Sincerely,



Clinton E. Jones
Manager
Cultural Compliance

SCC:ABM

Enclosures

cc (Enclosures)

Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

Reference Cited

Robinson, Ryan, Danny Gregory, Brian Cavanaugh, and Ashley Cavanaugh
2015 *Archaeological Survey of the Proposed Clarksville Natural Gas Interconnect Pipeline, Montgomery County, Tennessee and Todd County, Kentucky.*
Prepared by Barge Waggoner Sumner and Cannon, Inc. Prepared for the
Federal Energy Regulatory Commission.

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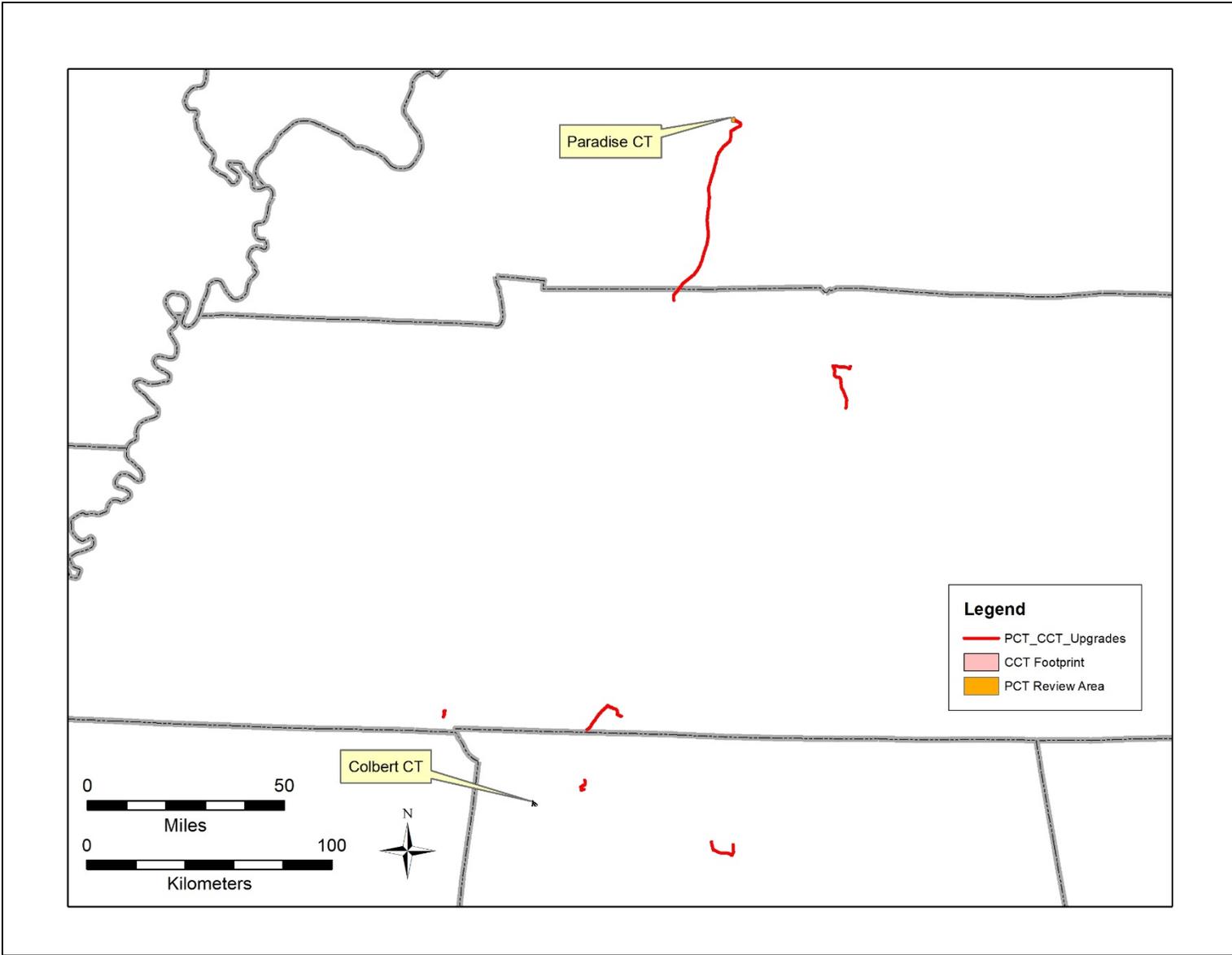


Figure 1. Updated map of overall project APE.



Figure 2. Half-mile radius surrounding L5823-01 Structure 76, and THC-inventoried properties.



0 1,000

Feet

0 500

Meters



Figure 3. Structure 76 (in L5823-01) and property SU-1001.



Figure 4. Google Street View looking from Connie Drive east toward L5823 Structure 76 (center-left of photo). Property SU-1001 is partially visible behind tree in center of photo.



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902

September 9, 2020

Mr. Craig Potts
State Historic Preservation Officer
and Executive Director
Kentucky Heritage Council
300 Washington Street
Frankfort, Kentucky 40601

Dear Mr. Potts:

TENNESSEE VALLEY AUTHORITY (TVA), PARADISE COMBUSTION TURBINE (PCT)/COLBERT COMBUSTION TURBINE (CCT) MODERNIZATION PROJECT, COLBERT, LAUDERDALE, LAWRENCE, LIMESTONE, AND MORGAN COUNTIES, ALABAMA; MUHLENBERG AND TODD COUNTIES, KENTUCKY; AND CHESTER, GILES, HARDIN, LAWRENCE, MAURY, MCNAIRY, MONTGOMERY, SUMNER, WAYNE, AND WILSON COUNTIES, TENNESSEE – INITIATION OF CONSULTATION

In 2019, TVA completed a Combustion Turbine (CT) Modernization study to evaluate the condition of TVA's current CT power generation units and evaluate steps needed to ensure a reliable power peaking fleet into the future. Combustion turbines are designed to meet peaks in power demand very quickly. TVA's CT plants run on natural gas as a fuel, and they can be activated on very short notice. Natural gas serves an increasingly important role in TVA's mission to provide clean, reliable energy to the people and businesses of the Tennessee Valley.

The CT Modernization study identified CT units that are over 40 years old and require replacement to ensure electrical reliability in the TVA power grid. These include Units 1-20 at Allen CT plant in Memphis, Tennessee and Units 1-16 at Johnsonville CT plant in New Johnsonville, Tennessee. TVA proposes to retire these outdated CT units and construct new frame CTs to replace the lost capacity. TVA would construct three 250-MW frame CTs at PCT plant in Muhlenberg County, Kentucky and three 250-MW frame CTs at CCT plant in Colbert County, Alabama.

These changes will require updates to the TVA electrical power grid. Thus, as part of this project, TVA also proposes to complete uprates and reconductors of transmission lines in Tennessee, Alabama, and Kentucky. Uprates involve making changes to allow the operation of a transmission line at a higher voltage. These changes could include such activities as replacing and/or modifying existing structures, installing intermediate structures, replacing or modifying conductor to increase ground clearance, adding tower extensions, and replacing structures with new, taller ones. Reconductoring projects involve removing the old conductor (cables that carry the electricity) and pulling new conductor into place. The proposed undertaking would affect segments of ten transmission lines scattered throughout Tennessee,

Kentucky and northern Alabama. TVA proposes to upgrade approximately 50 miles of transmission lines in Tennessee, and to reconductor approximately 155 miles of line in all three states. The total length of affected transmission lines is approximately 205 miles. However, not all of the lines would be affected throughout their extent. Activities with potential for ground disturbance would only take place at a limited number of locations within each transmission line. The scope would also include potential natural gas pipeline corridors within which a gas pipeline may need to be constructed and/or upgraded.

TVA has determined that the proposed CT Modernization Project is an undertaking (as defined at 36 CFR § 800.16(y)) with potential to cause effects on historic properties. Pursuant to §800.3(c), we are initiating consultation with your office and the State Historic Preservation Officers of Alabama and Tennessee. We are also initiating consultation with the federally recognized Indian tribes who have expressed an interest in the affected counties.

Based on current information about the project, TVA has determined that the area of potential effects (APE) should include the following areas (Figure 1):

- all areas at CCT and PCT plants where ground disturbance related to the undertaking would take place;
- all areas within proposed natural gas pipeline corridors;
- all areas within the right-of-way (ROW) of the affected transmission lines where ground disturbing activities would take place and/or work resulting in changes to the viewshed (such as tower extensions exceeding 20% of the height of the original tower structure) are proposed;
- any off-ROW access routes that are not surfaced in asphalt, concrete, or gravel; and
- the viewsheds within a one-half mile radius of those proposed activities that have potential for visual effects on above-ground historic properties.

The ground-disturbing portion of the undertaking's APE within the Commonwealth of Kentucky would be located in Muhlenberg and Todd Counties, and would include the following:

- areas affected by ground disturbance at PCT plant and the Paradise Fossil Plant reservation;
- installing one new 500-kV tower structure on the Paradise-Montgomery 500-kV Transmission Line;
- constructing feeds connecting the 500-kV and 69-kV switchyards to the new frame CT units; and
- reconductoring the approximately 52-mile long Paradise-Montgomery 500-kV Transmission Line. TVA may be able to accomplish this reconductoring using methods that do not cause ground disturbance.

TVA has conducted a preliminary desktop review of the area within the proposed limits of disturbance at Paradise Fossil and CT plants. A majority of the area has been included in previous archaeological surveys. Other parts of the project area consists of developed facilities,

Mr. Craig Potts
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such as roads, buildings, and impoundments, which have little or no potential for intact archaeological sites, and some areas are in reclaimed open-pit strip mines. TVA estimates that archaeological survey would be needed for approximately 17 acres of land at Paradise Fossil Plant. TVA has initiated a phase I archaeological survey of this area. TVA does not anticipate the installation of new units to result in potential effects on above-ground properties in the viewshed. However, TVA will continue to assess the undertaking's potential effects as project plans are developed.

Project plans are still being developed. At this time, TVA is unable to completely determine the undertaking's APE. We will consult further with your office to fully determine the APE as project plans are developed.

Considering the scope and complexity of the proposed undertaking, TVA proposes to use a phased process to conduct identification and evaluation efforts, pursuant to 36 CFR Part 800.4(b)(2) and Stipulation III-D-3 of TVA's Section 106 Programmatic Agreement.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally-recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and are eligible for the National Register of Historic Places.

Should you have any questions or comments, please contact Steve Cole at scOLE0@tva.gov.

Sincerely,



Clinton E. Jones
Manager
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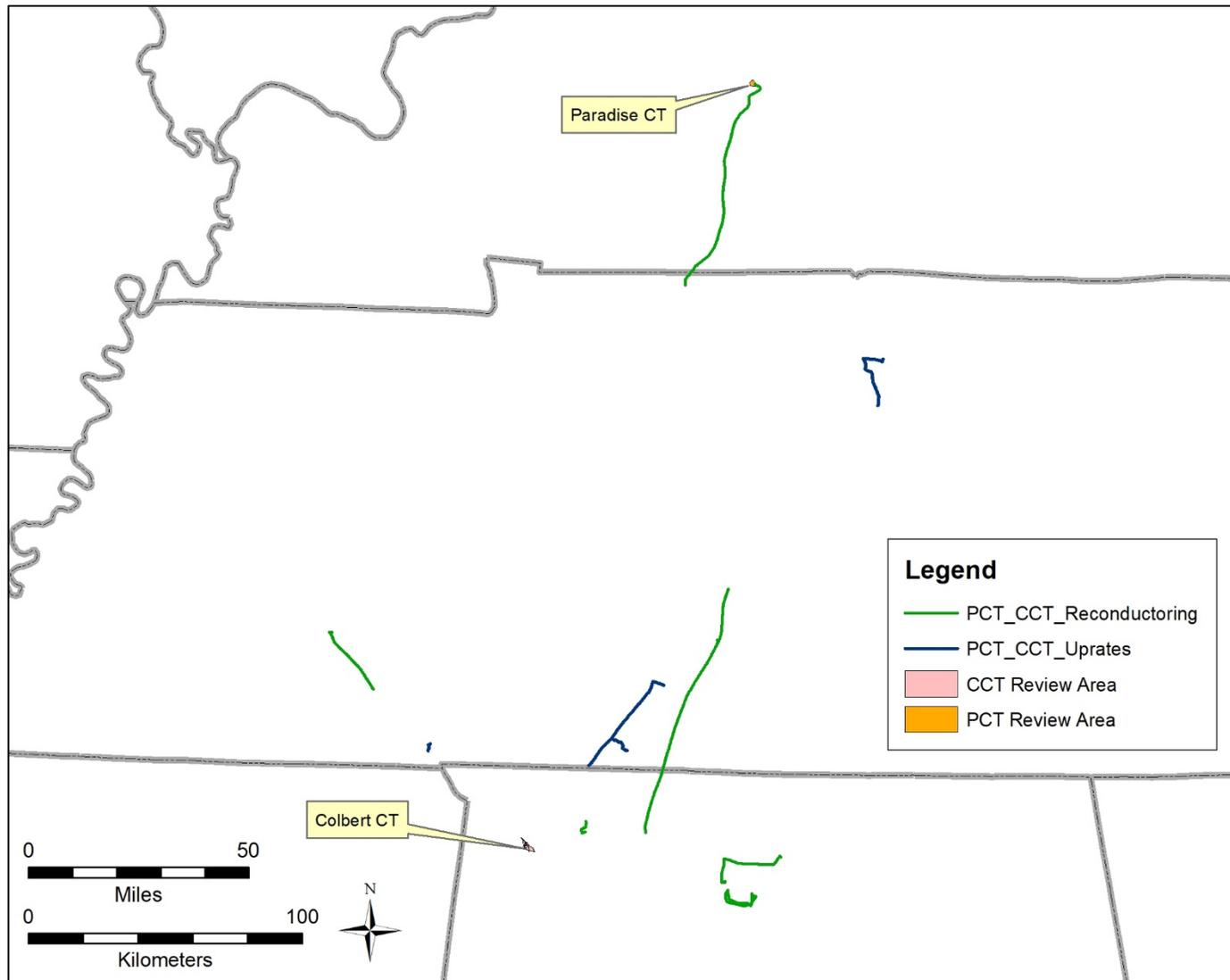


Figure 1. Overview of project APE.



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902

December 8, 2020

Mr. Craig Potts
State Historic Preservation Officer
and Executive Director
Kentucky Heritage Council
300 Washington Street
Frankfort, Kentucky 40601

Dear Mr. Potts:

TENNESSEE VALLEY AUTHORITY (TVA), PARADISE COMBUSTION TURBINE/COLBERT
COMBUSTION TURBINE (PCT/CCT) MODERNIZATION PROJECT, MUHLENBERG AND
TODD COUNTIES, KENTUCKY – PHASE I SURVEY

We initiated consultation with your office in September regarding our Section 106 review of the above-cited multi-state project. Since that time, TVA has made progress in project design, which enabled us to further define the area of potential effects (APE). We have also completed a Phase I Archaeological survey in the project footprint, and have assessed the undertaking's potential for direct and indirect effects on historic properties. In this letter, we describe how we determined the APE, discuss the survey, and present our findings for the portion of the project within Kentucky. We continue to consult with the State Historic Preservation Officers of Tennessee and Alabama concerning the portion of the project in their respective states.

APE

Two main types of activities would be carried out in Kentucky as part of the project: installation of three frame combustion turbine (CT) units at Paradise Combustion Cycle plant (PCC); and transmission line (TL) upgrades on TVA's Paradise-Montgomery 500-kilovolt (kV) TL. In addition to the major equipment systems, the proposed CT facilities would include plant equipment and systems such as natural gas metering and handling systems; instrumentation and control systems; transformers; and administration and warehouse/maintenance buildings. Subsurface piles would be installed to support foundations for plant components, as required. At full buildout, the CT plant would occupy about 4.4 acres on the reservation. Related activities would include the installation of 0.31 miles (1,622 feet) of new gas pipeline, construction of a six-bay 500-kV switchyard, the removal of 0.88 miles (4,641 feet) of retired 69-kV TL, and the use of lay down areas. The new TL would be built with lattice tower structures of varying heights, depending on the terrain and existing obstacles on the reservation. All of these activities would take place either in PCC or within the Paradise Fossil Plant (PAF) reservation. The installation of new units would also result in the introduction of new visual elements, which has the potential for visual effects on any historic architectural properties that may be in view of the new units within one-half mile. Figure 1 shows the area that would be affected by installation of the three new CT units at PCC. We refer to this area as the PAF/PCT Footprint.

The TL upgrade would include reconfiguration/retermination of the existing Paradise – Montgomery 500-kV TL into a new planned 500-kV switching station at PCT. This would require approximately 1.9 miles of new TL (all of which would be within the PAF/PCT Footprint shown in Figure 1). Additionally, new fiber optic line would be installed along 51 miles of the Paradise – Montgomery 500-kV TL (approximately 48 miles of which are in Kentucky, with the remainder in Tennessee; see Figure 2). The new fiber optic line may be installed by helicopter. Designated pull points along the TL corridor would be used to set up reels of fiber optic cable for installation. The pull points would require use of a trailer-mounted cable reel. Therefore, TVA included the access routes for each of the potential pull points (total of 22 non-contiguous access routes). These access routes consist of existing roads surfaced in dirt, gravel, asphalt, or concrete. TVA would make no modifications to any of the roads and would keep vehicles on those roads during travel to and from the work locations. This TL upgrade would not include any new visual elements and therefore does not have potential for visual effects on any above-ground properties that may be in the viewshed.

The new CT units at PCC, construction of the new 500-V switchyard, and the 1.9 miles of new TL (to be built as part of the reconfiguration/retermination of the Paradise-Montgomery 500-kV TL) would introduce new visual elements. Therefore TVA has included the viewshed within one-half mile of these three elements in the APE, to account for visual effects on any above-ground properties that could result directly from the undertaking. Figure 3 shows a half-mile radius surrounding these elements.

In sum, TVA has determined that the portion of the undertaking's APE in Kentucky should include the following areas:

- all areas at PAF and PCC where ground disturbance related to the undertaking would take place ("PAF/PCT Footprint");
- twenty-two access routes for potential on-the-ground work for reconductoring the Paradise-Montgomery TL, along with a fifty-foot radius surrounding each work location (pull point); and
- the viewshed within a one-half mile radius of the locations of the new CT units at PCC, the new switchyard, and the new 1.9-mile long TL.

Previous Archaeological Reviews in the Project Footprint

TVA has conducted six reviews under Section 106 of the National Historic Preservation Act within parts of the APE at PAF and PCT, in connection with various prior undertakings between 2013 and 2017 (Figure 4):

- construction of a baghouse (emissions control structure);
- construction of PCC (referred to in our 10/11/2013 letter as the Paradise Fossil Plant Combined Combustion-Combustion Turbine Plant Project);
- a transmission line feed to the new PCC units;
- barge roll-off area improvements;
- demolition of the Coal Wash Facility; and

- CCR (coal combustion residuals) Management.

All of these reviews began with a desktop review that included examination of historic and current topographic maps, current and historic satellite imagery, reports of previous investigations, TVA's technical reports on the Paradise Steam Plant Project (TVA 1964 and 1979), and historic photographs taken at ground level or from above. Three of the reviews included an archaeological survey, and one included a survey of historic architectural properties. The archaeological surveys involved systematic shovel testing and visual examinations of exposed ground surfaces. No archaeological sites were recorded in the PAF/PCT Footprint as a result of these investigations. In archaeological surveys, shovel testing provided evidence of past ground disturbance that has altered or removed the original soils and sediments. Such ground disturbance results in low (or no) probability for intact archaeological sites.

In addition to these prior reviews, TVA is currently consulting with your office concerning the proposed Paradise Fossil Plant Decommissioning, Decontamination, De-energizing, and Deconstruction (D4) Project. The footprint of that project is within the PAF/PCT Footprint. Based on our review of previous Section 106 reviews, data regarding previous disturbance in the PAF D4 APE, and a recent architectural assessment of PAF (Karpynek and Weaver 2020), we are proposing a finding of no historic properties affected for that project.

Four of the access routes associated with the Paradise-Montgomery TL upgrade intersect the survey area for a natural gas interconnect pipeline (Robinson et al. 2015). Four other access routes intersect a previous archaeological survey for a transmission line project (Wampler 2004). These surveys had identified three previously-recorded sites (15MU83, 15MU84, and 15MU248) in the current project footprint. (Please see the current report, referenced below, for maps showing the locations of these access routes). TRC, who conducted the 2004 survey, recommended site 15MU83 as not eligible and site 15MU84 as unassessed for listing in the NRHP. They recommended that the portion of site 15MU248 within the APE was not eligible.

Areas in the PAF/PCT portion of the APE not included in previous archaeological investigations

Roughly half of the PAF/PCT portion of the affected area was not included within previous archaeological investigations. As we have explained in previous consultation letters (October 11, 2013 [CC-CT Plant], August 20, 2014 [Slag Mountain], February 22, 2017 [CCR Operations], November 19, 2020 [D4]), large portions of this area lack potential for undisturbed archaeological deposits due to ground disturbance from past coal mining. Figure 4 shows areas that were surface mined and sub-surface (auger) mined by the Peabody Coal Company, as well as historical surface mines, both within and outside the APE. A very extensive portion of the PAF reservation, including much of the APE, has been affected by surface mining, which destroyed any archaeological sites that may have been present.

Nearly all areas within the PAF/PCT Footprint that have not been surveyed for archaeology, and were not affected by coal mining, consist of the developed areas of PAF and contain the powerhouse, the cooling water intake, ash storage areas, impoundments, coal pile, conveyors,

various other structures, drives, and parking areas. These features are documented to some extent by engineering drawings and historic photographs, and by current satellite images of the APE, and we have provided some of this documentation in past consultations. Figure 5, for example, shows PAF soon after completion of Units 1 and 2, looking east from what is now the coal pile toward the powerhouse; note the extensive grading and fill placement. Historic photos taken from various viewpoints at PAF, and grading plans drafted for plant construction, document extensive grading, excavation, and fill placement throughout the plant operations areas. Excavation and grading during construction resulted in the destruction of any archaeological sites that may have been present prior to TVA's acquisition of the property.

Archaeological Survey

A small amount of area within the PAF/PCT Footprint has not been included in previous archaeological reviews and is not obviously affected by mining or construction. This portion consists of two tracts totaling approximately 73.5 acres--a 33.5-acre tract east of PCC, and a 40-acre tract east of the former Coal Wash Plant (please see "PCT_survey areas" in Figure 4). TVA contracted with Wood Environment and Infrastructure (Wood) for an archaeological survey of these two tracts and the 22 TL access routes/pull points in order to identify archaeological sites that could be affected by the PCT/CCT Modernization Project. The total survey area encompassed approximately 95.3 acres. A low-resolution version of the report, titled, *Phase I Survey – Phase I Archaeological Survey, Tennessee Valley Authority, PCT/CCT Modernization Project, Muhlenberg and Todd Counties, Kentucky*, is attached. A high-resolution version can be downloaded.

The survey consisted of pedestrian survey and systematic shovel testing. The survey identified no archaeological sites within the PAF/PCT Footprint, but it did identify one cemetery in this area, the McDougal Cemetery. The survey revisited the three previously-recorded sites (15MU83, 15MU84, and 15MU248), and documents that for each of these sites, the portion within the current project footprint has been disturbed by the construction of gravel roads. These gravel roads are private, and were not built by TVA. No cultural material associated with any of the sites was identified. The survey also identified a previously unrecorded site, 15TO89. Wood recommends that the portion of this site within the APE does not demonstrate eligibility for the National Register of Historic Places (NRHP) due to a lack of integrity. We have read this report and agree with the findings and recommendations of the authors.

TVA has no plans for any ground disturbing activities within or adjacent to the McDougal Cemetery. TVA agrees with Wood that the portions of sites 15MU83, 15MU84, and 15MU248 within the project footprint consist of gravel roads lacking in archaeological deposits, and that the portion of site 15TO89 within the project footprint is ineligible for inclusion in the NRHP. Therefore, TVA finds that the Kentucky portion of the project footprint contains no NRHP-eligible or -listed archaeological sites.

Previous Reviews of Historic Architectural Properties in the Viewshed of PCT

TVA has carried out four historic architectural surveys and assessments in connection with past projects. TVA has also completed desktop reviews for historic architectural resources in association with two other past projects on the PAF reservation. One of these reviews was in regards to the then-proposed Paradise Combined Combustion-Combustion Turbine plant (see our October 11, 2013 letter). The half-mile radius for that review was based on a study area that included the current location of PCC plus some additional area. Taken together, the four surveys/assessments and two desktop reviews have included nearly the entire PCT half-mile radius (Table 3, Figure 6). None of the surveys identified any resources that are listed in or eligible for listing in the NRHP within the PAF reservation. Based on the 2013 architectural assessment (Karpyniec and Weaver 2013) TVA determined that PAF is ineligible for inclusion in the NRHP, due to physical changes that have compromised the historic integrity of the plant. Your office agreed with that assessment by letter dated May 8, 2013, but you also recommended that TVA complete a second assessment of PAF in 2020. A 2016 re-assessment of PAF in connection with the CCR Operations Project also found that PAF was ineligible (TVA did not receive a comment from your office). In 2020, we completed a third assessment of PAF and have again determined it is ineligible for inclusion in the NRHP. Our November 19, 2020 letter to your office regarding the PAF D4 project presents the findings of that study.

Neither of the desktop reviews identified any NRHP-listed or –eligible above-ground resources. We consulted with your office regarding our finding of no effect (letters dated October 11, 2013 and February 11, 2015, respectively), and you replied with concurrence in both cases.

The southeastern portion of the half-mile radius was not included in any of TVA's previous reviews of historic architectural properties. Some of the new TL structures would be visible from within some areas in this portion. To identify any potential aboveground historic properties in this area, TVA carried out a desktop review. This review included examinations of current topographic maps (Paradise, Kentucky and Rochester, Kentucky 7.5-minute quadrangles), historic topographic maps (1954 and 1963 editions of the Paradise, Kentucky quadrangle; 1953 edition of the Rochester, Kentucky quadrangle), current satellite imagery, reports of previous investigations, the Kentucky Heritage Council (KHC) Historic Resources online database, and the National Register of Historic Places. The KHC Historic resources online database and National Register of Historic Places show no properties in this part of the APE. TVA did not identify any potential historic structures on the historic maps.

Based on these previous surveys and assessments, our previous consultations with your office, and this desktop review, TVA finds that the PCT/CCT Modernization Project would not affect any aboveground historic properties in Kentucky.

Table 3. Previous historic architectural reviews that overlap portions of the APE

Review type and year	Report Title/Project Name	Consultant
Survey, 2005	<i>Phase I Architectural and Historical Survey for a Proposed Communications Tower at the Paradise Fossil Plant, Muhlenberg County, Kentucky (Comm Tower Project)</i>	TRC
Survey, 2013	<i>Architectural Assessment of the Proposed Improvements to the TVA Paradise Fossil Plant (Baghouse Project)</i>	TVAR
Survey, 2016	<i>Phase I Architectural Survey of a Proposed Dry Ash Landfill and Dewatering Facility at TVA's Paradise Fossil Plant (PAF), Muhlenberg County, Kentucky (CCR Operations Project)</i>	TVAR
Survey, 2020	<i>National Register of Historic Places Assessment of the Tennessee Valley Authority's Paradise Fossil Plant, Muhlenberg County, Kentucky</i>	TRC
Desktop, 2013	Paradise Combined Combustion-Combustion Turbine Plant Project (CC)	N/A
Desktop, 2014	Transmission Line Connection to PCC/PCT (TL Route)	N/A

Removal of 0.88 miles of retired 69-kV TL

The 69-kV TL to be removed consist of steel conductor supported on wood poles. This line was constructed as part of PAF Units 1 and 2 in ca. 1962. The materials and design are the same that were used throughout the TVA Power Service area for TLs carrying power at voltages below 161-kV in the period from the 1940s through the 1980s. TVA finds that this line lacks historic significance and is not eligible for inclusion in the NRHP.

Conclusion

The project footprint contains no NRHP-listed or –eligible archaeological sites and the undertaking's APE contains no NRHP-listed or –eligible historic architectural properties. Therefore, TVA finds that the PCT/CCT Modernization Project would result in no effects on historic properties in Kentucky.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally-recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and are eligible for the NRHP.

Pursuant to 36 CFR Part 800.4(d)(1) we are notifying you of TVA's finding of no historic properties affected, providing the documentation specified in § 800.11(d); and inviting you to

Mr. Craig Potts
Page 7
December 8, 2020

review the finding. Also, we are seeking your agreement with TVA's eligibility determination for 15TO89, and TVA's finding that the undertaking as currently planned will have no effects on historic properties.

Should you have any questions or comments, please contact Steve Cole by email, at sccole0@tva.gov.

Sincerely,



Clinton E. Jones
Manager
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Enclosures

References Cited

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Karpy nec, Ted

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Karpy nec, Ted and Larry McKee

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Karpy nec, Ted and Meghan Weaver

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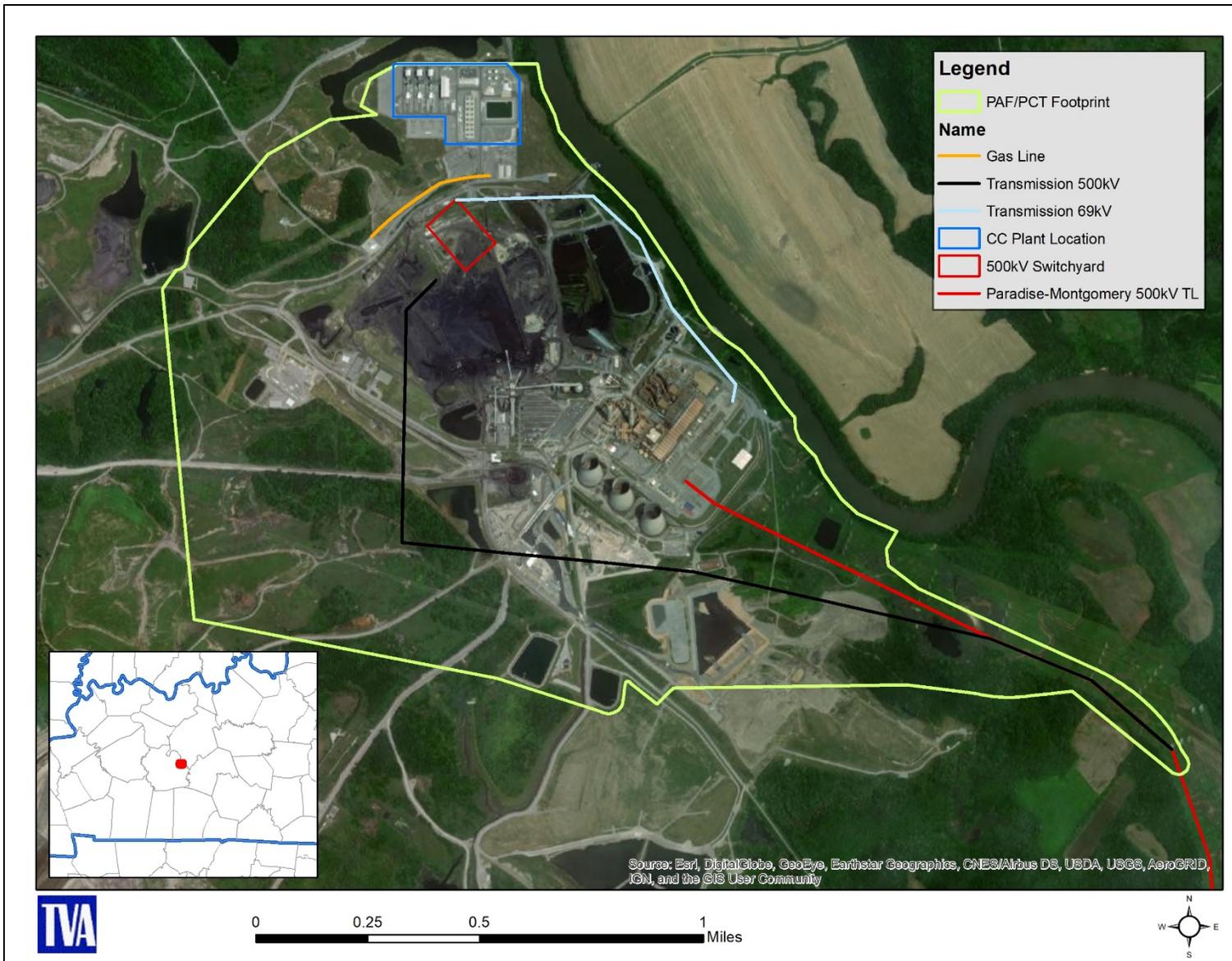


Figure 1. PAF/PCT portion of project footprint. The CC Plant, Paradise-Montgomery 500-kV TL, and 69kV TL are existing. Gas line, 500-kV transmission line, and 500-kV switchyard are proposed.

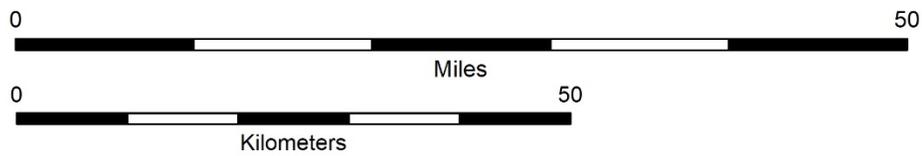
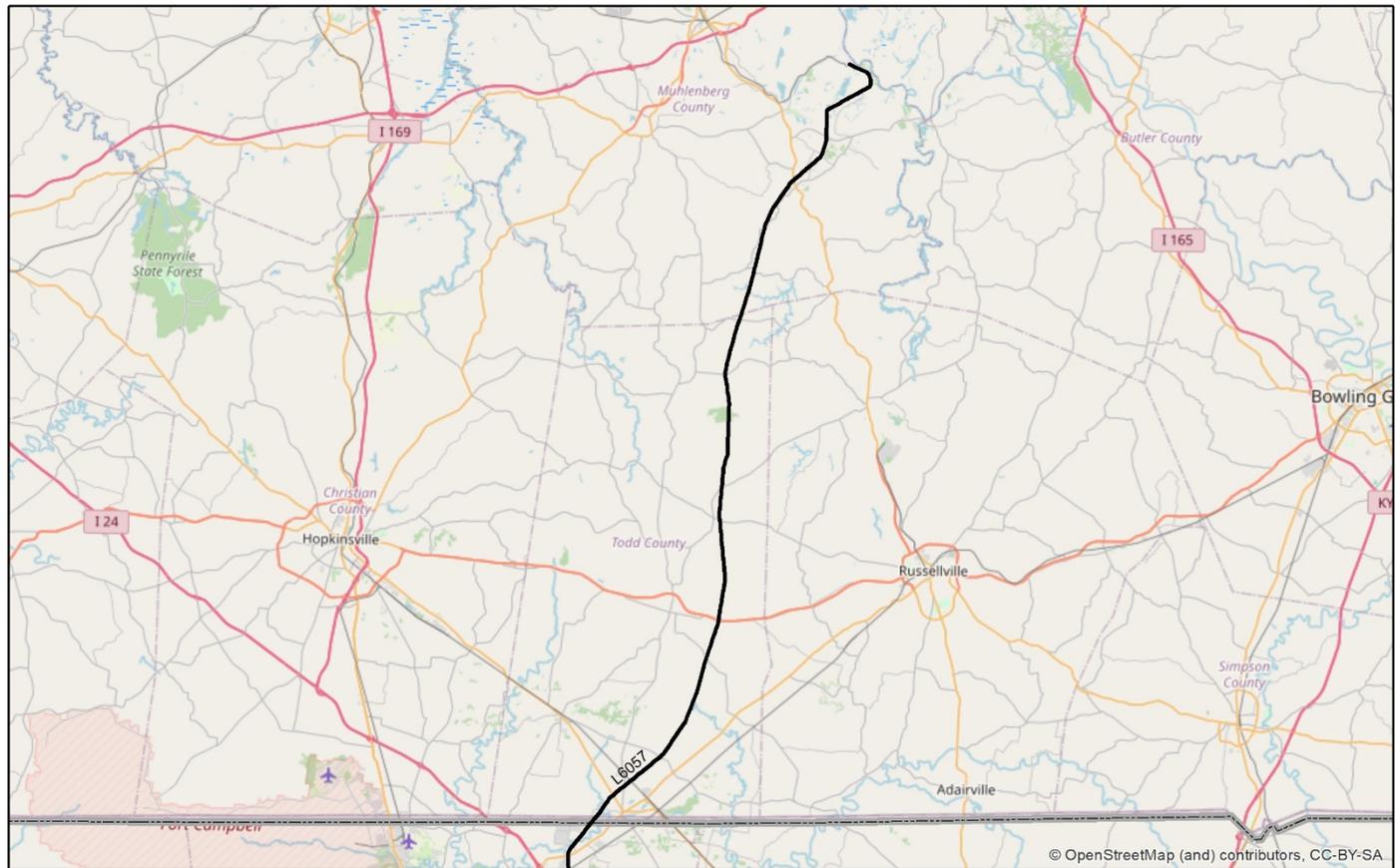


Figure 2. Location of transmission line L6057-02 (Paradise-Montgomery 500-kV TL).

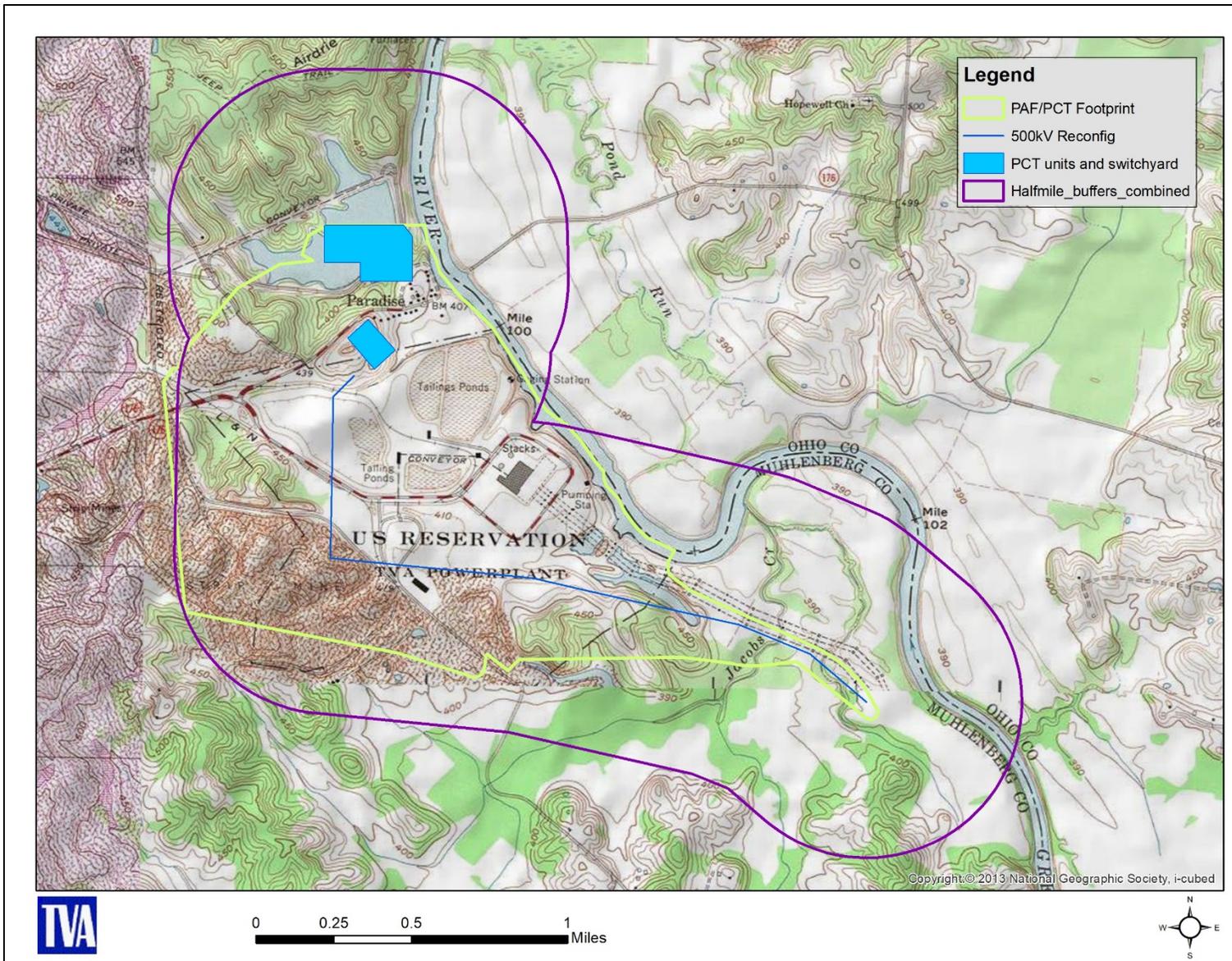


Figure 3. PAF/PCT Footprint and half-mile radius surrounding proposed new construction (new CT units, new 500-kV switchyard, and reconfiguration/retermination of the existing Paradise – Montgomery 500-kV TL).

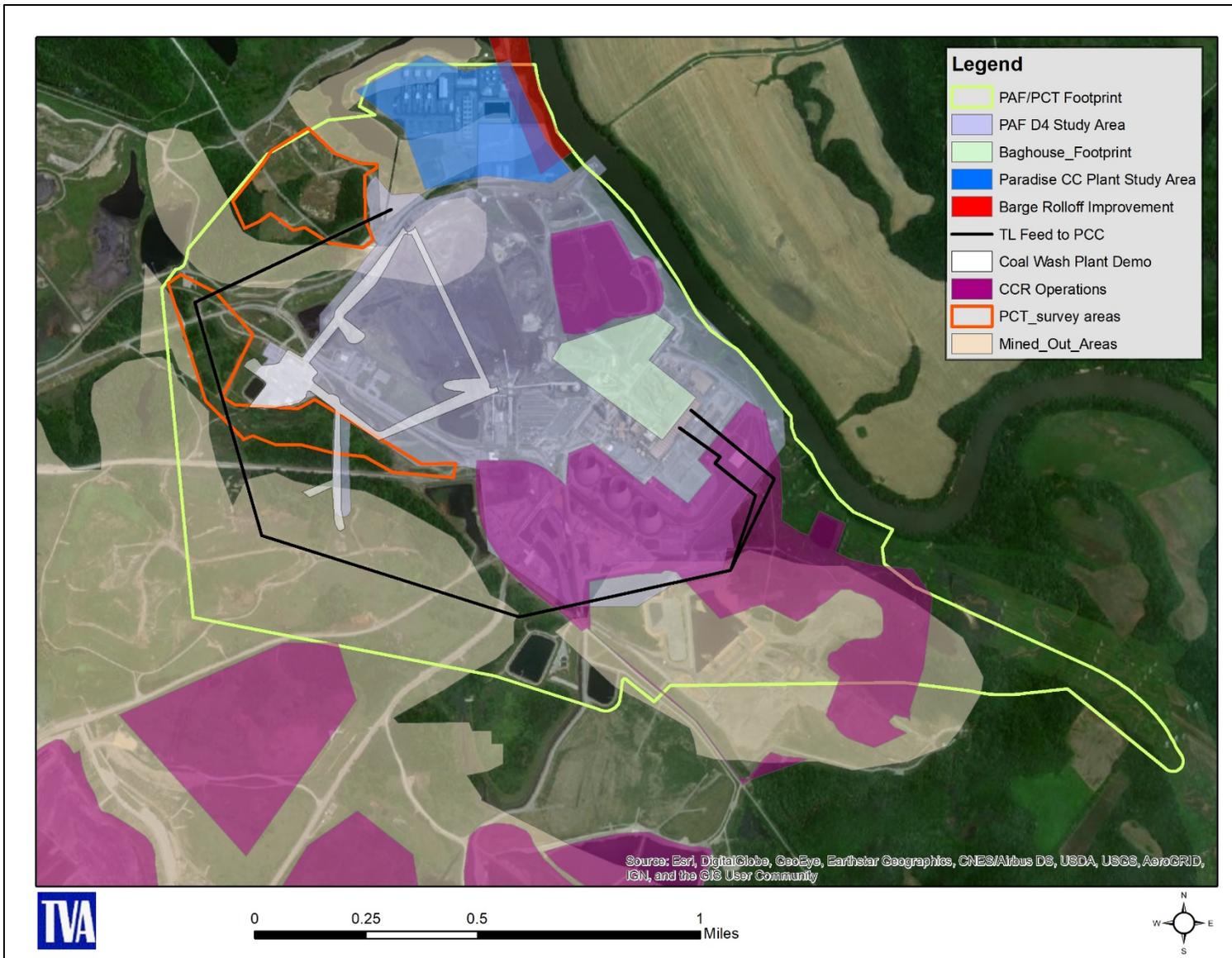


Figure 4. Areas in the PAF/PCT Footprint that have been reviewed previously for archaeological sites, and areas affected by past mining activities.



Figure 5. Photo taken June 1963, looking east from what is now the coal yard toward the powerhouse. The railroad tracks in foreground are no longer extant.

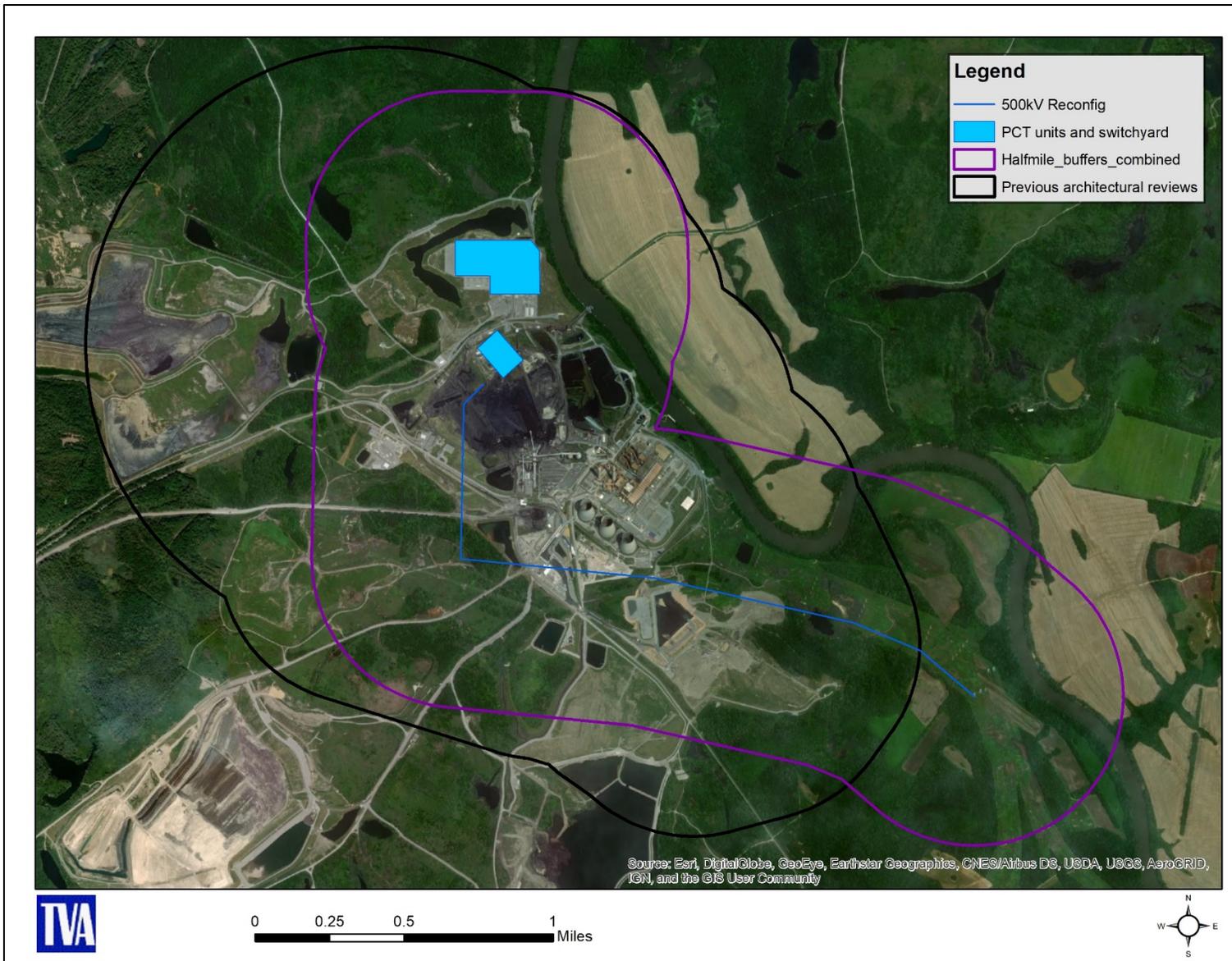


Figure 6. Locations of new construction (CT units, 500-kV Switchyard, and 500-kV TL reconfiguration), with half-mile radius, compared with the combined areas of previous reviews for visual effects.



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902

September 9, 2020

Ms. Lee Anne Wofford
Deputy State Historic Preservation Officer
Alabama Historical Commission
468 South Perry Street
Montgomery, Alabama 36130-0900

Dear Ms. Wofford:

TENNESSEE VALLEY AUTHORITY (TVA), PARADISE COMBUSTION TURBINE (PCT)/COLBERT COMBUSTION TURBINE (CCT) MODERNIZATION PROJECT, COLBERT, LAUDERDALE, LAWRENCE, LIMESTONE, AND MORGAN COUNTIES, ALABAMA; MUHLENBERG AND TODD COUNTIES, KENTUCKY; AND CHESTER, GILES, HARDIN, LAWRENCE, MAURY, MCNAIRY, MONTGOMERY, SUMNER, WAYNE, AND WILSON COUNTIES, TENNESSEE – INITIATION OF CONSULTATION

In 2019, TVA completed a Combustion Turbine (CT) Modernization study to evaluate the condition of TVA's current CT power generation units and evaluate steps needed to ensure a reliable power peaking fleet into the future. Combustion turbines are designed to meet peaks in power demand very quickly. TVA's CT plants run on natural gas as a fuel, and they can be activated on very short notice. Natural gas serves an increasingly important role in TVA's mission to provide clean, reliable energy to the people and businesses of the Tennessee Valley.

The CT Modernization study identified CT units that are over 40 years old and require replacement to ensure electrical reliability in the TVA power grid. These include Units 1-20 at Allen CT plant in Memphis, Tennessee and Units 1-16 at Johnsonville CT plant in New Johnsonville, Tennessee. TVA proposes to retire these outdated CT units and construct new frame CTs to replace the lost capacity. TVA would construct three 250-MW frame CTs at PCT plant in Muhlenberg County, Kentucky and three 250-MW frame CTs at CCT plant in Colbert County, Alabama.

These changes will require updates to the TVA electrical power grid. Thus, as part of this project, TVA also proposes to complete uprates and reconductors of transmission lines in Tennessee, Alabama, and Kentucky. Uprates involve making changes to allow the operation of a transmission line at a higher voltage. These changes could include such activities as replacing and/or modifying existing structures, installing intermediate structures, replacing or modifying conductor to increase ground clearance, adding tower extensions, and replacing structures with new, taller ones. Reconductoring projects involve removing the old conductor (cables that carry the electricity) and pulling new conductor into place. The proposed undertaking would affect segments of ten transmission lines scattered throughout Tennessee, Kentucky and northern Alabama. TVA proposes to uprate approximately 50 miles of

transmission lines in Tennessee, and to reconductor approximately 155 miles of line in all three states. The total length of affected transmission lines is approximately 205 miles. However, not all of the lines would be affected throughout their extent. Activities with potential for ground disturbance would only take place at a limited number of locations within each transmission line. The scope would also include potential natural gas pipeline corridors within which a gas pipeline may need to be constructed and/or upgraded.

TVA has determined that the proposed CT Modernization Project is an undertaking (as defined at 36 CFR § 800.16(y)) with potential to cause effects on historic properties. Pursuant to §800.3(c), we are initiating consultation with your office and the State Historic Preservation Officers of Kentucky and Tennessee. We are also initiating consultation with the federally recognized Indian tribes who have expressed an interest in the affected counties.

Based on current information about the project, TVA has determined that the area of potential effects (APE) should include the following areas (Figure 1):

- all areas at CCT and PCT plants where ground disturbance related to the undertaking would take place;
- all areas within proposed natural gas pipeline corridors;
- all areas within the right-of-way (ROW) of the affected transmission lines where ground disturbing activities would take place and/or work resulting in changes to the viewshed (such as tower extensions exceeding 20% of the height of the original tower structure) are proposed;
- any off-ROW access routes that are not surfaced in asphalt, concrete, or gravel; and
- the viewsheds within a one-half mile radius of those proposed activities that have potential for visual effects on above-ground historic properties.

The ground-disturbing portion of the undertaking's APE within the state of Alabama would include the following:

- areas affected by ground disturbance at Colbert CT plant (and the Colbert Fossil Plant reservation);
- the area just south of the CCT plant associated with potential new natural gas pipeline; and
- areas within the approximately 71 miles of transmission line in Alabama where reconductoring activities with potential for effects on historic properties are proposed, plus any associated unsurfaced access routes.

The APE would include areas within the following Alabama counties: Colbert, Lauderdale, Lawrence, Limestone, and Morgan.

TVA has conducted a preliminary desktop review of the area within the proposed limits of disturbance at CCT plant. A majority of the area has been included in previous archaeological surveys. Other parts of the project area at CCT plant consists of developed facilities, such as

Ms. Lee Anne Wofford
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roads and impoundments, which have little or no potential for intact archaeological sites. TVA estimates that archaeological survey would be needed for approximately 27 acres of land at CCT plant. TVA has initiated a phase I archaeological survey of this area. Given the presence of existing CT units at CCT plant, and given that our offices have previously agreed that Colbert Fossil Plant is ineligible for inclusion in the National Register of Historic Places (NRHP), TVA does not anticipate the installation of new units to result in potential effects on above-ground properties in the viewshed.

Project plans are still being developed. At this time, TVA is unable to completely determine the undertaking's APE. We will consult further with your office to fully determine the APE as project plans are developed.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and are eligible for the NRHP.

Considering the scope and complexity of the proposed undertaking, TVA proposes to use a phased process to conduct identification and evaluation efforts, pursuant to 36 CFR Part 800.4(b)(2) and Stipulation III-D-3 of TVA's Section 106 Programmatic Agreement.

Should you have any questions or comments, please contact Steve Cole at scole0@tva.gov.

Sincerely,



Michaelyn Harle on Behalf of Clinton E. Jones
Manager
Cultural Compliance

SCC:ABM
Enclosures

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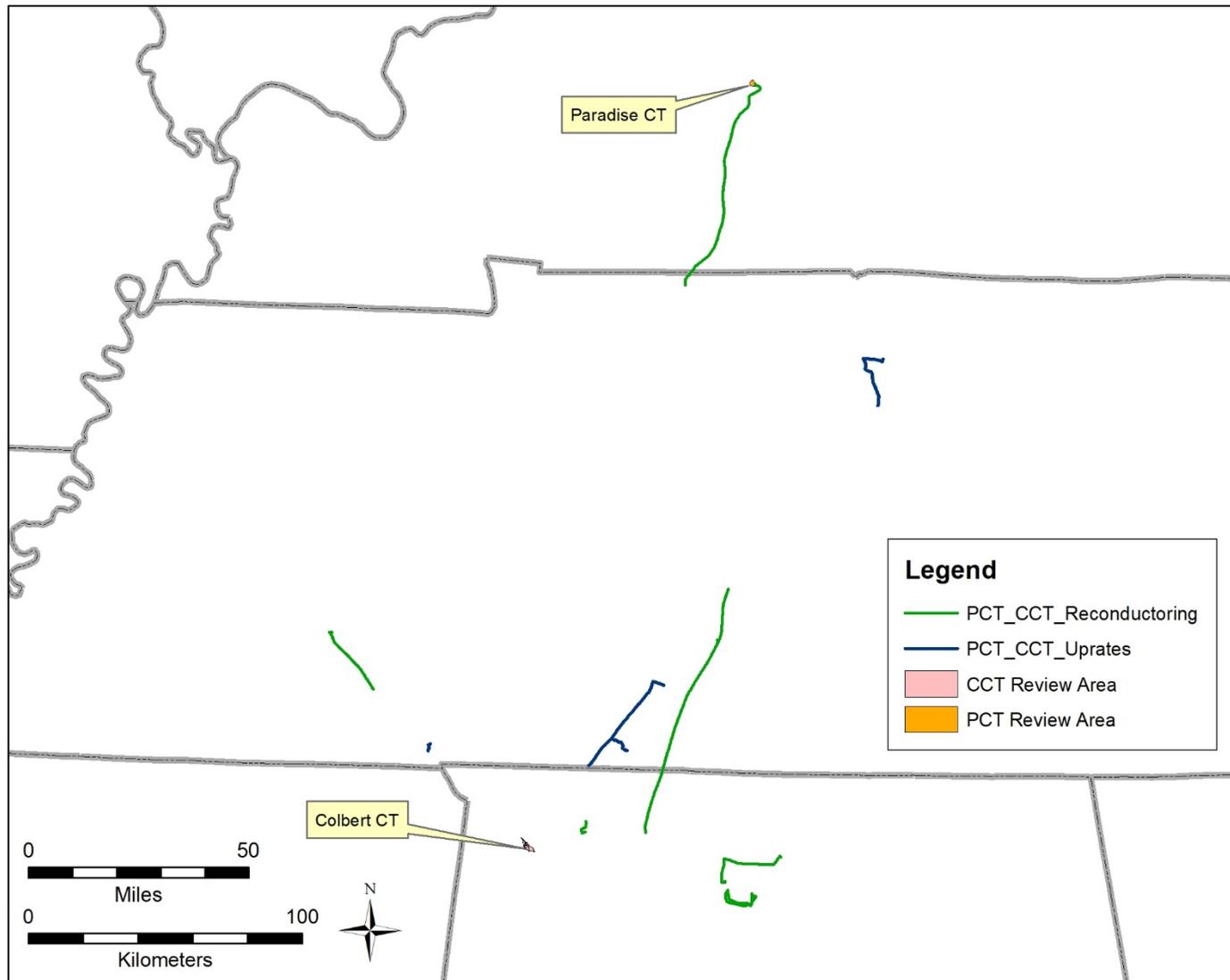


Figure 1. Overview of project APE.



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902

December 8, 2020

Ms. Lee Anne Wofford
Deputy State Historic Preservation Officer
Alabama Historical Commission
468 South Perry Street
Montgomery, Alabama 36130-0900

Dear Ms. Wofford:

TENNESSEE VALLEY AUTHORITY (TVA), PARADISE COMBUSTION TURBINE/COLBERT COMBUSTION TURBINE (PCT/CCT) MODERNIZATION PROJECT, COLBERT, LAUDERDALE, AND MORGAN COUNTIES, ALABAMA – PHASE I SURVEY

We initiated consultation with your office in September regarding our Section 106 review of the above-cited multi-state project. Since that time, TVA has made progress in project design, which enabled us to further define the area of potential effects (APE). Figure 1 shows an updated map of the overall project's APE. We have also completed a Phase I Archaeological survey in the project footprint, and have assessed the undertaking's potential for direct and indirect effects on historic properties. In this letter, we describe how we determined the APE, discuss the survey, and present our findings for the portion of the project within Alabama. We continue to consult with the State Historic Preservation Officers of Tennessee and Kentucky concerning the portion of the project in their respective states.

Project description

Three main types of activities would be carried out in Alabama as part of the project: installation of three frame combustion turbine (CT) units at Colbert Combustion Turbine plant (CCT) (Figure 2); installation of an approximately 0.X mile natural gas supply pipeline (Figure 2); and reconductoring approximately 14.4 miles of transmission line (Figures 3 and 4). Figure 2 shows the boundaries of the area where activities associated with the CT unit and natural gas pipeline installation would take place. We refer to this part of the project area as the CCT Footprint. The CCT Footprint encompasses a total of approximately 65 acres. The reconductoring work would take place in two locations: near Florence and near Decatur, Alabama.

Work associated with the construction of new frame CT units

CCT is on the same reservation as the Colbert Fossil plant in Tuscumbia, Alabama, and went online in 1972. TVA's Colbert Reservation is situated on 1,354 acres on the south shore of Pickwick Lake in city of Tuscumbia in Colbert County, Alabama. The Colbert CT plant has eight frame CT units. The retired coal-fired plant on the reservation is currently undergoing decommissioning.

The three frame CT units would be constructed in a new power block to be built on heavily disturbed lands in the former Colbert Fossil Plant coal yard. In addition to the major equipment

systems, the proposed CT facilities would include plant equipment; natural gas metering and handling systems; instrumentation and control systems; transformers; and administration and warehouse/maintenance buildings. Subsurface piles would be installed to support foundations for plant components, as required. At full buildout, the CT plant would occupy about 4.4 acres on the reservation.

In order to provide power to the CT plant, TVA would construct a new, 0.42-mile long, 161-kilovolt (kV) TL from the existing switchyard to the new CT plant. The new TL would be built to the north of the proposed CT units and would likely be constructed with double and single steel-pole structures of varying heights, depending on the terrain and existing obstacles on the reservation. The new TL structures would either be erected on concrete foundations or direct buried with spoil or gravel backfill. Some TL structures would likely require steel guy wires secured to buried anchors (e.g., wood logs or reinforced concrete). The TLs, CTs and supporting components would all be within the Colbert Reservation (formerly known as the Colbert Fossil Plant reservation).

Construction would also require minor improvements to an existing rail spur, and use of several laydown/staging areas and a temporary use area. These activities would be limited to the existing Colbert Reservation.

Work associated with installation of a natural gas supply pipeline

In order to provide the additional natural gas supply to the new CT units, a new lateral tie into the main distribution pipeline would be constructed just south of the intersection of Steam Plant Road and US Highway 72. Easements with landowners south of Highway 72 and with TVA for land on the reservation would be amended to reflect the proposed pipeline installation. The proposed pipeline and station upgrades would be constructed and operated by a commercial supplier. Gas to fuel the new CT units would be provided by a new 20-inch underground pipeline. This pipeline would run parallel to an existing 10-inch lateral natural gas pipeline on the Colbert Reservation. The new pipeline facilities would also require upgrades to the existing onsite natural gas delivery station to include replacement of metering and pressure/flow regulating equipment as well as additional piping and valves.

Transmission line reconductor work

Since initiating consultation, TVA has made changes to the planned TL upgrade work. Figures 3 and 4 show overviews of this work within the state of Alabama. The work would consist of reconductors of two line segments totaling approximately 4.2 miles in the Florence vicinity (Figure 3), and one line segment totaling 10.2 miles in the Decatur vicinity (Figure 4). Reconductoring projects involve removing the old conductor (cables that carry the electricity) and pulling new conductor into place. One 72-foot tall tower structure on L5670, near Florence, would receive a 10-foot extension. Designated pull points along the TL corridor would be used to set up cable reels of conductor for installation. The pull points would require use of a trailer-mounted cable reel. Therefore, TVA included the access routes for each of the potential pull points (total of 49 non-contiguous access routes). These access routes consist of existing roads surfaced in dirt, gravel, or pavement. TVA would make no modifications to any of the roads and would keep vehicles on those roads during travel to and from the work locations. The

TL reconductoring would not include any new visual elements and therefore does not have potential for visual effects on any above-ground properties that may be in the viewshed.

APE

New construction in the CCT Footprint (installation of CT units, laying new gas pipeline, and building the 0.4-mile 161-kV TL) would result in ground disturbance. TVA has included the entire 65-acre CCT Footprint in the APE in order to fully capture any and all project activities that could take place on the Colbert Reservation. Setting up cable reels and replacing TL structures, also could result in ground disturbance and TVA has included a fifty-foot radius around each of these areas in the APE as well, along with the associated access routes, Project elements with potential for visual effects would be limited to the new CT units and new TL feed. TVA has included a half-mile radius surrounding these proposed features to account for the undertaking’s potential visual effects (Figure 5).

Previous Archaeological Surveys in the Project Footprint

CCT Footprint

TVA has conducted several reviews under Section 106 of the National Historic Preservation Act within parts of the CCT Footprint in connection with various prior undertakings (Figure 6). Some of these reviews (e.g., Hubbert 1981, Lafferty 1978, Webb and DeJarnette 1942) were completed prior to the development of standard survey guidelines and TVA’s current practice of systematically surveying projects as part of our Section 106 reviews. The reports for those reviews lack the level of detail needed to satisfy documentation standards of 36 CFR Part 800.11. Therefore, for this project, we relied solely on the more recent surveys, for which sufficient detail is given and survey methods were consistent with current guidelines.

Ten archaeological surveys meeting the above conditions have included nearly 100% of the surveyable land in the CCT Footprint. Table 1 lists the project titles and survey years; Figure 6 shows the previously-surveyed areas.

Table 1. Previous archaeological surveys that overlap portions of the CCT Footprint.

Year	Author(s)	Report Title	Consultant
1993	Shaw, S.	<i>A Cultural Resources Assessment of the Proposed Colbert Coproduction Site at the Colbert Reservation Near Pride, Colbert County, Alabama</i>	University of AL
1995	Goldman-Finn, Nurit S.	<i>Archaeological Survey in the Middle Tennessee River Uplands, Colbert and Lauderdale Counties, Alabama</i>	University of AL
2001	Pearce, K. and H. Johnson	<i>Phase I Cultural-Resource Survey of the Proposed Bamagas Pipeline through Colbert, Lawrence, and Morgan Counties, Alabama</i>	Panamerican

Year	Author(s)	Report Title	Consultant
2002	Wild, M. J. and J. Holland	<i>Archaeological Survey of An Approximately 6-Acre Tract, As Part of a Project to Install Ammonia Removal Equipment at Colbert Fossil Plant in Colbert County, Alabama</i>	TRC
2003	D'Angelo, J. and T. Cleveland	<i>Cultural Resource Survey of Approximately 150 Acres Proposed for a Borrow Pit and Other New Facilities at Colbert Fossil Plant in Colbert County, Alabama</i>	TRC
2004	D'Angelo, J.	<i>An Archaeological Survey of Three Tracts Totalling Approximately 200 Acres for the Colbert Steam Plant Scrubber Project, Colbert County, Alabama</i>	TRC
2010	Tucker-Laird, E.K. and J.L. Holland	<i>Archaeological Survey of Two Tracts Totalling Approximately 216.2 Acres for Geophysical Survey at the Colbert Fossil Plant, Colbert County, Alabama</i>	TRC
2015	Manning, K.M., H.. Rosenwinkel, T. Rael, and J. le Roux	<i>A Phase I Archaeological Survey of Tennessee Valley Authority's Electrical Resistivity Imaging Project at the Colbert Fossil Plant Reservation in Colbert County, Alabama</i>	TVAR
2015	De Gregory, R. and H. Rosenwinkel	<i>A Phase I Archaeological Survey of Tennessee Valley Authority's Bottom Ash Pond No. 4 Seismic Remediation Project #417259 at Colbert Steam Plant in Colbert County, Alabama</i>	TVAR
2016	Rosenwinkel, H. T. Karpynec, M. Weaver, K. Wright, E. Crook, K. Manning, and C. Medeiros	<i>A Phase I Archaeological Survey of Tennessee Valley Authority's Colbert Fossil Plant Decommissioning in Colbert County, Alabama</i>	TVAR

Transmission Line Reconductors

Table 2 lists previous archaeological surveys within, or intersecting, the transmission line reconductor portion of the project footprint. These surveys account for a relatively minor portion of the APE. These surveys identified six archaeological sites in the current project footprint: 1MG778, 1MG1038, 1LU639, 1CT332, 1CT333, and 1CT334.

Table 2. Previous archaeological surveys in the transmission line reconductor portion of APE

Survey year	Author(s)	Report Title/Project Name	Consultant
1994	Shaw, S.	<i>A Cultural Resources Assessment of the Tennessee Valley Authority's Muscle Shoals Reservation, Colbert and Lauderdale Counties, Alabama</i>	University of AL
1998	Rooney	<i>A Cultural Resources Survey of a Proposed Transmission Line in Decatur, Morgan County, Alabama</i>	
2002	Stanyard, W.F., L.M. Pietak, and J.L. Holland	<i>Phase I Archaeological Investigations along the Calpine-Solutia Transmission Line, Morgan County, Alabama</i>	TRC

Areas in the Project Footprint Not Included In Previous Archaeological Investigations

Four small areas within the CCT Footprint have not been included in any previous archaeological surveys. One of these is a thin sliver of land in the southern portion of the CCT Footprint within the right-of-ways of Highway 72 and a railroad. Given the prior disturbance from road and railroad construction, TVA considers the potential for archaeological sites in this area to be very low. Three other tracts in the CCT Footprint totaling 27.3 acres have not been included in any previous archaeological surveys and appear to have some potential for the presence of archaeological sites. The majority of land affected by the TL reconductor work has not been included in previous archaeological surveys.

After completing the archaeological survey described below, TVA modified the CCT Footprint portion of the APE slightly. This resulted in some previously unsurveyed land being omitted from the survey. This can be seen in Figures 6 and 7 by comparing the CCT Survey Area with the CCT Footprint. However, TVA is not planning any physical work in the area that was not surveyed. Should plans change, resulting in proposed ground disturbance in that area, we will consult further with your office.

Previously-Recorded Archaeological Sites in the Project Footprint

Background research revealed that 15 previously-recorded archaeological sites are located within the CCT Footprint, and six previously-recorded sites are located in parts of the TL corridors that would be affected by potentially ground-disturbing work. Table 3 lists these sites and gives their current National Register of Historic Places (NRHP) status according to data maintained by the Alabama Office of Archaeological Research and/or recent investigations.

Table 3. Previously-recorded archaeological sites in the Project Footprint, with current NRHP status based on OAR listing and/or previous investigations.

Site number	NRHP status	Location
1CT16	Non-extant	CCT Footprint
1CT20	Undetermined	CCT Footprint
1CT21	Undetermined	CCT Footprint

Site number	NRHP status	Location
1CT22	Undetermined	CCT Footprint
1CT75	Undetermined	CCT Footprint
1CT77	Non-extant	CCT Footprint
1CT78	Undetermined	CCT Footprint
1CT113	Undetermined	CCT Footprint
1CT116	Undetermined	CCT Footprint
1CT437	Undetermined	CCT Footprint
1CT625	Potentially-eligible	CCT Footprint
1CT626	Ineligible	CCT Footprint
1CT630	Potentially-eligible	CCT Footprint
1CT631	Potentially-eligible	CCT Footprint
1CT632	Ineligible	CCT Footprint
1MG778	Eligible	Transmission line corridor
1MG1038	Ineligible	Transmission line corridor
1LU639	Undetermined	Transmission line corridor
1CT332	Undetermined	Transmission line corridor
1CT333	Undetermined	Transmission line corridor
1CT334	Undetermined	Transmission line corridor

Archaeological Survey

TVA contracted with Wood Environment and Infrastructure (Wood) for an archaeological survey of previously unsurveyed land in the project footprint (CCT Footprint and footprint of the TL reconductor work) in order to identify archaeological sites that could be affected by the undertaking. The total survey area encompassed approximately 27.3 acres of land in the CCT Footprint (shown in Figures 6 and 7), and access routes and a 50-foot radius surrounding each proposed work structure in the TLs to be affected by the reconductor work (please see figures in the accompanying report showing these survey areas). A reduced-resolution version of the report, titled, *Phase I Survey – Phase I Archaeological Survey, Tennessee Valley Authority, PCT/CCT Modernization Project, Colbert, Lauderdale, and Morgan Counties, Alabama*, is attached. A high-resolution version can be downloaded.

The survey consisted of pedestrian survey and systematic shovel testing. The survey revisited the locations of seven previously-recorded archaeological sites in the survey area—one in the CCT Footprint (1CT437) and six in the TL portion of the project footprint (1MG778, 1MG1038, 1LU639, 1CT332, 1CT333, and 1CT334). The latter six sites were not relocated, and it appears that the portions of these sites within the APE are no longer extant. One previously-recorded site located in the survey area within the CCT Footprint (1CT437) was relocated. Wood recommends that this late historic site is ineligible for the NRHP, and that no further work on the site should be necessary. The survey did not identify any previously-unrecorded archaeological sites. The remaining previously-recorded sites have been addressed by the surveys listed in Table 1.

Two of the affected TLs intersect known terrestrial routes of the Trail of Tears/Removal Route (TOT/RR). L5670-01 intersects a known TOT/RR in Morgan County, Alabama (Figure 8). The TOT/RR at this location aligns with a railroad; use of two access routes would be within a 500-foot radius of the route. Shovel testing along the access routes and at work structures 117 and 118 indicated disturbed soils and yielded no cultural material. L5676-01 intersects a portion of the TOT/RR in Lauderdale County, Alabama (Figure 9). Here, the only portion of the APE within 500 feet of the TOT/RR is a small section of an access route that follows a dirt road to a substation. Shovel test here and elsewhere in the vicinity indicated disturbed soils and yielded no artifacts. Given the disturbed nature of the soils at these two locations, TVA did not pursue further testing within the TOT/RR radius.

Assessment of Effects on Archaeological Sites

Most of the 13 extant sites in the CCT Footprint are located outside areas where planned activities would occur related to the undertaking (Figure 7). Of these sites, the OAR database lists the status of 10 as unassessed/undetermined or potentially eligible. Based on Wood's survey, we have determined that site 1CT437 should be considered ineligible. TVAR's survey for the Decommissioning Project indicated that two sites (1CT16 and 1CT77) are non-extant. Sites 1CT20, 1CT21, 1CT22, 1CT75, and 1CT113 (all potentially-eligible cave and rockshelter sites) are located on the bluff north of the former coal pile (now reclaimed), on the northern edge of the CCT Footprint. TVA plans no activities in this area; the undertaking will not affect any of these sites. Site 1CT78 (undetermined) is located adjacent to, but almost entirely outside of, a proposed laydown/staging area. Rosenwinkel et al. (2016) were unable to access site 1CT78 due to the presence of contaminated soils. For that same reason, TVA would not use the area where site 1CT78 is located, and therefore the undertaking will not affect that site. Site 1CT116 is also located outside of a planned laydown/staging area, on the bluff overlooking the Tennessee River (Figure 10 shows a close-up of the area containing sites 1CT78 and 1CT116). Sites 1CT630 and 1CT631 (both potentially eligible) are located in land along the left descending bank of Cane Creek; TVA has planned no activities in this area. This area was included in the project footprint early in the stages of project scoping, but as design developed, TVA has not seen any need to use this part of the footprint for any project activities. Site 1CT625 (potentially-eligible) is located on the right descending bank of Cane Creek adjacent to the railroad paralleling Highway 72. A gravel road passes through the site. TVA may use the gravel road during construction, but has no plans to make any improvements to the road. Therefore, based on current project design, the undertaking would not affect potentially eligible/undetermined sites 1CT20, 1CT21, 1CT22, 1CT75, 1CT78, 1CT113, 1CT116, 1CT630, 1CT631, or 1CT625.

Historic Architectural Properties in the Viewshed of CCT

TVA has carried out one historic architectural survey of an area surrounding the COF powerblock, in connection with a proposed dry ash storage facility (Tucker-Laird and Holland 2010). The survey area was based on two proposed dry ash storage areas located west and south of the powerblock. Figure 11 shows a comparison of that study area with the half-mile radius surrounding the proposed CT units and proposed 161-kV TL. Most of the latter area was

contained within the previously-surveyed area, save a portion along the river bluff that contains the decommissioned COF units, the COF waterfront facility, and some of the former coal yard.

The 2010 survey, performed by TRC, identified fifteen properties, and recommended that COF, the Old Lee Highway, and the Memphis and Charleston Railroad, were potentially eligible for inclusion in the NRHP. All of these resources except COF are located outside the APE. Despite TRC's recommendation that COF was potentially eligible, our offices agreed in consultation that COF was ineligible. We reiterated that consultation consensus in our 2016 consultation regarding the COF Decommissioning Project.

Two of the TLs that would be reconducted meet the minimum age criterion for consideration as potential historic properties: L5670-01, constructed in 1936, and L5676-01, constructed in 1924. (L5676-02 was built in 2001). Thirty-four (62%) of the original structures in L5670-01 are extant; the remainder were replaced with a modern type of structure between 1952 and 1970. TVA is currently developing a context for TVA's historic transmission system. Although we have not yet consulted with your office on this context, based on the research we have completed in developing the context, TVA will propose that replacement of 20 percent or more of the original structures compromises the integrity of design, materials, and feeling of historic transmission lines. Based on this threshold, L5670-01 is ineligible for the NRHP. As mentioned above, the only proposed modification to any of the structures in L5670-01 is the addition of a 10-foot extension to one structure (Structure 134, which is one of the original A-frame structures). L5676-01 consists of seven structures, of which five date to 1924 and are associated with Wilson Hydroelectric Project (listed in the NRHP). No modifications would be made to any of those structures. Therefore, TVA finds that the proposed transmission line work would not result in effects on any NRHP-listed or –eligible transmission lines.

Conclusion

The project footprint contains 10 archaeological sites that are potentially eligible for inclusion in the NRHP, or of undetermined/unassessed eligibility. All of these sites are located in areas where TVA plans no project-related activities. One site, 1CT437, which previously had an undetermined eligibility status, is herein recommended to be not eligible. No NRHP-listed or –eligible above-ground properties are located in the viewshed of activities that could have visual effects. While the undertaking would result in a physical change (tower extension) to one transmission structure in TL L5670-01 (built 1936), TVA recommends that this TL, while meeting the minimum age threshold for eligibility, lacks integrity and is not eligible for the NRHP. Therefore, TVA finds that the PCT/CCT Modernization Project, which includes work associated with (i) installation of CT Units, (ii) a new natural gas supply pipeline, and (iii) transmission line reconductor efforts, would result in a finding of no effects on historic properties in Alabama for each of these three components and, as a result, the Modernization Project in its entirety.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally-recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and are eligible for the NRHP.

Ms. Lee Anne Wofford
Page 9
December 8, 2020

Pursuant to 36 CFR Part 800.4(d)(1) we are notifying you of TVA's finding of no historic properties affected, providing the documentation specified in § 800.11(d); and inviting you to review the finding. Also, we are seeking your agreement with TVA's eligibility determinations and finding that the undertaking as currently planned will have no effects on historic properties.

Should you have any questions or comments, please contact Steve Cole by email at sccole0@tva.gov.

Sincerely,



Clinton E. Jones
Manager
Cultural Compliance

SCC:ABM
Enclosures

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INTERNAL COPIES ONLY, NOT TO BE INCLUDED WITH OUTGOING LETTER:

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Michael C. Easley, BR 2C-C
Bennie J. Foshee, Jr., LP 5D-C
Susan R. Jacks, WT 11C-K
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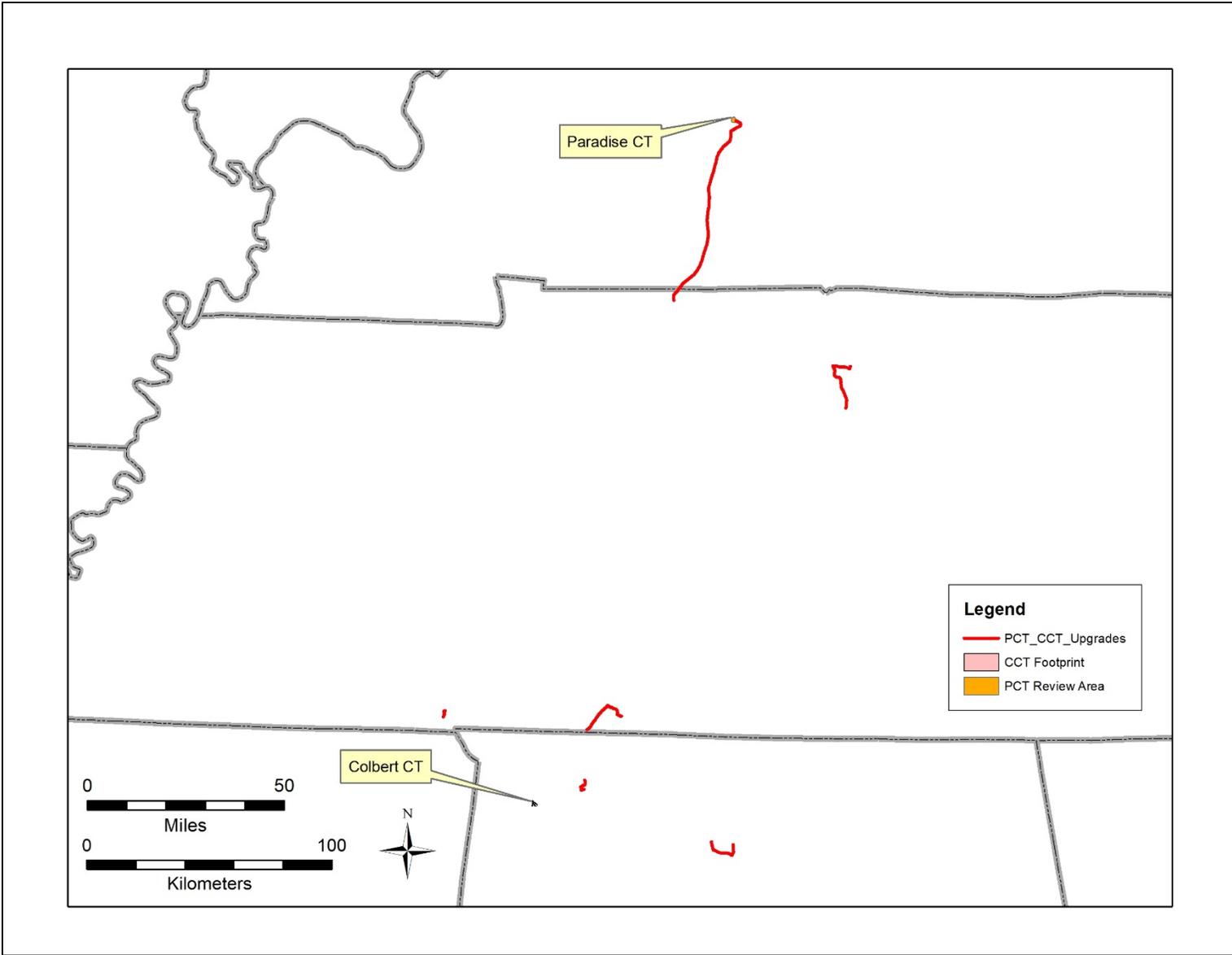


Figure 1. Updated map of overall project APE.

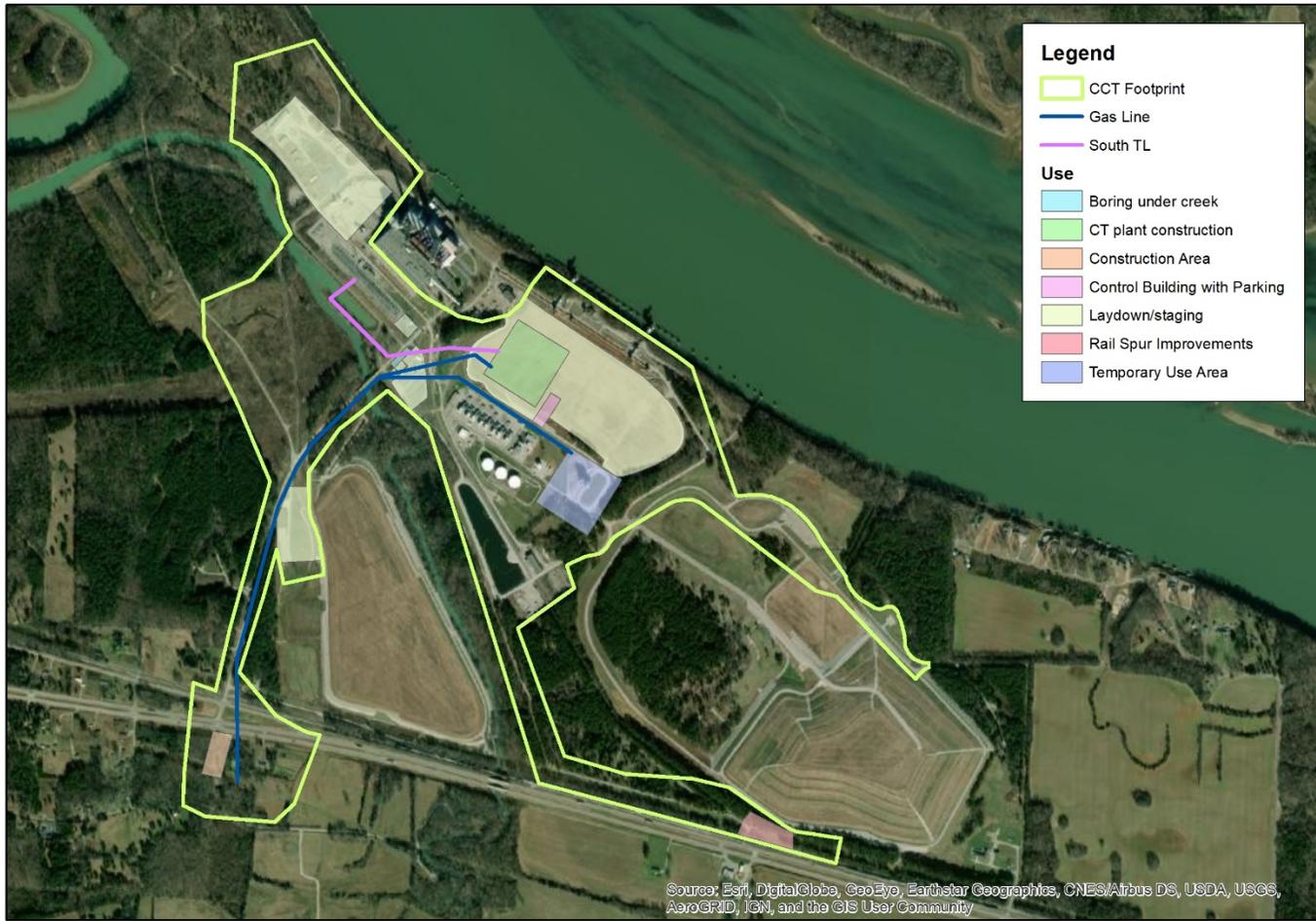


Figure 2. Proposed construction activities in the CCT Footprint.

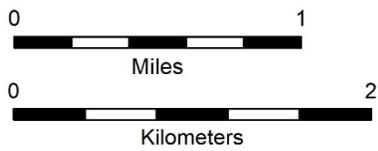
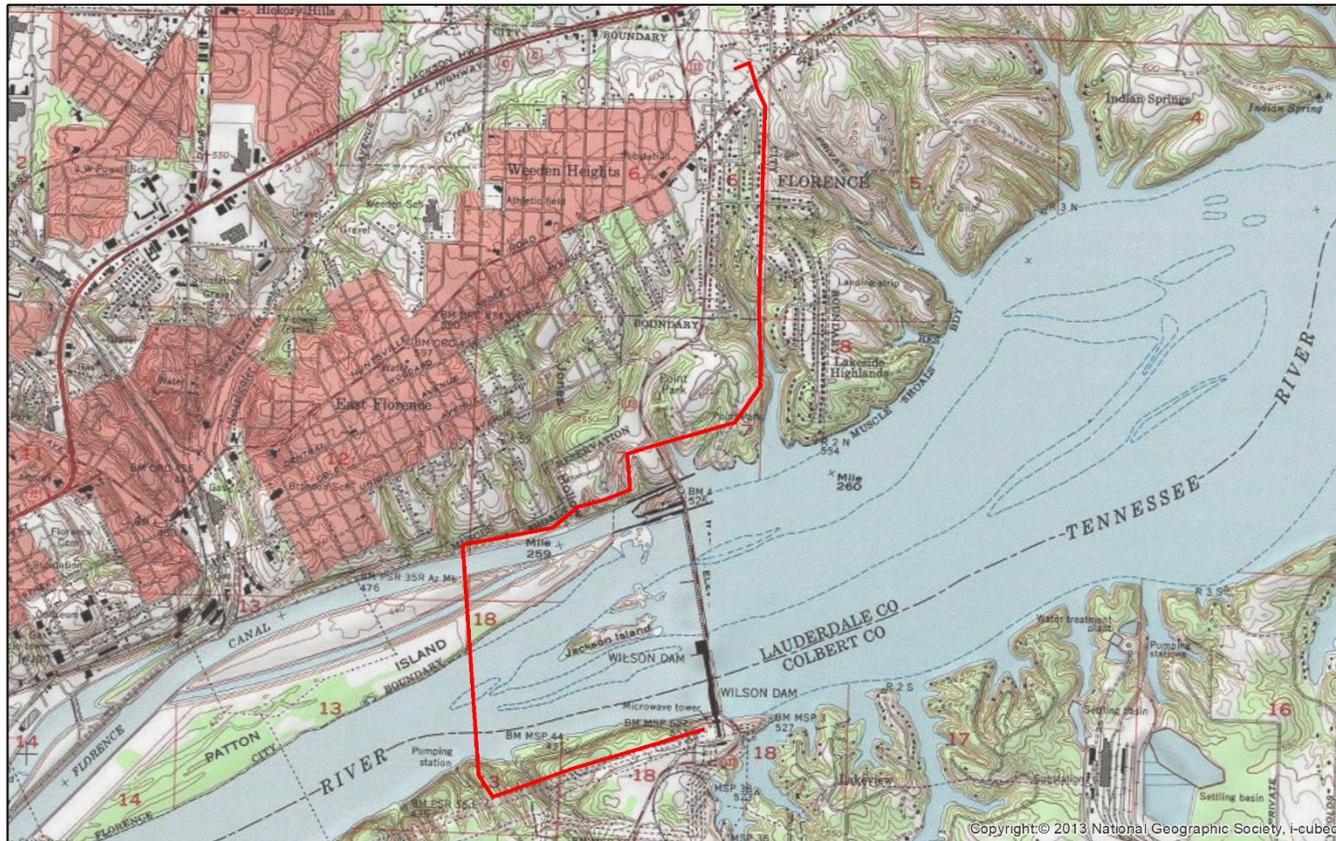


Figure 3. Transmission line segments that would be reconducted in the Florence, Alabama vicinity (L5676, segments 1 and 2).

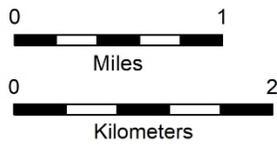
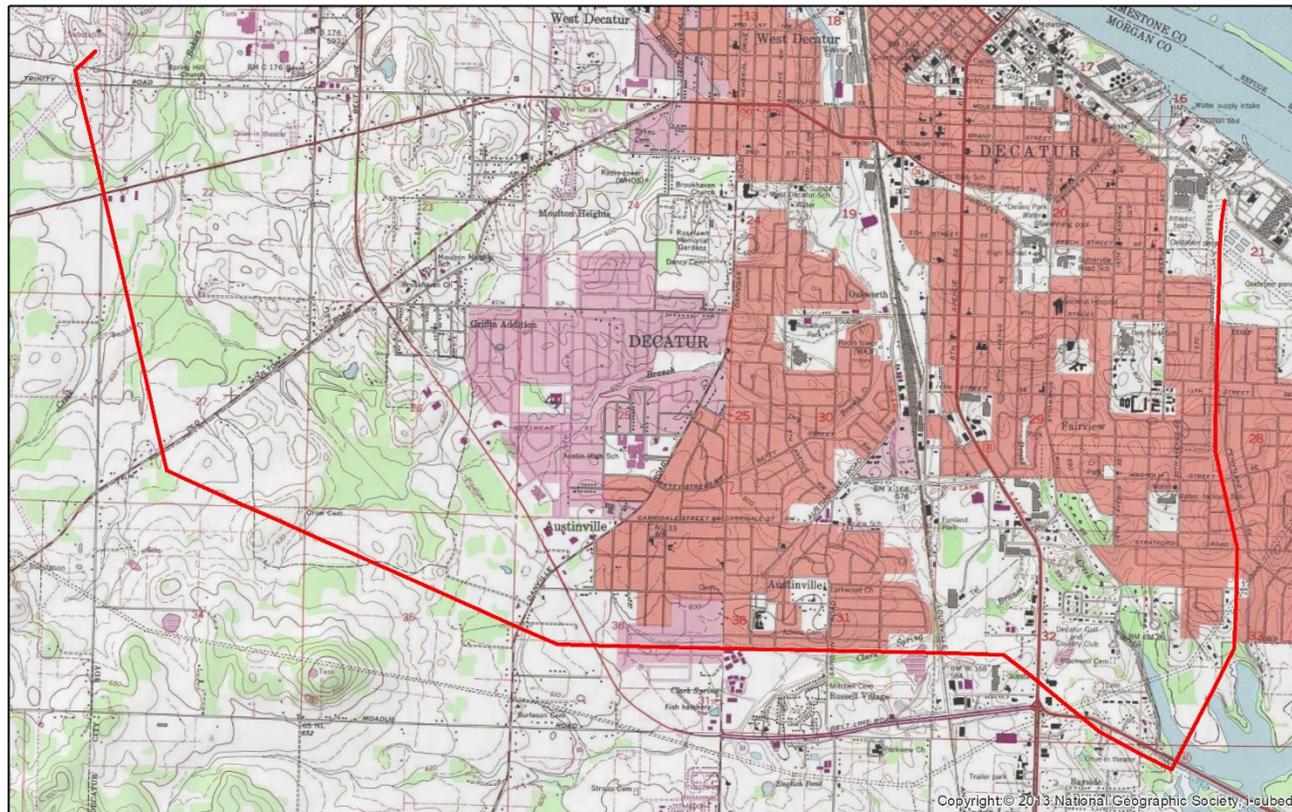


Figure 4. Transmission line that would be reconducted in the Decatur, Alabama vicinity (L5670, segment 01).



Figure 5. Locations of new construction (CT units and 161-kV transmission line), with half-mile radius.

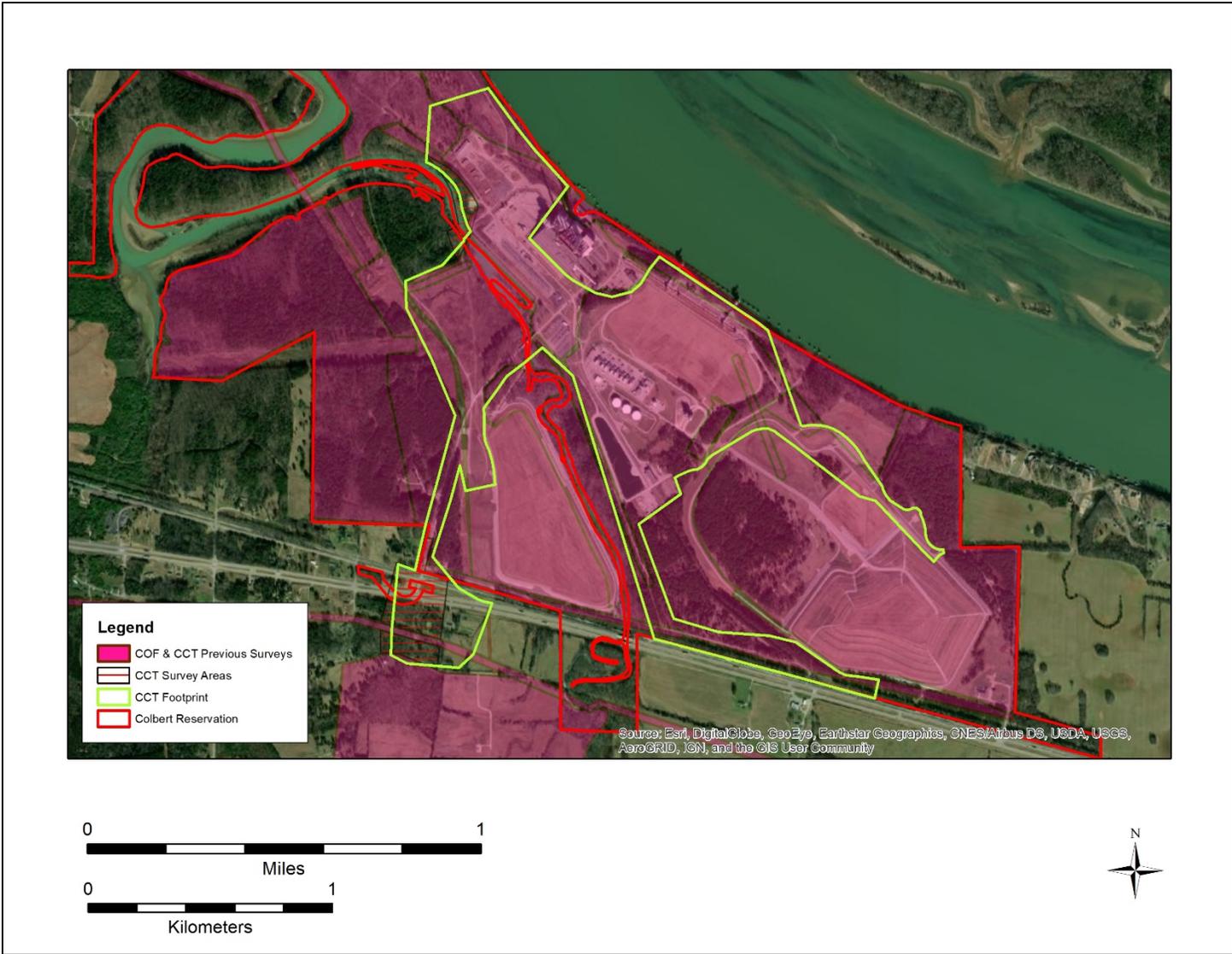


Figure 6. Coverage by Previous Archaeological surveys in the Colbert Reservation, and areas included in the current archaeological survey ("CCT Survey Area").

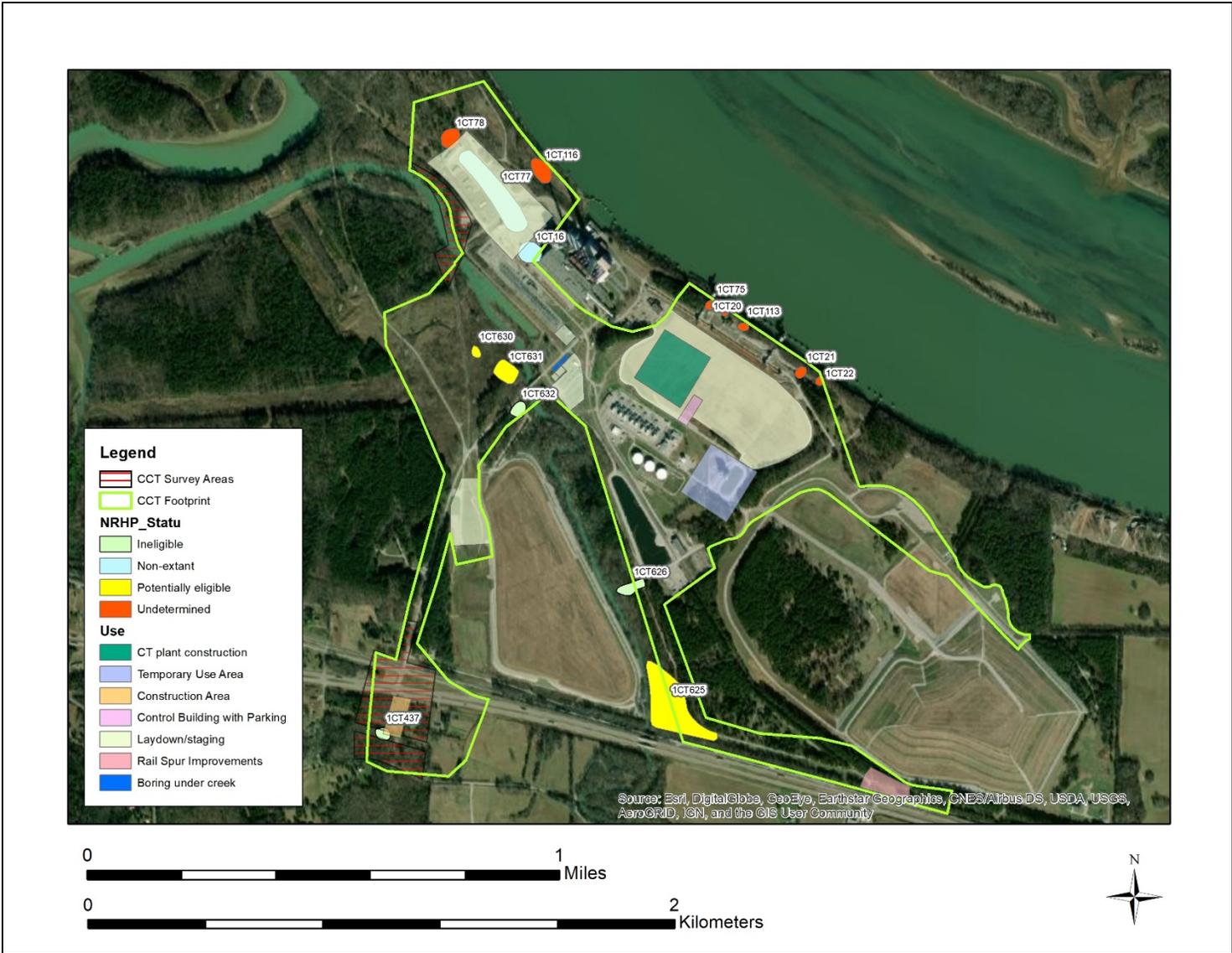


Figure 7. Previously-recorded archaeological sites in the CCT Footprint, with NRHP eligibility status, and proposed uses related to the undertaking.

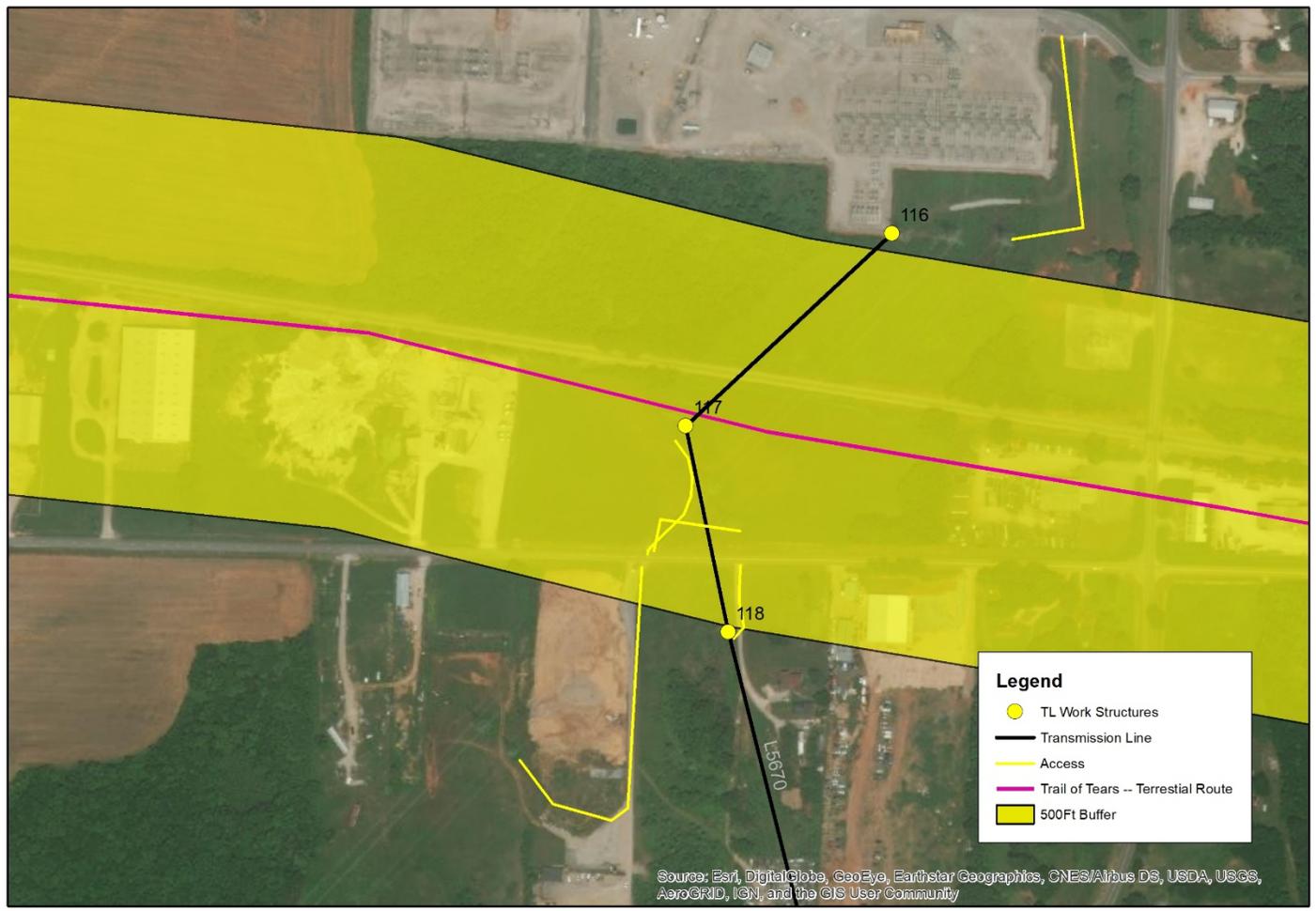
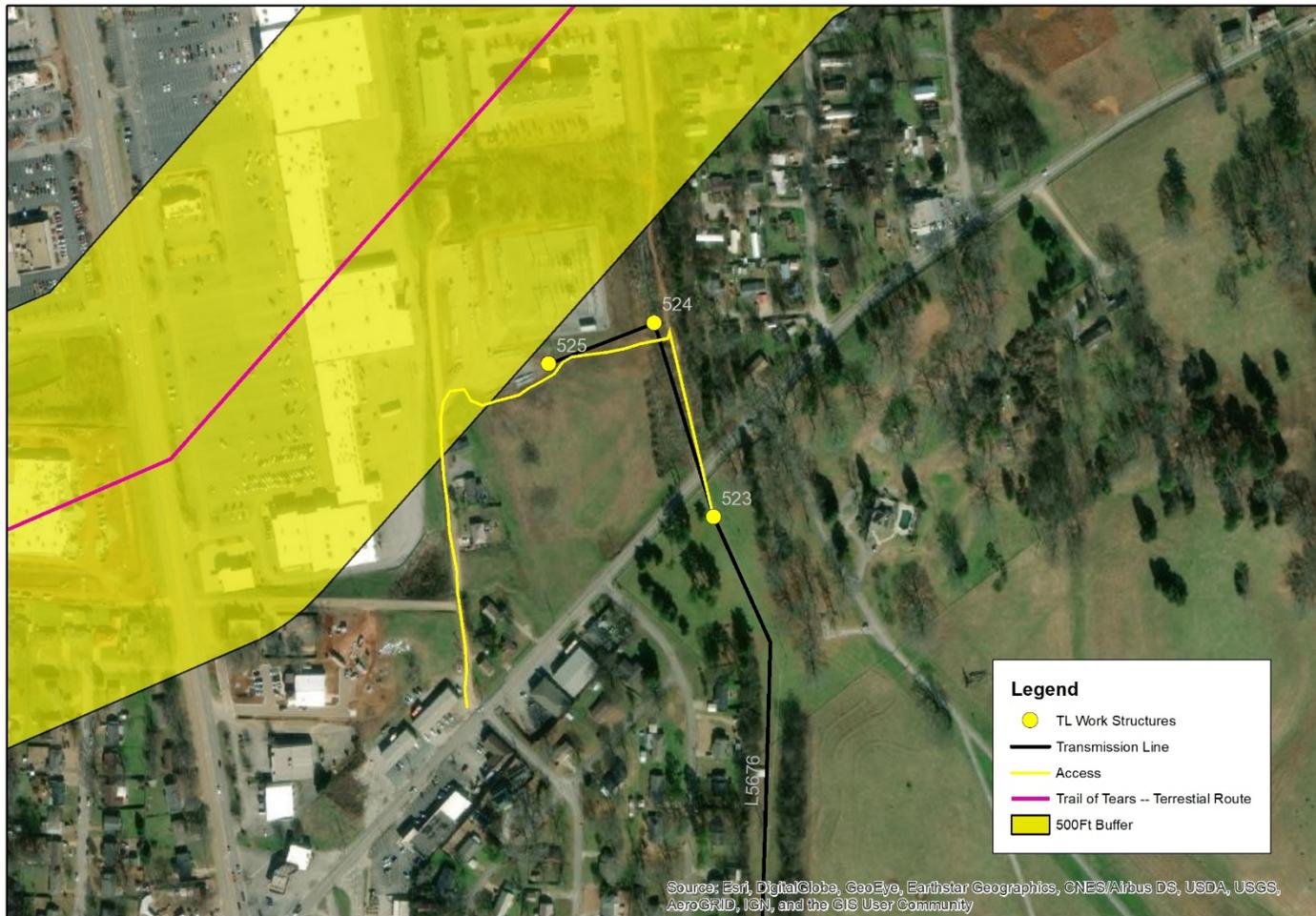


Figure 8. Location where L5670 intersects a Trail of Tears/Removal Route, in Morgan County, Alabama.



0 1,000 Feet

0 500 Meters



Figure 9. Location where L5676 intersects a Trail of Tears/Removal Route, in Lauderdale County, Alabama.



Figure 10. Close-up of area containing sites 1CT77, 1CT78, 1CT16, and 1CT116.

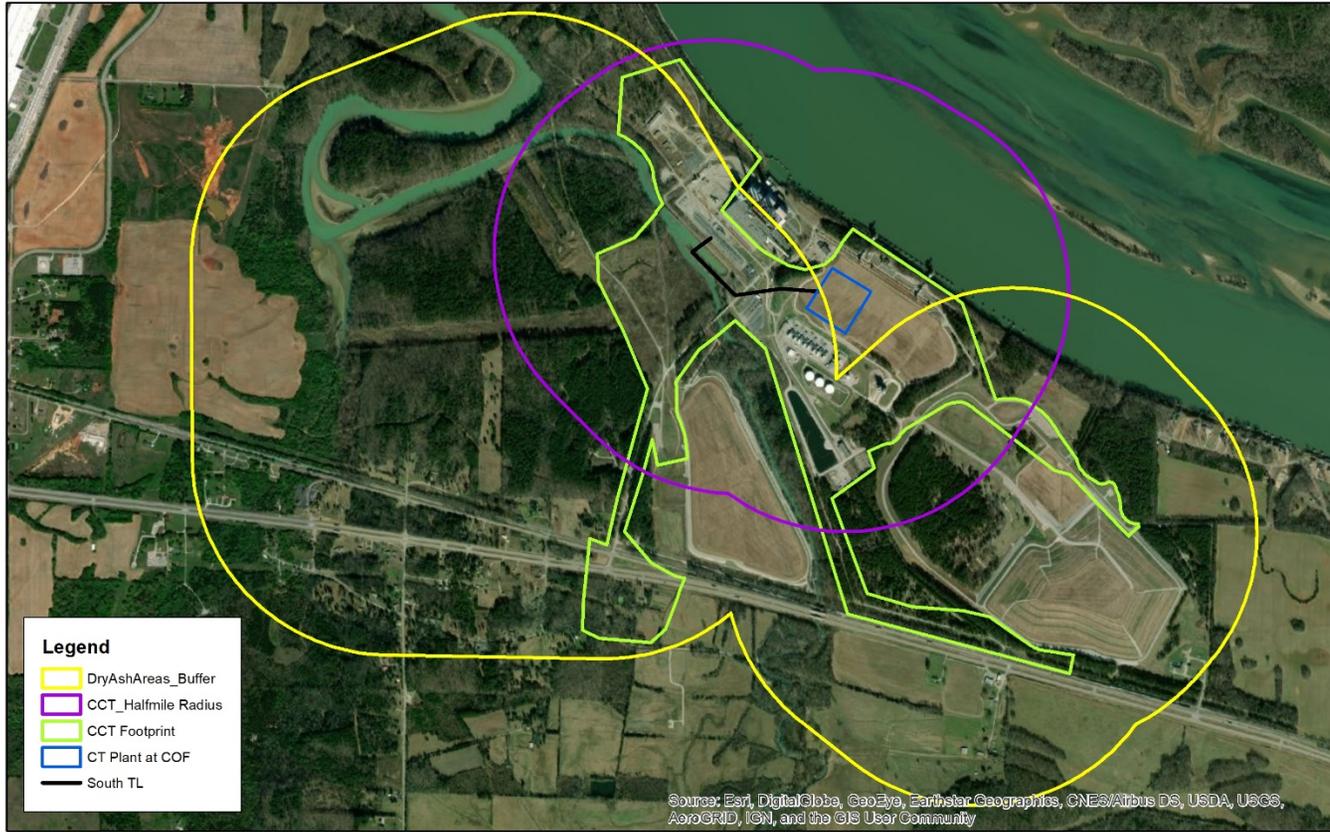


Figure 11. Comparison of half-mile radius surrounding the proposed CT plant and associated 161-kV TL with area surveyed for above-ground resources in 2010 for the dry ash storage areas project.



ANDY BESHEAR
GOVERNOR

TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY HERITAGE COUNCIL
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CRAIG A. POTTS
EXECUTIVE DIRECTOR &
STATE HISTORIC
PRESERVATION OFFICER

May 7, 2021

Mr. Clinton Jones
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

Re: Continuing Consultation, Tennessee Valley Authority Paradise Combustion Turbine/Colbert Combustion Turbine Project, Muhlenberg County, Kentucky

TVA Project CID 78509

REVISED: Phase I Archaeological Survey, Tennessee Valley Authority, PCT/CCT Modernization Project, Muhlenberg and Todd Counties, Kentucky prepared by Elise Hargiss of Wood Environment and Infrastructure Solutions. Report dated April 2, 2021.

and

Addendum Report: Genealogical Research and Recordation of McDougall Cemetery, Paradise Combustion Turbine Plant, Muhlenberg County, Kentucky, prepared by John A. Hunter, Clay Cantrell, Susan Andrews, and Tim Reynolds, report dated April 2, 201.

Dear Mr. Jones:

Thank you for your email attached documentation concerning the above-mentioned project, received April 5, 2021. The archaeological report has been revised, based on our previous comments on this project in January 2021. An addendum report describing the MacDougall Cemetery is also included as part of the current stage of consultation.

The revised archaeological report addresses our previous comments and requests for additional information. On the basis of these revisions, we can agree with its level of effort in the field. However, we find that the report requires revision as several maps appear to have been omitted from Appendix A – Map #22 (aerial) and Map #22 (topo), and Appendix B - Maps 67 and 68. We reviewed a digital draft of this report. ***Please ensure that we receive three printed and bound archival copies of the report with these maps added.***

On the basis of this report, we understand that the project APE contains four archaeological sites. These include 15Mu83, 15Mu84, 15Mu284, and 15To89. Site 15Mu284 was previously determined to be not eligible for the National Register of Historic Places (NRHP). The NRHP eligibility of sites 15Mu83, 15Mu84, and 15To89 has not been established. Additionally, site 15Mu331/MU-75 (the McDougall Cemetery), MU-01 (the Airdrie Iron Furnace), MU-146 (TVA Paradise Fossil Plant), and the NRHP-listed and National Historic Landmark 15Oh2 – Indian Knoll shell mound are within the APE of the project.

(Continued on Next Page)



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Unfortunately, the author of the Addendum report cited above, an archaeologist, has incorrectly interpreted the National Register Criteria as well as Criteria *Consideration D* as they apply to Cemeteries. The text of National Register Bulletin 41 (p.14) reads: “However, cemeteries and graves may qualify under Criteria A, B, or C if they are integral parts of larger properties that do meet the criteria, or if they meet the conditions known as Criteria Considerations.” Although the author of the Addendum report seems to believe otherwise, these two different applications of the Criteria/Considerations are separated by an “or” - meaning that cemeteries can qualify under the standard National Register Criteria if they are “integral parts of larger properties . . .” OR, alternately, that cemeteries can qualify under the Criteria *Considerations* without being “integral parts”

Based on our review of the additional information provided in the Addendum report and updated transmittal letter as it relates to the McDougall Cemetery as an aboveground historic property, we understand that the authors of the report have recommended that the McDougall Cemetery is not within the viewshed of the proposed project; however, we also understand that TVA has disagreed with Wood’s assessment and considers the McDougall Cemetery within the viewshed, and thus the APE, for this project. We understand that the authors of the Addendum report documented 182 legitimate or possible markers, including headstones and footstones, with 76 inscribed headstones noted. The Addendum report documented approximately 16 unmarked depressions; however, these would need further investigation to confirm as burials. We understand that the authors of the report document “Notable individuals . . . with ties to the earliest settlers of the area and others with ties to the development of the towns of Airdrie and Paradise.” We understand that the cemetery was likely started when the Hunsaker family owned the property and that very early settlers of Muhlenberg County are buried here including Aaron F. Smith (1782) and his wife Judith Stom (1792) daughter of the founder of Stom’s Landing (Paradise) and several of their children, as well as William Mabrey (1812), Sarah Brewer (1781), Elias V. Kirtley (1811) and his wife Nancy Kittinger (1814) and several of their children.

We understand that individuals instrumental in developing Airdrie and coal mining are also buried here including John McDougall (1821) and his wife Jane who arrived in Philadelphia on June 30, 1852 aboard the ship Marchioness of Clydesdale. James and Jean Gilmour, Henry Southerland, and John and Amanda McLish all immigrated from Scotland to work at Airdrie and stayed in the community.

Finally, we understand that four (known) African American burials were documented which the authors describe as “. . . unusual as cemeteries were typically segregated.” We understand that one African American woman, Roena Barnard was buried in the McDougall Cemetery in 1871 while her parents were buried in the African American cemetery near Drakesboro. We understand that the other African American burials are members of the same family; Cade (Kade) Reno and his wife Lue (Lucy) and one child, Sarah. These individuals were buried in the cemetery in 1899 and 1902 and, per the authors, “Cade and Lue Reno were likely born into slavery and took the name of their owners.” We understand that the Reno family, large landowners and slave owners settled in northern Muhlenberg County in the late eighteenth and early nineteenth centuries and were farmers.

We agree with the authors’ statement that, “the McDougall Cemetery was found to contain interments of local historic significance given that among those interred there are early settlers and community leaders who contributed to the development of Muhlenberg County”. Based on the significance of the individuals described above, and using what we feel is the correct interpretation of the Criteria/Considerations for cemeteries, we disagree with TVA’s official determination that McDougall Cemetery is Not Eligible and instead recommend that McDougall Cemetery appears to retain sufficient historic integrity and significance to be Eligible for listing on the National Register under Criteria Consideration D/Criterion B due to its significance as the burial place of individuals of transcendent importance who settled and developed Muhlenberg County.

(Continued on Next Page)

Beyond its significance under Criteria Consideration D/Criterion B, we would add that McDougall Cemetery may be Eligible under either Criterion D or Criteria Consideration D/Criterion C as it relates to the design of early cemeteries containing both African American and non-African American burials and how that design embodies larger cultural and burial traditions during the period of significance. Rather than being fully “integrated” it appears that the African American burials (along with a number of unmarked burials) are located at the western side of the cemetery. ***Please ensure that we receive (1) printed and bound archival copy of the Addendum report and (1) printed copy of the survey form for McDougall Cemetery.***

The determination of effect that accompanies the historic properties identification information indicates that TVA determined that the project will result in No Effect to Historic Properties. On April 26, 2021, we emailed Steven Cole of TVA to request additional information on how TVA arrived at this effect determination, as site 15To89 is directly affected by the project and no rationale for a No Effect finding was provided in the determination of effect. We received a reply on April 26, 2021 from Mr. Cole confirming that the site would be directly affected, but that the effect would be minor. Mr. Cole followed up on May 7, 2021, stating that the 30-day project review period had expired but also indicating that TVA’s April 5 letter should have stated that the correct determination of effect would be No Adverse Effect.

Before we comment on this project further, we must strongly disagree with TVA’s assertion that we have not responded to its determination of effect within thirty days. This is demonstrably false as our email of April 26, 2021 and TVA’s response on that same day indicates that insufficient information had been provided to us and that additional information was needed. However, to alleviate any future confusion, we will provide TVA with explicit written responses in the future. To be clear, our office does not use a *lack* of response to indicate its concurrence with a federal agency’s determination of National Register eligibility or effect.

We do not concur with TVA’s determination that the proposed project will result in no effect to historic properties, and we do so for the several reasons indicated below:

- We are now unsure of TVA’s actual determination of effect for this project. Does TVA determine that the project will have no effect or no adverse effect to historic properties?
- As currently proposed, TVA will have a direct effect to site 15To89 for this project and proposes to continue to directly affect the site during maintenance activities in the future. This is not acceptable. We would find it acceptable for TVA to either employ minimizations measures such as matting at this site or avoid the site. TVA must indicate which it proposes in an updated consultation letter.
- Likewise, the updated consultation letter should additionally explicitly take all properties within its APE into account and provide an explicit rationale for its effect determination. Based on our understanding of the project, this letter should include specific statements for 15Mu83, 15Mu84, 15Mu284, 15Oh2, 15To89, 15Mu331/MU-75 (the McDougall Cemetery), MU-01 (the Airdrie Iron Furnace), and MU-146 (TVA Paradise Fossil Plant).
- In our October 9, 2020, response regarding the aboveground portion of the project we stated that:
The APE, as described, proposes to address indirect effects of the proposed project to aboveground historic resources (utilizing exclusions proposed in the executed PA); however, it does not seem to take into account the potential direct effects to aboveground resources including the potential replacement of equipment or structures 50 years of age or older which may retain historic integrity and significance. This includes but may not be limited to the historic transmission structures proposed for replacement. We currently understand that no (potentially) historic combustion turbines at the Paradise facility are being replaced. If this is incorrect, then we may need to consider the effects of any CT removals at PCT.

(Continued on Next Page)

C. Jones
Tennessee Valley Authority
Paradise Fossil PCT/CCT Project, Muhlenberg County
May 10, 2021
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Based on the updated response to our office as it applies to the aboveground review of this project, we still do not see that our questions/comments have been addressed regarding the direct effect of the project to equipment or structures 50 years of age or older. For instance, are the transmission structures proposed for replacement historic?

Should you have any questions, please contact Chris Gunn of my staff at chris.gunn@ky.gov or Jennifer Ryall of my staff at Jennifer.Ryall@ky.gov.

Sincerely,



Craig A. Potts,
Executive Director and
State Historic Preservation Officer

CP:cmg, jnr, KHC# 59721, 60396, 61513, 61721, 61681
cc: George Crothers (OSA)



400 West Summit Hill Drive, Knoxville, Tennessee 37902

May 28, 2021

Mr. Craig Potts
State Historic Preservation Officer
and Executive Director
Kentucky Heritage Council
410 High Street
Frankfort, Kentucky 40601

Dear Mr. Potts:

TENNESSEE VALLEY AUTHORITY (TVA), PHASE I SURVEY, PARADISE COMBUSTION TURBINE/COLBERT COMBUSTION TURBINE (PCT/CCT) MODERNIZATION PROJECT, MUHLENBERG AND TODD COUNTIES, KENTUCKY (TVA TRACKING NUMBER – CID 78509) – RESPONSE TO YOUR LETTER OF MAY 11, 2021

Thank you for your response to our most recent consultation letter regarding the above-cited undertaking. We appreciate your comments and questions and the opportunity to provide clarification on the project scope and our determinations and findings. Your letter was received May 11, 2021; six days after the end of the 30-day comment period prescribed by the regulations at 36 CFR Section 800.4(d)(1)(i). Nevertheless, we are continuing to review your concerns and questions about: (1) what TVA's finding is, (2) whether site 15To89 would be affected by the project, (3) whether specific properties are in the area of potential effects (APE), and (4) whether the McDougall Cemetery is eligible for the National Register of Historic Places (NRHP). Here we address those concerns and present additional documentation of our finding of No Adverse Effect on Historic Properties. To clarify on TVA's determinations and findings and their factual basis, we have first summarized below the communications with your office to date for this undertaking.

Initiation of consultation and determination of APE

We initiated consultation with your office on this undertaking by our letter of September 9, 2020. In that letter, we described the undertaking as a whole (in all three states) as it was then understood, and described the undertaking's total APE in fairly specific terms.

Your office responded by letter, received October 12. In your response, you:

1. acknowledged your understanding of the undertaking's scope and APE and observed that the APE "does not seem to take into account the potential direct effects to aboveground resources including the potential replacement of equipment or structures 50 years of age or older which may retain historic integrity and significance," and
2. indicated that TVA ensure that the APE take such factors as the potential replacement of combustion turbine (CT) units or transmission line (TL) structures at the Paradise plant into consideration.

Mr. Craig Potts
Page 2
May 28, 2021

There is some confusion, for which we take responsibility. In our initiation of consultation letter, we incorrectly referred to the existing Paradise gas plant as the “Paradise Combustion Turbine” plant. Our December 8, 2020 letter attempts to clarify this confusion by referring to the “installation of three frame combustion turbine (CT) units at Paradise Combustion Cycle plant (PCC),” but from your most recent letter it appears the confusion was not entirely resolved. We seek to clarify again that the undertaking does not involve removal of any generating units from the existing combined combustion plant. Another source of confusion is that our December 8, 2020 letter states that undertaking would include “the removal of 0.88 miles (4,641 feet) of retired 69-kV TL.” Although the statement was accurate at the time because TVA’s initial plans included consideration of removing this 69-kV TL, that action was later removed from the project scope. The undertaking currently does not include plans for the removal of any transmission lines. We apologize for the confusion.

Phase I surveys and consultation on findings and effects assessments

After completing our Phase I identification surveys, we consulted further with you by letter sent December 8, 2020. This letter:

- Included a map illustrating the undertaking’s APE.
- Provided more detail about the activities associated with new gas plant construction and TL upgrades, the locations of those activities, and the types of effects on historic properties that could be expected to result, if any such properties were present in the APE.
- Described our attempts to relocate archaeological sites 15Mu83, 15Mu84, and 15Mu248. The first two sites were considered of undetermined NRHP status, according to Office of State Archaeology (OSA) records, and the latter site (15Mu284) had been recommended ineligible. Our survey documented that the areas of each archaeological site within the APE have been disturbed by the construction of gravel roads, and that no artifacts or features associated with any of the sites were identified in the APE.
- Documented that the survey identified previously-unrecorded site 15To89. In our letter, we stated, “the portion of site 15To89 within the project footprint is ineligible for inclusion in the NRHP” because this portion lacks any research potential.
- Documented the McDougall Cemetery. We noted that the cemetery is not within the undertaking’s footprint and so would not experience any physical effects.
- Stated TVA’s finding that the Kentucky portion of the project footprint contains no NRHP-eligible or-listed archaeological sites.
- Noted that our offices have previously and repeatedly agreed that PAF is ineligible for the NRHP, and that the current survey identified no aboveground properties in the APE.

From this, we concluded with a finding that the undertaking would not affect any historic properties in Kentucky.

We received your response 33 days later, on January 11, 2021. In your response, you raised concerns about three issues:

Mr. Craig Potts
Page 3
May 28, 2021

1. the documentation of proposed access routes that are surfaced in gravel;
2. the NRHP status of site 15To89; and
3. ambiguity about whether the McDougall Cemetery is in the APE and if it is, whether it is eligible and would be adversely affected.

We would like to respond here to the lingering concerns. First, the draft report did provide documentation of the conditions of the access routes for which you requested additional documentation. The report (p. 52) states, "The majority of the proposed access roads fall across existing 2-track or gravel roads (Figure 6.9). These areas were investigated via pedestrian survey. The remaining survey areas for the proposed access roads include grassy and agricultural fields and were investigated via STPs (Figure 6.10)." Following this statement in the original draft report were four photographs illustrating the conditions of the access routes, including three that are clearly surfaced in thick layers of gravel. We did not provide photographs of each of the 23 non-contiguous proposed access roads, which have a combined length of over nine miles. We believe that the documentation we provided of the access routes was adequate to understand the survey findings and determinations. This is consistent with the ACHP's Section 106 guidelines and the report fully meets the documentation standards of §§ 800.11. Even so, as explained below, we have provided a revised report that contains additional documentation of the conditions of the proposed access routes. If fuller documentation of the conditions of access routes continues to be of interest to your office, we will be happy to increase the amount of documentation of access routes in future reports.

Second, the draft report shows that the portion of site 15To89 within TVA's APE lacks any characteristics that would make it eligible for the NRHP. Responding to an email from Chris Gunn on 4/26, Steve Cole clarified (in emails sent 4/26 and 5/7) that TVA considers that the undertaking would result in no adverse effect on this property and offered to provide a revised letter to further clarify TVA's finding. We received no response to these emails and from this assumed that the information we provided was clear, but your most recent letter indicate we have not been sufficiently clear. TVA finds that the NRHP eligibility status of 15To89 should be considered "undetermined", and we find further that the undertaking would result in a minor physical effect on the site that would not be adverse as it would not compromise any research value the site may have.

The comment on the McDougall Cemetery is addressed more fully below.

Report revision, addendum report preparation, and consultation of April 5, 2021

In response to your January 11 letter, we directed Wood to make the requested changes in the report regarding documentation of the disturbed condition of the off right-of-way (ROW) access roads and to provide a viewshed analysis of the McDougall cemetery. Although the cemetery is outside the project footprint and within the half-mile radius of the proposed switchyard and CT units, the question of whether it would have direct views to the latter structures was less than clear in the original draft report. We acknowledged that deficit, and we responded on April 5, 2021 by providing a revised survey report, an addendum report with the additional information on the McDougall Cemetery, and an explanation of how this provided the information you requested.

Mr. Craig Potts
Page 4
May 28, 2021

In our response we also agreed that the NRHP eligibility status of site 15To89 as a whole should be considered to be undetermined, rather than ineligible, and, further, that 15Mu83 and 15Mu84 should also be considered undetermined. We reiterated that 15Mu284 had been determined previously as ineligible, and was not identified in the project footprint. Sites 15Mu83 and 15Mu84 also were not identified in the project footprint, but since the OSA considers the status of those sites to be of undetermined NRHP eligibility, and we identified no evidence pertaining to their eligibility, we are not recommending any change to their eligibility statuses. We made efforts to clarify all of this in our April 5 letter.

The remainder of our April 5 letter discusses the McDougall Cemetery. Despite that Wood recommended the cemetery is outside TVA's APE, we disagreed and suggested that the taller structures would be visible from the cemetery. We then summarized Wood's argument that the cemetery is ineligible because it is not a part of a larger property that meets NRHP eligibility criteria, and stated our agreement with that analysis. With the additional information and analysis, we concluded with a finding of No Effect for the undertaking.

Your May 11 response to the revised report and addendum report

Your most recent response reiterates some prior concerns and raises new ones, and states disagreement with TVA's finding of No Effect (which, based on the above-mentioned emails, should have been stated as TVA's finding of No Adverse Effect). Your letter:

1. Expresses uncertainty about TVA's finding of effect for the undertaking
2. States an opinion that the undertaking would directly affect undetermined site 15To89
3. Requests TVA to explicitly address specific properties within the APE, and indicates your opinion that the Airdrie Iron Furnace, PAF, and archaeological sites 15Mu83, 15Mu84, 15u284, 15OH2 (Indian Knoll Site), 15To89, and 15Mu331 (McDougall Cemetery) are all historic properties located in the APE.
4. Asks that TVA address whether the undertaking would directly affect above ground resources including the potential replacement of equipment or structures 50 years of age or older such as historic transmission structures and potentially historic CT units.
5. Presents thoughts about how the McDougall Cemetery could be eligible for inclusion in the NRHP either under Criterion D, or under Criteria Consideration D/Criterion B or Criteria Consideration/Criterion C, and requests that TVA consider the undertaking's potential effects on this resource.

We appreciate the opportunity to address each of these remaining questions/concerns. Below, we address each of your questions in the order in which they were presented. Your specific questions are in italics, and are followed by our answers.

1) *We are now unsure of TVA's actual determination of effect for this project. Does TVA determine that the project will have no effect or no adverse effect to historic properties?*

Answer: TVA's finding is that the undertaking will have no adverse effects on historic properties, as Dr. Cole stated in his May 7 email to Chris Gunn.

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2) As currently proposed TVA will have a direct effect to site 15To89 for this project and proposes to continue to directly affect the site during maintenance activities in the future. This is not acceptable. We would find it acceptable for TVA to either employ minimizations measures such as matting at this site or avoid the site. TVA must indicate which it proposes in an updated consultation letter.

Answer: We are confused by this question; it seems to imply that a direct effect must be an adverse effect. However, causality of effect and degree of effect are independent variables. An undertaking can result directly in a non-adverse effect on a property. That is the case with this site. As Dr. Cole explained in his May 7 email to Chris Gunn:

TVA would be driving equipment such as bucket trucks over the site within the project footprint (the < 5 meter wide access route). The ground here ranges from level to slightly sloped, and it all consists of an active agricultural field. The equipment will leave tire tracks on the site, but we do not expect rutting because the part of the access route in the site is a straight line, meaning the equipment would not turn or back up in the site boundary; they would just drive to the TL structure (which is outside the site boundary), perform the work, then drive back. This will occur once, during construction, and potentially at various times in future, should maintenance be necessary on the structure in question. However, these instances would be few and far in between; it would not be a regularly recurring event. I would expect little or no horizontal displacement of artifacts from this activity. This site is in the plow zone, is not stratified, and has no deeply buried deposits. The dominant soil here is Pembroke silt loam, 2-6% slopes, which is classified as well-drained and had a frequency of flooding and frequency of ponding of 0, which indicates it has no tendency to remain wet after rain. This soils has a "sensitivity to compaction" rating of "medium", meaning it may become compacted with the first pass of equipment, but would not continue to become increasingly compact with additional passes of equipment. Since these fields have been affected by ag equipment for probably many years, I would not expect a significant amount of additional compaction from TVA's activity. This suggests ... than any effects on this site from the vehicular traffic would be minor and would not result in any cumulative or indirect effects. I would say the undertaking's effects (were the site to be determined eligible) would be non-adverse, and would not compromise any research value the site may have.

We stated in our December 8 letter that "the portion of site 15To89 within the project footprint is ineligible for inclusion in the NRHP." In Dr. Cole's recent email correspondence with Chris Gunn, he clarified that the NRHP status of the site should be considered to be undetermined, rather than ineligible, since the site may extend to areas outside the APE. The additional details that Dr. Cole provided in emails about the site's context and the nature of TVA's activities within the site boundary is the basis of our finding that the undertaking would result in a non-adverse effect on the site. Given this finding, avoidance measures for this site are unwarranted.

3) *Likewise, the updated consultation letter should additionally explicitly take all properties within its APE into account and provide an explicit rationale for its effect determination. Based on our understanding of the project, this letter should include specific statements for 15Mu83, 15Mu84, 15Mu284, 15Oh2, 15To89, 15Mu331/MU-75 (the McDougall Cemetery), MU-01 (the Airdrie Iron Furnace), and MU-146 (TVA Paradise Fossil Plant).*

Answer: We believe we have provided answers to this question in our previous consultation letters, the revised report, emails, and the addendum report on the McDougall Cemetery, and provide additional clarification here:

- Archaeological site 15Oh2 (Indian Knoll) located approximately one-half mile from the proposed new CT units, and over one-half mile from the proposed substation. As detailed in the revised Appendix C of the addendum report, this NRHP-listed, National Historic Landmark site is significant under Criterion D as an outstanding example of a Middle and Late Archaic shell midden site. TVA's actions would have no effects on this site. We discussed this site in a consultation letter responding to your comment on our then-proposed Paradise CC project, in March 2014. In our March 15, 2014 letter we provided the following explanation and finding:

Your letter asks for TVA's recommendation regarding potential impacts to archaeological site 15OH2, the Indian Knoll Site. This site is located on the opposite side of the Green River, outside the archaeological APE. TVA's undertaking does not include any plans for ground disturbing work in that vicinity. Therefore, TVA found that the current undertaking would not affect this archaeological site.

In your response (dated April 29, 2014), you acknowledged that the site was outside the Paradise CC project APE. The current undertaking is identical with respect to potential effects on that site, and we find that it would not result in any effects on the site.

- MU-146 (PAF) is ineligible for the NRHP, as we determined in 2013 based on an architectural assessment. Your office agreed with that determination by letter dated May 8, 2013. We conducted an additional architectural assessment of PAF last year, and again determined that PAF is ineligible for the NRHP; you agreed by letter dated November 18, 2020. As our offices have so recently agreed that PAF is ineligible, we did not anticipate that you would again request a statement on the plant's eligibility. We stand by our 2020 determination and consultation consensus: PAF is ineligible for the NRHP, and therefore is not a historic property. As such, no assessment of the current undertaking's potential effects on that facility is needed.
- In our December 8, 2020 letter we addressed the conditions of those portions of sites 15Mu83, 15Mu84, 15Mu248, and 15To89 located in the APE as follows:

TVA agrees with Wood that the portions of sites 15Mu83, 15Mu84, and 15Mu248 within the project footprint consist of gravel roads lacking in archaeological deposits, and that the portion of site 15To89 within the

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project footprint is ineligible for inclusion in the NRHP. Therefore, TVA finds that the Kentucky portion of the project footprint contains no NRHP-eligible or –listed archaeological sites.

As noted above, in subsequent exchanges our offices have agreed that 15To89, 15Mu83, and 15Mu84 are of undetermined NRHP eligibility status and that 15Mu284 is ineligible. We have also documented that all three sites of undetermined eligibility would not be adversely affected by the undertaking. Thus, to be clear, the APE contains three archaeological sites of undetermined eligibility (15To89, 15Mu83, and 15Mu84), but TVA's undertaking would not result in any adverse effects on any of these sites.

- For additional clarification regarding 15Mu331/MU-75 (McDougall Cemetery), please see below

4) Based on the updated response to our office as it applies to the aboveground review of this project, we still do not see that our questions/comments have been addressed regarding the direct effect of the project to equipment or structures 50 years of age or older. For instance, are the transmission structures proposed for replacement historic?

Answer: No TL structures would be replaced as part of this undertaking, and no generating units would be removed from Paradise Combined Cycle plant (which was constructed in 2015). As explained above, although an initial project scope included the removal of 0.88 miles of retired 69-kV TL this was later removed from the scope. The undertaking would not include removal of any TL structures. We apologize for any confusion.

McDougall Cemetery-eligibility status and effects assessment

Finally, we wish to address your questions regarding the McDougall Cemetery.

In your May 11 letter, you presented a counter argument concerning the NRHP eligibility of the cemetery and assert that the NPS allows that cemeteries can be considered eligible either under Criterion D, or under one of the Criteria Considerations, without being part of a larger property that is eligible. We accept your interpretation of the NPS's guidance and acknowledge that although we recognized that the cemetery has some historic significance, we did not give full consideration to the possibility that it possess historic significance under Criterion D or Criteria Consideration D or C. In response to your questions and suggestions, we tasked Wood with further analysis and documentation of the McDougall Cemetery. Wood has revised Appendix C of the addendum report with additional photographic documentation, analysis, and discussion. An electronic copy of the revised addendum cemetery report, containing new information and documentation in Appendix C, is attached.

After considering all the evidence at hand, including information gained from archival records and cemetery markers and the cemetery's past and current settings, Wood recommends that the McDougall Cemetery is ineligible for inclusion in the NRHP due to a lack of integrity. We

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agree with Wood's recommendation, and based on their analysis, TVA determines that the cemetery is ineligible for the NRHP.

As regards cemeteries eligible under Criterion D, we believe that the intent is to allow nomination of cemeteries containing significant data that could not be obtained from archival evidence alone, similar to the rationale for archaeological sites nominated under Criterion D. In our view for a cemetery to be considered eligible under Criterion D requires a demonstration that data obtained from examination of its buried artifacts and features would provide important information that could not be gained from existing documents. Wood has uncovered a significant amount of archival evidence on the McDougall Cemetery, which is how we know about the four African American graves and the persons of local significance interred there. As this evidence has already provided a good understanding of the cemetery's role in history, we believe there would be little to be gained from exhuming graves and studying the artifacts. Thus, we do not agree that this cemetery is eligible under Criterion D. Further, even if the cemetery were to be determined eligible under Criterion D, as it is outside the project and will not be physically affected by TVA's actions, the undertaking would not diminish whatever archaeological significance the cemetery might have. Thus, even assuming, for the sake of the argument, that the cemetery is eligible under Criterion D, TVA's undertaking would have no effect on the cemetery's potential eligibility under Criterion D. None of TVA's actions would diminish the cemetery's ability to yield information of historic significance.

As far as the McDougall Cemetery's potential significance under Criteria Consideration D, for Criteria A, B, or C, while we agree that it could have some significance; we also find it lacks integrity of setting, feeling, and association. Wood's revised addendum report documents the setting of the McDougall Cemetery more fully than either the original draft survey report or the earlier version of the addendum report. The cemetery's potential significance, as you indicate, would be closely linked to the town of Paradise, which is entirely non-extant. Because the town was vacated and removed when the Peabody Coal Company acquired the Sinclair Mine in the late 1950s, the cemetery lacks integrity of association. The cemetery is located adjacent to two modern power plants, Paradise Fossil Plant (mid-twentieth century) and Paradise Combined Combustion plant (early twenty-first century); it has a full, unobstructed view of the latter as well as views of other infrastructure. The additional photographs provided in the revised addendum report document that the dominant features in this landscape are the facilities that are part of these plants: the cellular tower, the radio tower, the combined combustion plant, the PAF smokestacks, multiple high-voltage transmission lines, TVA's marquee at the entrance to the facility, and reclaimed strip mines. Although there were small coal mines in this area before TVA's presence, the Peabody Coal company's massive coal extraction efforts here caused drastic changes to the landscape. Current topography and vegetation reflect modern mine reclamation and the operation of PAF, and not the original landscape of the town of Paradise. None of the visual elements in the viewshed convey the cemetery's original setting, which was on the outskirts of a small town surrounded by a scenic, remote, rural landscape. The original natural and developed landscape of the cemetery's early period of use is simply non-extant. Thus, the cemetery lacks integrity of setting and feeling.

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The cemetery also lacks integrity internally as it lacks any intact area relating to its early period of use. As Wood documents in the revised addendum report, old and new graves are interspersed throughout the cemetery, and new graves continue to be added in various places. The cemetery also contains at least two pet burials dating from the 21st century. These changes have resulted in a cemetery with a mixture of older and newer graves that lack strong patterning that could convey historic significance. National Register *Bulletin No. 41* (1992:19) states,

When a large historic cemetery with scattered gravesites has had modern infill, the entire cemetery still may be eligible if the proportional number, size, and scale of new features are not so imposing as to overwhelm the overall historic appearance. Once the non-historic features begin to dominate, and one's impression is of a modern cemetery with isolated historic burials or clusters of historic gravesites, then the overall historic character of the cemetery has been lost, and it would not meet National Register standards.

Wood's revised Appendix C for the addendum report documents that the McDougall cemetery gives the impression of a modern cemetery with isolated historic burials and clusters of historic gravesites, surrounded by a landscape dominated by the modern gas plant and associated structures, as well as reclaimed coal mines. Wood argues, and we agree, that the McDougall Cemetery lacks integrity of setting, feeling, and association.

For all of these reasons the McDougall Cemetery does not convey a level of historical significance that would make it eligible for the NRHP. Thus, TVA determines that this cemetery is ineligible for inclusion in the NRHP due to a lack of sufficient integrity.

We appreciate your view that the cemetery may possess some level historic significance, but do not believe this level rises to the threshold of significance required for inclusion in the NRHP. And as stated above, even if the McDougall Cemetery were assumed to retain sufficient integrity to be considered eligible for the NRHP, TVA's actions will result in only minor additions to the already-disturbed viewshed. As demonstrated by Wood's viewshed analysis, the project would be partially visible from the cemetery. The proposed new substation would not be visible from the cemetery; the tops of the exhaust stacks of the new CT units would be visible from the southern half of the cemetery. These new visual elements would not result in a significant change in this industrial landscape. Therefore, the undertaking would not further diminish the integrity of setting and feeling that has already been severely compromised by modern industrial features. Thus, even were the cemetery to be determined eligible for the NRHP, Wood recommends that the project would have no effect on the cemetery. TVA, however, notes that the project would introduce new visual elements, and for that reason, TVA finds that the undertaking would result in No Adverse Effect on this resource, were it to be determined eligible for the NRHP. Wood's viewshed model and associated analysis support this finding.

Here is a summary of the NRHP eligibility determinations and effect findings pertaining resources discussed in our correspondence on this undertaking:

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Resource	Eligibility	Effects	Rationale
15Mu83	Undetermined	No adverse effect	No intact deposits in APE
15Mu84	Undetermined	No adverse effect	No intact deposits in APE
15Mu284	Ineligible	n/a	Consultation consensus
15To89	Undetermined	No adverse effect	No intact deposits in APE
15Oh2	Listed	n/a (outside APE)	Outside project footprint
McDougall Cemetery	Ineligible	n/a	Lacks integrity
MU-01 (Airdrie)	Eligible	n/a (outside APE)	> 0.5 miles from project
MU-146 (PAF)	Ineligible	n/a	Consultation consensus

We hope that this additional information provides the clarification that you seek. Please contact Steve Cole by email, sccole0@tva.gov, with any further questions.

Sincerely,



Susan R. Jacks
General Manager
Federally Mandated Environmental Compliance

SCC:ABM
Enclosures



ANDY BESHEAR
GOVERNOR

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CRAIG A. POTTS
EXECUTIVE DIRECTOR &
STATE HISTORIC
PRESERVATION OFFICER

June 24, 2021

Ms. Susan Jacks
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

Re: Continuing Consultation, Tennessee Valley Authority Paradise Combustion Turbine/Colbert Combustion Turbine Project, Muhlenberg County, Kentucky

TVA Project CID 78509

Addendum Report: Genealogical Research and Recordation of McDougall Cemetery, Paradise Combustion Turbine Plant, Muhlenberg County, Kentucky, prepared by John A. Hunter, Clay Cantrell, Susan Andrews, and Tim Reynolds, report dated April 2, 2021.

Appendix C: Aboveground Architectural Survey of McDougall Cemetery, Paradise Combustion Turbine Plant, Muhlenberg County, Kentucky, author and report date undetermined.

Dear Ms. Jacks:

Thank you for your email attached documentation concerning the above-mentioned project, received May 28, 2021. We have reviewed the consultation letter and revised addendum report concerning the McDougall Cemetery. We additionally understand that the project has been revised.

We believe that we understand the proposed undertaking to entail activities in three states, and that a portion of the proposed project falls within Kentucky and involves the Paradise Combustion Cycle Plant and its associated Paradise-Montgomery transmission line in Muhlenberg and Todd Counties, Kentucky. We understand that the project will consist of the installation of three frame combustion turbines at the Paradise Combustion Cycle Plant, and upgrades to the Paradise-Montgomery 500 kV transmission lines. In addition to the construction of the turbines, the project entails the construction of new gas supply pipeline, natural gas metering and handling systems, instrumentation and controls systems, transformers, additional buildings for administration, maintenance, and warehousing supplies, and a new switchyard. Upgrades the Paradise-Montgomery transmission line include the construction of 1.9 miles of new transmission line at the Paradise plant, and the installation of 48 miles of fiber optic line in Kentucky. We understand from your May 28, 2021 letter that the project does now not entail the removal of 0.88 miles of 69 kV transmission line.

We understand from your December 8, 2020 letter that the APE for the project entails “all areas at PAF where ground disturbance related to the undertaking would take place...”, “twenty-two access routes [along] the Paradise-Montgomery TL, along with a fifty-foot radius surrounding each work location...” and “the viewshed within a one-half mile radius of the location of the new CT units at PCC, the new switchyard, and the new 1.9-mile long TL.” We have had no additional guidance on updates to the project’s APE.

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Based on the May 28, 2021 correspondence, we understand that TVA has determined that six cultural resources are within the project's area of potential effect. These include 15Mu83, 15Mu84, 15Mu284, 15To89, the McDougall Cemetery (15Mu331/MU-75), and Paradise Fossil Plant (MU-146). We understand that TVA determined that sites MU-01 (Airdrie Furnace) and 15Oh2 (Indian Knoll) are not in the APE.

We understand that TVA determined that sites 15Mu83, 15Mu84, and 15To89 have an undermined NRHP eligibility status. We understand that TVA determined that sites 15Mu284, MU-146 (Paradise Fossil Plant) and 15Mu331/MU-75 (McDougall Cemetery) are not eligible for the NRHP. We previously concurred that sites 15Mu284 and MU-146 are not eligible.

We understand that sites 15Mu83, 15Mu84, and 15To89 fall within the direct footprint of the project, and all three will be traversed during project activities and by future maintenance activities. In the case of 15Mu83 and 15Mu84, we understand that roads already traversed the sites when they were defined, and that TVA does not propose any additional modification to these roads. We understand that 15To89 is currently situated in agricultural fields, and that TVA proposes to drive across the sites during project construction and future maintenance activities. We additionally understand that TVA determined that the portion of the site that will be driven over does not contain significant archaeological resources. We additionally understand that, although 15Mu331/MU-75 falls within the project APE, that TVA determined that it was not eligible for the NRHP.

Based on our review of Appendix C of the Addendum report, separately titled as an "Aboveground Architectural Survey" but otherwise combined with the Addendum report and not separately attributed to a specific author or authors, we are confused by the dramatically different assessments of National Register significance presented between the original Addendum report and what is contained in Appendix C. Perhaps these reports were written by different authors; either way, we do not feel that the degree of change between these assessments is well supported. For instance, the assessment of McDougall Cemetery contained in the original Addendum report describes, "Notable individuals . . . with ties to the earliest settlers of the area and others with ties to the development of the towns of Airdrie and Paradise" and includes a statement that "the McDougall Cemetery was found to contain interments of local historic significance given that among those interred there are early settlers and community leaders who contributed to the development of Muhlenberg County." The newly presented assessment included in Appendix C states instead that "Moreover, while the people located within the cemetery have play [sic] important roles on [sic] the development of the area, research did not identify any information that the remaining families interred in the cemetery contributed great significance to the local level to warrant eligibility for NPS guidelines"

We appreciate TVA choosing to complete additional identification efforts and providing its reassessment of McDougall Cemetery as it relates to individual significance and integrity under Criteria Consideration D. Based on the most recent information that has been submitted for our review, we agree that some aspects of the integrity of the cemetery have been diminished over time. Although the author of the original Addendum report argued that the *individuals* interred in the cemetery had a strong association with Paradise (and with Airdrie), a community which we understand has been basically removed, we disagree with the argument in Appendix C that the cemetery itself would also be required to retain this same strong association as it relates to individual eligibility. In fact, with much of Paradise having been removed, we would argue that this raises the level of significance of the burial places of its founders. At this point it seems that, as it relates to the cemetery's significance under Criteria Consideration D/Criterion B we are quibbling about degrees of local significance. The National Park Service lays out the argument that transcendent importance can also exist at the local level. In fact, the cemetery seems to be an excellent model of the example laid out in Bulletin 41 of ". . . cemeteries that likely would meet Criteria Consideration D requirements if adequately documented," and described as follows: "A cemetery possessing important historic associations from a community's early period of settlement, or which reflects important aspects of community history." Again, based on our assessment, McDougall Cemetery appears to retain sufficient historic significance and integrity under Criteria Consideration D/Criterion B and we continue to disagree with TVA's official determination that it is Not Eligible and recommend that it appears to be Eligible for listing on the National Register of Historic Places. Although this the case, based on TVA's clarification through additional viewshed photos, mapping, and APE description, we are now able to concur that the impacts of the proposed undertaking should not create additional negative impacts to the historic integrity of the McDougall Cemetery. Although Appendix C of the Addendum report would not meet our *Specifications* as it relates to cultural historic survey reports, since we did not request this report, we are also not requesting revisions. ***To fulfill our archival requirements, since we reviewed a digital draft of Appendix C, we are requesting (1) bound hard copy of the "Aboveground Architectural Survey" report.***

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Tennessee Valley Authority
Paradise Fossil PCT/CCT Project, Muhlenberg and Todd Counties, KY
June 24, 2021
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Based on this information, we understand that TVA has determined that the proposed project will result in No Adverse Effect to Historic Properties and we now concur with this determination.

We believe that we are in agreement that the consultation for this project, as well as many others with TVA, has taken too long. However, we would like to take this opportunity to respond directly to some of the characterizations of the consultation that are presented in your May 28, 2021 letter to highlight the reasons that this consultation has taken as long as it has. We would note that the issues raised in these comments are characteristic of several consultations for other TVA projects as well.

On page 2 of the letter, it states that TVA's December 8, 2020 letter "Documented the McDougall Cemetery." At that point in the consultation, the cemetery had been briefly mentioned in the first draft of the archaeological report. The report provides basic information concerning the location and general age of the cemetery and a brief characterization of the above-ground expression of this cemetery. However, the archaeological report does not make an NRHP evaluation of the cemetery and neither the survey report nor TVA's consultation letter identifies that the cemetery is within the overall project APE. At this point in the consultation, we believed that the agency had not sufficiently completed identification of historic properties within its APE, and therefore could not have adequately supported its determination of effect. We therefore requested additional information concerning this potential historic property on January 7, 2021. We understand from your April 5, 2021 letter that the cemetery is in the project's APE.

Page 3 of your letter mischaracterizes another request for additional information concerning the level of effort to identify historic properties. The letter states that we raised a concern about proposed access routes that are surfaced in gravel, and then goes on to describe the portions of the archaeological report that discuss the roads and to state that the level of information provided fully meets the ACHPs Section 106 guidelines and that the report fully meets the documentation standards of 36 CFR § 800.11. In our January 7, 2021 response to the first draft of the archaeological identification report, we requested additional information to document reported disturbance along seven of the 22 access roads that are needed for this project. We requested this information specifically because the mapping provided in the report indicated that these segments crossed fields under agricultural production (i.e. not existing gravel roads), and no additional description was provided to clarify the discrepancy. After our review, it did not appear that the report contained sufficient information for us to understand the basis of the determination that no historic properties were present along these specific seven access routes. Here specifically, we were left with conflicting documentation about the application of one field method (pedestrian survey) suited to gravel roads with documentation that suggested a different field method (shovel testing) would have been the appropriate field methods to satisfy our expectations concerning level of effort. The KHC's *Specifications for Conducting Fieldwork*... represent a minimum level of effort that we feel is necessary to identify and assess the eligibility of cultural resources. We do not believe, as is implied by this characterization of our request, that we have requested anything that is incongruent with our Specifications, or with 36 CFR §800.4 or 36 CFR §800.11.

Site 15To89, its NRHP eligibility, and the project's effects on this resource have also been a recurring part of this consultation. Only a portion of this site was identified, and we understood the archaeological consultant to recommend that the portion of the site within the APE was not eligible for the NRHP. TVA's December 8, 2020 (p.4) letter affirms its agreement that the portion of 15To89 within the project footprint is ineligible for inclusion in the NRHP. In our January 7, 2021 response we indicated that, because the site had not been fully delineated (and therefore not fully assessed) that its NRHP eligibility was undetermined. This is consistent with the outcome of discussion between TVA, KHC, and Tribal Groups initiated in August 2020. TVA agreed with this eligibility status in its April 5, 2021 letter. However, the April 5, 2021 letter fails to address how the site will be affected and TVA's determination of that effect. Consequently, we were left in an ambiguous situation with respect to TVA's determination of no historic properties affected reiterated in that letter and our understanding that a resource with undetermined NRHP eligibility would be directly affected by the project. We requested clarification via email on April 26, 2021, and received the response from Steve Cole via email on that same day, as indicated in the May 28, 2021 letter.

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S. Jacks
Tennessee Valley Authority
Paradise Fossil PCT/CCT Project, Muhlenberg and Todd Counties, KY
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Our request on May 10, 2021 to restate this determination of effect concerning 15To89 in a letter should be understood within our overarching request to have a single comprehensive statement from TVA that presented all of the results of identification of historic properties, the project's effects on those historic properties, and single determination of effect that considered all of the results of identification and our consultation. It is important to note that we disagreed with TVA's original acceptance of its consultant's application of NPS guidelines for the evaluation of cemeteries for eligibility for the NRHP, and that, regardless of TVA's emailed response about 15To89, TVA still needed to clarify the way that it reached its eligibility recommendation for the McDougal Cemetery – a resource (which we recommend is a historic property) in the APE of the project.

We do not wish to prolong consultation processes unnecessarily. However, we believe that our comments provided during the consultation and in this letter indicate that we had to make repeated requests for the agency to provide a reasonably complete set of identification information pursuant to 36 CFR 800.4(b), provide a logical evaluation of the historical significance of cultural resources within the APE of the undertaking pursuant to 36 CFR 800.4(c), and to arrive at determination of effect supported by this evidence pursuant to 36 CFR 800.4(d).

Should you have any questions, please contact Chris Gunn of my staff at chris.gunn@ky.gov or Jennifer Ryall of my staff at Jennifer.Ryall@ky.gov.

Sincerely,

Craig A. Potts,
Executive Director and
State Historic Preservation Officer

CP:cmg, jr, KHC# 59721, 59828, 60396, 61512, 61513, 61681, 61721, 62049, 62144
cc: George Crothers (OSA)