

JOHNSONVILLE AERODERIVATIVE COMBUSTION TURBINES PROJECT FINAL ENVIRONMENTAL ASSESSMENT

Humphreys County, Tennessee

Prepared by:
TENNESSEE VALLEY AUTHORITY
Knoxville, TN

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To request further information, contact:

Brittany Kunkle
NEPA Compliance
Tennessee Valley Authority
400 W. Summit Hill Drive, WT 11B
Knoxville, TN 37902
Phone: 865.632.6470
E-mail: brkunkle@tva.gov

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Symbols, Acronyms, and Abbreviations

AADT	Annual Average Daily Traffic
Aero	Aeroderivative
APE	Area of Potential Effect
APCR	Air Pollution Control Regulations
AR	Assessment Report
BACT	Best Available Control Technology
BMP	Best Management Practice
C	Celsius
CAA	Clean Air Act
CC	Combined Cycle
CCR	Coal Combustion Residuals
CEQ	Council on Environmental Quality
CFC	Chlorofluorocarbons
CFR	Code of Federal Regulations
CH₄	Methane
CHP	Combined Heat and Power
CO	Carbon Monoxide
CO₂	Carbon Dioxide
CO₂e	Carbon Dioxide Equivalent
CPP	Clean Power Plan
CT	Combustion Turbine
CWA	Clean Water Act
dB	Decibel(s)
dBA	A-weighted decibel
DLE	Dry Low Emissions
DLN	Dry Low-NO _x
DO	Dissolved Oxygen
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMFs	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
F	Fahrenheit
FR	Federal Register
GHG	Greenhouse Gases
gpm	Gallons per Minute
ha	Hectare
HAP	Hazardous Air Pollutant
HRSG	Heat Recovery Steam Generator
HUD	U.S. Department of Housing and Urban Development
ICE	Internal Combustion Units
IPaC	Information for Planning and Consultation
IPCC	Intergovernmental Panel on Climate Change
IRP	Integrated Resource Plan
JCT	Johnsonville Combustion Turbine
kTons	Thousand short-tons
kV	Kilovolt
Ldn	Day-Night Sound Level
MCL	Maximum Contaminant Level
MMBtu	Million British Thermal Units

MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NCA4	Fourth National Climate Assessment
NCA5	Fifth National Climate Assessment
NDC	Nationally Determined Contribution
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLCD	National Land Cover Dataset
NMSZ	New Madrid Seismic Zone
NNSR	Nonattainment New Source Review
NO_x	Nitrogen Oxide
NO₂	Nitrogen Dioxide
N₂O	Nitrous Oxide
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NSR	New Source Review
OC	Oxidation Catalyst
O₂	Oxygen
O₃	Ozone
OSHA	Occupational Safety and Health Administration
Pb	Lead
PM	Particulate Matter
ppm	Parts Per Million
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
ROW	Right-of-Way
SCC	Social Cost of Carbon
SCR	Selective Catalytic Reduction
SER	Significant Emissions Rate
SHPO	State Historic Preservation Office
SI	Spark Ignition
SO_x	Sulfur Oxide
SO₂	Sulfur Dioxide
SWPPP	Stormwater Pollution Prevention Plan
TDEC	Tennessee Department of Environment and Conservation
TDOA	Tennessee Division of Archaeology
TMSP	Tennessee Multi-Sector Permit
tpy	tons per year
TRM	Tennessee River Mile
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
UN	United Nations
UPLs	Upper Prediction Limits
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
VOC	Volatile Organic Compounds

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CHAPTER 1 – PURPOSE AND NEED FOR ACTION

1.1 Introduction

In June 2019, the Tennessee Valley Authority (TVA) published the 2019 Integrated Resource Plan (IRP), which was developed with input from stakeholder groups and the general public. The purpose of the IRP was to provide TVA with direction on how to best meet future demand for power. 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 combustion turbines (CTs), as playing a critical role in providing the flexibility needed to integrate renewable energy generation and promote distributed energy resources (TVA 2019a).

TVA's asset strategy incorporates the strategic direction from the 2019 IRP and continues to support affordable, reliable, and cleaner energy for the customers TVA serves. The proposed action to be studied as part of this EA is one piece of the overall asset strategy, which also includes:

- Maintaining the existing low-cost, carbon-free nuclear and hydro fleets
- Retiring aging coal units as they reach the end of their useful life, expected by 2035
- Adding 10,000 megawatts (MW) of solar by 2035 to meet customer and system needs, complemented with storage
- Using natural gas to enable needed coal retirements and solar expansion as other technologies develop
- Leveraging demand-side options, in partnership with local power companies
- Partnering to develop new carbon-free technologies for deeper decarbonization

TVA utilizes least-cost planning in the development of its asset strategy to provide electricity at the lowest feasible rate for customers. As a result of resource changes outlined in the asset strategy and formalized in TVA's Strategic Intent and Guiding Principles document (TVA 2021f), TVA has a plan for 70 percent carbon reductions by 2030, a path to approximately 80 percent carbon reductions by 2035, and aspires to net-zero carbon emissions by 2050 (based on a 2005 baseline).

TVA expects to add about 10,000 MW of solar by 2035, with 2,800 MW already committed, pending environmental review (TVA 2022b). 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.

TVA's natural gas-fueled fleet currently includes 21 combined cycle (CC) units at eight sites and 87 simple-cycle 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. 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 2021b).

Aeroderivative Combustion Turbines:

Aeroderivative (Aero) CT units are highly efficient peaking units that can ramp up very quickly to provide capacity and grid support when needed. Peaking units are essential for maintaining system reliability requirements, as they can startup quickly to meet sudden changes in either demand or supply.

The Aero CTs would enhance the reliability of TVA's peaking fleet and promote system flexibility to integrate renewable resources which have variable generation patterns.

Similar to TVA's existing simple-cycle CTs, aeroderivative (Aero) CT units operate like a jet engine where 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. Aero CTs are different from the simple-cycle CTs as they provide high cycling capability and very fast startup. The Aero CT's speed provides excellent control response for better grid support, particularly as TVA increases the use of intermittent renewable resources.

Aero CTs enhance system flexibility, integrate increasing renewable capacity, and provide dispatchable capacity. They are highly efficient peaking units with very fast ramp rates and little startup penalty that can achieve full generating capacity from a cold start very quickly and allow for multiple daily starts. As such, they improve the system's ability to effectively integrate generation from variable resources, such as solar and wind. In addition, the Aero CTs would provide emergency Black Start capability to aid in system restoration following a significant event or disturbance to the bulk electric system. In the event of a widespread power outage, Black Start is the ability of a generating unit to be manually started and connected to the grid to help start other generating units and restore electricity to the grid. Aero CTs also provide the ability to run in synchronous condensing mode, which can efficiently support local area voltage stability that is especially important near load centers.

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 and flexible peaking fleet into the future. The results of the study placed TVA's existing frame CTs in three categories based on age and material condition and made recommendations for each category:

- Reliable CT units, which have received some recent investment, are around 20 years old, and are expected to remain reliable at current funding levels. Recommendation: **Invest to Maintain**
- Challenged CT units, which have received some recent investment, are 40+ years old, and require additional investment to ensure reliability. Recommendation: **Refurbish and Maintain**
- Most Challenged CT units, which have received little recent investment, are 40+ years old, and require replacement to ensure reliability. Recommendation: **Replace**

The CT Modernization Study also recommended adding approximately 500-650 MW of new Aero CTs in the near-term to enhance system flexibility, integrate increasing renewable capacity, and provide dispatchable capacity.

TVA is proposing the addition of 10 natural gas-fired Aero CTs at the Johnsonville Reservation. The Aero CTs would generate approximately 550 MW for commercial operation no later than December 31, 2024. TVA's Johnsonville Reservation currently houses 20 simple-cycle CT units within the Johnsonville Combustion Turbine (JCT) plant. The existing JCT Units 1-16 were determined to be in the Most Challenged group and will be retired with their combined generation being replaced at TVA's Paradise and Colbert facilities. The retirement of JCT Units 1-16 and the Allen CT units, and their replacement with new CT units at Paradise and Colbert, was among the actions evaluated in the *Paradise and Colbert Combustion Turbine Plants Environmental Assessment* (EA) (TVA 2021c).

Investments in adding Aero CTs to the peaking fleet aligns with the direction in the IRP, which recommended enhancing system flexibility to integrate renewables and distributed resources, with substantial solar additions over the next two decades. As the amount of solar generation on the TVA generation portfolio continues to increase, flexibility of the remainder of the fleet becomes even more important. Cloud patterns that temporarily block the sun and reduce solar generation require other generating units to respond in order to continue to reliably supply power to customers. Aero CTs are inherently well-suited to provide flexibility, enabling the remainder of the system to better integrate renewables.

Therefore, the proposed action is the addition of 10 natural gas-fired Aero CTs to generate approximately 550 MW at the existing TVA Johnsonville Reservation. The Aero CTs are needed to ensure TVA maintains a reliable peaking fleet and would enhance system flexibility by facilitating the integration of intermittent renewable resources. TVA has prepared this Draft EA pursuant to the National Environmental Policy Act (NEPA) to evaluate the environmental impacts from construction and operation of these Aero CTs.

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 to construct and operate the Aero CTs at the Johnsonville Reservation. 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

Various related environmental documents and materials were reviewed during the preparation of this EA and are listed below. The contents of these documents helped to support the proposed action and/or describe the affected environment and are incorporated by reference as appropriate.

- *2019 Integrated Resource Plan (TVA 2019a)* – 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 Tennessee Valley by providing low-cost reliable power, environmental stewardship, and economic development.

- *2019 Integrated Resource Plan, EIS (TVA 2019b)* – This EIS accompanied the 2019 IRP and assessed the natural, cultural, and socioeconomic impacts associated with the implementation of the IRP. The proposed actions evaluated in this EA support TVA's preferred alternative, Target Power Supply Mix, as described in the IRP and accompanying EIS.
- *Johnsonville Cogeneration Plant EA (TVA 2015)* – TVA evaluated whether to continue to provide steam to external customers given the pending retirement of the fossil plant in 2017. This EA was prepared to evaluate the environmental effect associated with the construction and operation of a heat recovery steam generator (HRSG) integrated into an existing combustion turbine at the Johnsonville Fossil Plant.
- *Johnsonville Fossil Plant Decontamination and Deconstruction EA (TVA 2018)* – In December of 2017 the Johnsonville Fossil Plant ceased operation, and TVA proposed to deconstruct the fossil plant. This EA was prepared to evaluate the environmental effects associated with demolition of the plant into a brownfield site.
- *Johnsonville Fossil Plant Coal Yard and Coal Yard Runoff Pond Closure, Construction of a Process Water Basin and Development of a Borrow Site EA (TVA 2019c)* – TVA has retired all coal-fired units at the Johnsonville Reservation and no longer has a need for coal and therefore proposed to close the associated coal yard and coal yard runoff pond. This EA was prepared to evaluate the environmental effects associated with closure of the coal yard and coal yard runoff pond, construction of a process water basin for process flow management associated with the CT site, and development of a borrow area to support foreseeable projects at the Johnsonville Reservation.
- *Paradise and Colbert Combustion Turbine Plants EA (TVA 2021c)* – TVA prepared this EA to evaluate environmental effects associated with the retirement and decommissioning of certain CT units at the Allen and Johnsonville reservations and the construction of three new natural gas-fueled frame CT units (750 MW) at Paradise and three frame CT units (750 MW) at Colbert for a total of 1,500 MW.
- *Cumberland Fossil Plant Retirement Draft EIS (TVA 2022a)* – TVA prepared this Draft EIS to evaluate the environmental effects associated with the proposed retirement and demolition of the two coal-fired units at the Cumberland Fossil Plant (CUF) and the construction and operation of facilities to replace part of the retired generation. 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 Aero CTs at the Johnsonville Reservation. The impacts associated with the retirement and decommissioning of JCT Units 1-16 were analyzed in the 2019 IRP and are incorporated by reference into the current EA. Long-term actions related to the potential demolition of those units are outside the scope of this EA and will be addressed by TVA in the future when TVA has a detailed proposal for the demolition or future disposition of those units. The scope of this EA, therefore, focuses on the impacts related to construction and operation of Aero CT units, as well as any supporting facilities that may be necessary. A detailed description of the proposed action and alternatives considered are provided in Chapter 2.

This EA was prepared consistent with 2020 Council on Environmental Quality's (CEQ) regulations for implementing NEPA at 40 CFR 1500-1508 (85 Federal Register [FR] 43304-43376, July 16, 2020). TVA's 2020 NEPA regulations at 18 CFR 1318 were also applied (85 FR 17434, March 27, 2020). Further, the EA is consistent with CEQ's recently finalized rule (87 FR 23453, April 20, 2022) amending certain provisions of its 2020 regulations. TVA has considered direct, indirect, and cumulative effects of its proposed action in the EA. The EA also considered all reasonable alternatives that are technically and economically feasible, and meet the purpose and need of the proposed action. TVA considered the possible environmental effects of the proposed action, 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 |
| • Wetlands | • Cultural and Historic Resources | |
| | • Transportation | |

TVA's preliminary analysis identified the following resources as not being affected by the proposed action and are therefore eliminated from further review in this EA.

- Prime Farmland – There are no prime farmland soils mapped within the temporary and permanent use areas. 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 boundaries of the Johnsonville Reservation. Therefore, no changes in land use are anticipated to occur as a result of implementation of this project, and this resource is not evaluated any further in this EA.
- Floodplains – The reservation is located on the eastern shore (right descending bank) of Kentucky Reservoir on the Tennessee River at Tennessee River Mile (TRM) 100 in Humphreys County, Tennessee. The 100-year floodplain is that area that is subject to a one-percent chance of flooding in any given year, and the 500-year floodplain is that area subject to a 0.2 percent change of flooding in any given year. At the proposed project location, both the 100- and 500-year flood elevations would be 375.0 feet referenced to National Geodetic Vertical Datum 1929. The proposed facilities, as well as proposed railway work adjacent to US 70, would be located on existing ground that ranges in elevation from 380 feet to over 400 feet, which is well above the 100- and 500-year flood elevations of 375.0 feet. Additionally, based on Humphreys County, Tennessee, flood insurance rate map panel number 47085C0140D (effective 09/25/2009), all project activities would be located outside of the mapped 100-year floodplain.

As discussed in Section 3.6, one perennial stream was noted during field survey in the southeast corner of the Project Area. Although located within the proposed Project Area, construction activities, structures, and facility operation would avoid the stream and its floodplain (see Figure 3-1). Thus, there would be no direct impacts to floodplains as a result of implementation of the proposed action because the development would occur above both the 100- and 500-year flood elevations and outside the floodplains prescribed by those elevations. Indirect impacts due to the project would be limited to the Johnsonville Reservation and the Johnsonville Borrow Site. Impacts resulting from using material from the borrow site were analyzed in an earlier NEPA review (TVA 2019c).

The proposed project would, therefore, be consistent with Executive Order (EO) 11988 (Floodplain Management) and have no impact on floodplains and their natural and beneficial values. EO 13690 (Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input) was reinstated in May 2021. However, implementation of EO 13690 is still in development at the national level. TVA is working with other federal agencies to develop consistent implementing plans for these EO requirements. Accordingly, this resource is not evaluated any further in this EA.

TVA's action would satisfy the requirements of EO 11988 (Floodplain Management) as amended by EO 13690, EO 11990 (Protection of Wetlands), EO 12898 (Environmental Justice), and EO 13751 (Invasive Species), as well as other applicable laws, including the National Historic Preservation Act (NHPA), Endangered Species Act (ESA), Clean Water Act (CWA), and Clean Air Act (CAA).

1.5 Public and Agency Involvement

The Draft EA was released for a 30-day public comment period on January 10, 2022, and was posted on TVA's website (<http://tva.com/nepa>). Comments on the Draft EA were accepted through February 8, 2022. To solicit public input, the availability of the Draft EA was announced in newspapers that serve the Humphreys County, Tennessee area. A news release was also issued to the media. TVA's agency involvement includes notification of the Draft EA to local, state, and federal agencies, and federally recognized tribes as part of the review.

TVA accepted comments submitted through mail and email. TVA received comments from Tennessee Department of Environment and Conservation (TDEC), Sierra Club, Southern Environmental Law Center, and three members of the public. Comments submitted by the Sierra Club were signed by 174 citizens, 97 of which were accompanied by additional personal messages. Two comments were received from the Southern Environmental Law Center, one in collaboration with Sierra Club, Southern Alliance for Clean Energy, and Center for Biological Diversity asking for an extension of the public comment period, and the second in conjunction with Appalachian Voices, Energy Alabama, Sierra Club, Center for Biological Diversity, and Southern Alliance for Clean Energy that included 45 attachments. Across all of the comments received, the most frequently mentioned topics related to the analysis of alternatives, air quality and climate impacts, environmental justice, and cumulative impacts.

All substantive comments received from the public, agencies and other interested parties were carefully reviewed. Appendix A includes the comments received on the Draft EA and TVA's responses to those comments.

1.6 Necessary Permits or Licenses

TVA would 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.

- Stormwater Best Management Practices (BMPs) and TDEC National Pollutant Discharge Elimination System (NPDES) permit application and/or modification for all stormwater discharges associated with construction activity that disturbs more than one acre of land.
- Modification of the existing TDEC NPDES permit for discharges from the operation of the proposed Aero CT plant.
- Modification to Johnsonville Reservation's existing CAA Title V Operating Permit via Prevention of Significant Deterioration (PSD) review under the CAA.

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CHAPTER 2 – ALTERNATIVES

2.1 Alternative Development

2.1.1 Generation Type

As described in Chapter 1, the 2019 CT Modernization Study recommended that TVA add approximately 500-650 MW of new Aero CTs to the fleet in the near-term to enhance system flexibility, integrate increasing renewable capacity, and provide dispatchable capacity, which would lessen the burden on the remainder of the system as renewable energy resources, such as solar, are integrated.

At this time, the combination of renewable energy and storage cannot provide the same magnitude of reliable and cost-effective energy year-round as is possible with CTs in combination with renewables. While solar prices are becoming competitive, solar does not contribute to the winter peak, which typically occurs just before sunrise. Therefore, solar requires dispatchable resources, such as 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.

2.1.2 Location

During initial project planning, TVA considered a range of alternatives and specific screening criteria with respect to the proposed action. Candidate sites 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 multiple potential locations for new Aero CTs. The 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 Aero CTs

<u>Transmission</u> <ul style="list-style-type: none"> • System Upgrades Needed • Locational Value 	<u>Site Considerations</u> <ul style="list-style-type: none"> • TVA owned vs non-TVA Owned Sites • Site Availability (available for purchase) • Land Cost • Access to Water 	<u>Operational Considerations</u> <ul style="list-style-type: none"> • Supply Chain Considerations • Staffing
<u>Fuel Supply</u> <ul style="list-style-type: none"> • Cost • Availability • Reliability • Operational Considerations 	<u>Environmental Considerations</u> <ul style="list-style-type: none"> • Environmental Regulations • Sensitive Environmental/Cultural Resources Present 	<u>Financial and Planning Considerations</u> <ul style="list-style-type: none"> • Long Range Financial Plan • Integrated Resource Plan

Based on evaluation of the screening criteria and the 2019 CT Modernization Study, TVA proposes to construct new Aero CTs at the Johnsonville Reservation. This location offered several advantages to alternative locations:

- The construction footprint for the new units would allow the Aero CTs to be built on previously disturbed land within existing TVA property, as opposed to requiring the purchase or utilization of greenfield property to locate the new units.
- The existing natural gas infrastructure on the Johnsonville Reservation that supports the existing JCT plant could be utilized to also support the additional proposed Aero CT units.
- Proximity of the Johnsonville Reservation to load centers in Nashville and Middle Tennessee make this site increasingly attractive for Aero CTs offering synchronous condensing for area grid support.
- Throughout the operational history of the Johnsonville Fossil Plant, extensive environmental reviews have been conducted, which provide a level of confidence, for initial screening purposes, that there is a low potential for impacting sensitive environmental resources.

2.2 Description of Alternatives

2.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not construct 10 natural gas-fired Aero CTs generating approximately 550 MW or the associated support systems to provide this generation at the Johnsonville Reservation. However, the No Action Alternative would not align with IRP recommendations or the TVA Strategic Intent and Guiding Principles, which focus on energy supply and decarbonization initiatives (TVA 2021f). This alternative does not meet the purpose and need of TVA's proposed action and is carried forward in this analysis as a baseline for comparison.

2.2.2 Alternative B – Construction of Johnsonville Aero CTs and Support Systems

Under Alternative B, TVA would construct 10 natural gas-fired Aero CTs generating approximately 550 MW and associated support systems to provide this generation at the Johnsonville Reservation. The overall Johnsonville Aero CT Project Area (herein referred to as the Project Area) consists of approximately 245 acres of mostly heavily disturbed land located completely within the Johnsonville Reservation (Figure 2-1). The entirety of this Project Area would not be affected by project activities; however, final locations for laydown yards, parking, construction trailers, etc., are dependent upon final design. Estimated locations for these features have been included in Figure 2-1. Construction of the Aero CTs and associated structures is expected to begin in late 2022 and would take approximately two years. Actions associated with implementation of this alternative are described below.

2.2.2.1 Construction of Aero CTs

TVA would construct 10 new natural gas-fired Aero CTs, with inlet evaporative cooling, within the boundaries of the Johnsonville Reservation as shown in Figure 2-1. Subsurface piles would be installed to support foundations for plant components, as required. In addition to these major equipment systems, the proposed Aero CT facility 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 Aero CT plant would occupy approximately 15 acres of the 245-acre Johnsonville Aero CT Project Area.

2.2.2.2 Construction of Supporting Facilities

To support the new Aero CTs, TVA would also construct and operate an Aero 161-kilovolt (kV) switchyard, which would be situated on approximately 2 acres located southeast of the new Aero CT units within the Project Area. A new transmission line would be constructed to connect the Aero CTs to the Aero 161-kV switchyard. TVA would add and replace breakers in the existing Johnsonville switchyard and upgrade the associated protection systems. A new switch house would be installed for the Aero 161-kV switchyard, which would tie into the existing force main and sewer system. Fiber would be installed on the new transmission lines between the new Aero 161-kV switchyard and the existing Johnsonville switchyard.

The Aero CT units would be fueled by a reliable supply of natural gas through existing TVA service agreements. No upgrades to the existing natural gas supply would be required. However, TVA would need to construct and operate a new compressor station onsite. The final location for the compressor station is anticipated to be within existing TVA property and in close proximity to the Aero CT units. The compressor station would be driven by electric motors and, therefore, would not require additional air permitting.

Other support facilities that would be constructed as part of this alternative include a new administration/control building that would be constructed to serve the Aero CTs in addition to the existing CT units 17-20 and auxiliary boilers. TVA may also construct up to three new warehouses for supplies and/or office space for regional employees. The final locations for these buildings are anticipated to be within existing TVA property and in close proximity to the Aero CT units. The estimated location for these warehouses is shown on Figure 2-1.

TVA has identified six areas (totaling approximately 36 acres) within the Project Area that would be used for vehicle and equipment parking, materials storage, laydown, and construction administration during construction of the Aero CTs. In addition, the craft trailer area (0.8 acres) would be designated for temporary light uses, such as trailer placement or light vehicle parking, during construction. These areas are all located on previously disturbed areas and, when construction is complete, they would be allowed to revert to their original use.

TVA estimates that borrow needs would be minimal, and if necessary, borrow could be obtained from the TVA-owned borrow site identified in the *Johnsonville Fossil Plant Coal Yard and Coal Yard Runoff Pond Closure, Construction of a Process Water Basin, and Development of a Borrow Site EA* (TVA 2019c) or from an existing commercial borrow pit. The location of the TVA-owned borrow site is shown on Figure 2-2. If borrow material from an existing off-site commercial borrow pit is required, additional environmental reviews would be conducted, as appropriate.

The Aero CT units would utilize evaporative cooling and wet compression for power augmentation. Evaporative cooling would only be used when the ambient temperature is 60 degrees Fahrenheit (°F) or greater and wet compression would be used when the ambient temperature is 45°F or greater. Maximum total estimated water consumption is 300 gallons per minute (gpm) potable water and 300 gpm demineralized water. The JCT plant already has adequate capacity for demineralized water production that would be used for the Aero CTs. Any process water discharges would be directed to the existing Johnsonville Process Water Basin and the site NPDES permit would be modified accordingly. Additional potable

water for evaporative cooling, domestic use, and safety showers would be obtained from the existing public supply. The water supply for the fire protection system would be provided from the existing fire water supply.

Operating the Aero CT units would also require air emissions monitoring. Reduction of nitrogen oxide (NO_x) emissions from the Aero CTs would be achieved through dry low emissions (DLE) combustion systems and Selective Catalytic Reduction (SCR). An oxidation catalyst (OC) system would be used to control carbon monoxide (CO) emissions. Exhaust stacks would be equipped with continuous emissions monitoring systems. Emissions from the units would adhere to the requirements of state 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 may be transported by rail. The existing rail system within the Johnsonville Reservation may require repairs, which would be identified at a later date pending evaluation of the final design. These modifications would be minor and are expected to occur within approximately 19.3 acres of the 245-acre Johnsonville Aero CT Project Area. Additional environmental reviews would be conducted, as appropriate, for any necessary changes to the existing rail system. Roads within the Project Area would be maintained during the construction process.

2.2.2.3 Aero CT Project Construction

Site preparation work, Aero CT plant construction, and other site upgrades would begin in late 2022, and the plant would begin commercial operation no later than December 31, 2024. 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 (for example, tracked vehicles) 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 200 workers would be employed onsite at the peak of the 2-year construction period. Once constructed, it is expected that staff from the retiring JCT Units 1-16 could transition to operate the new Aero CTs; therefore, there would be no change in the operations staff.

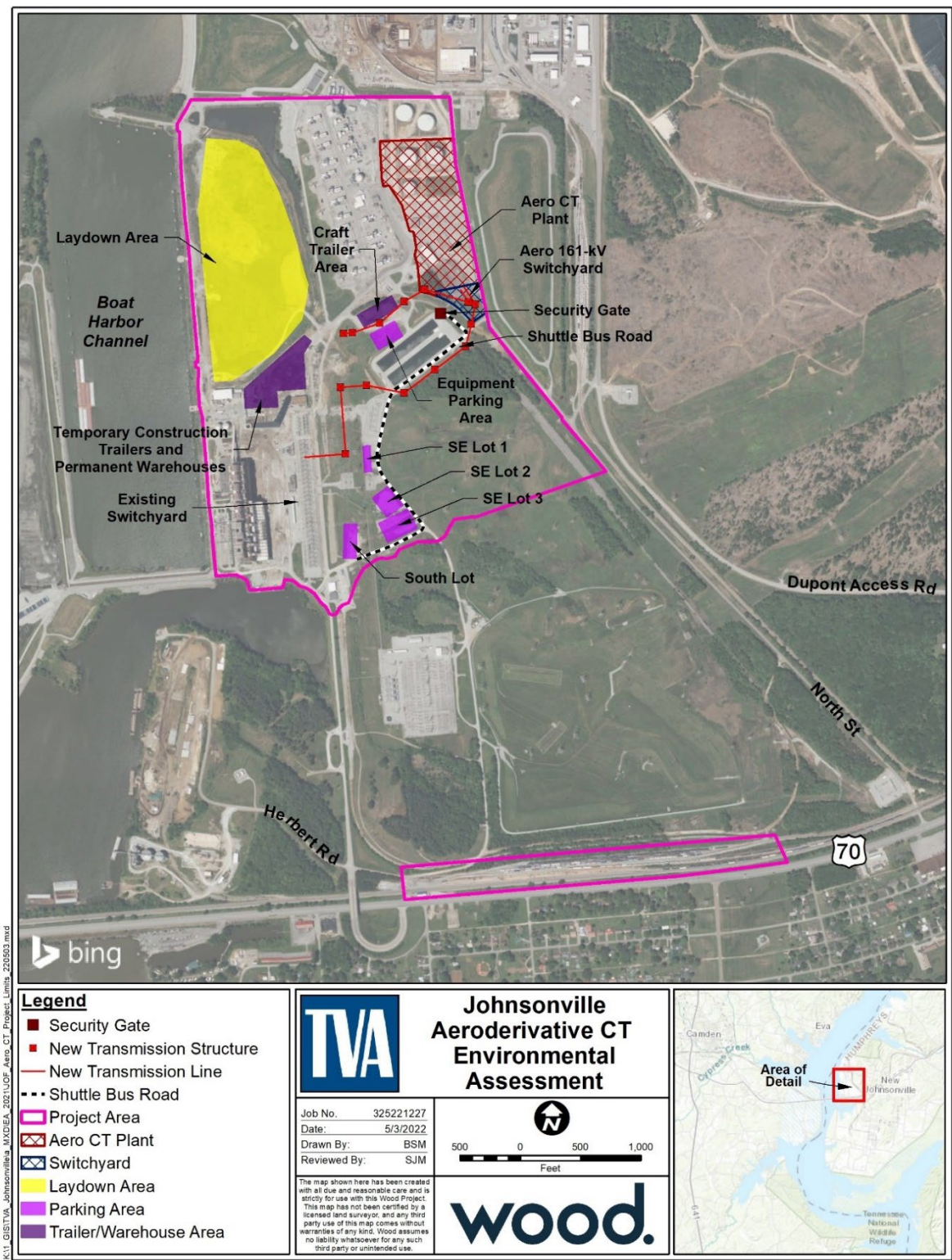


Figure 2-1. Johnsonville Aero CT Project Area

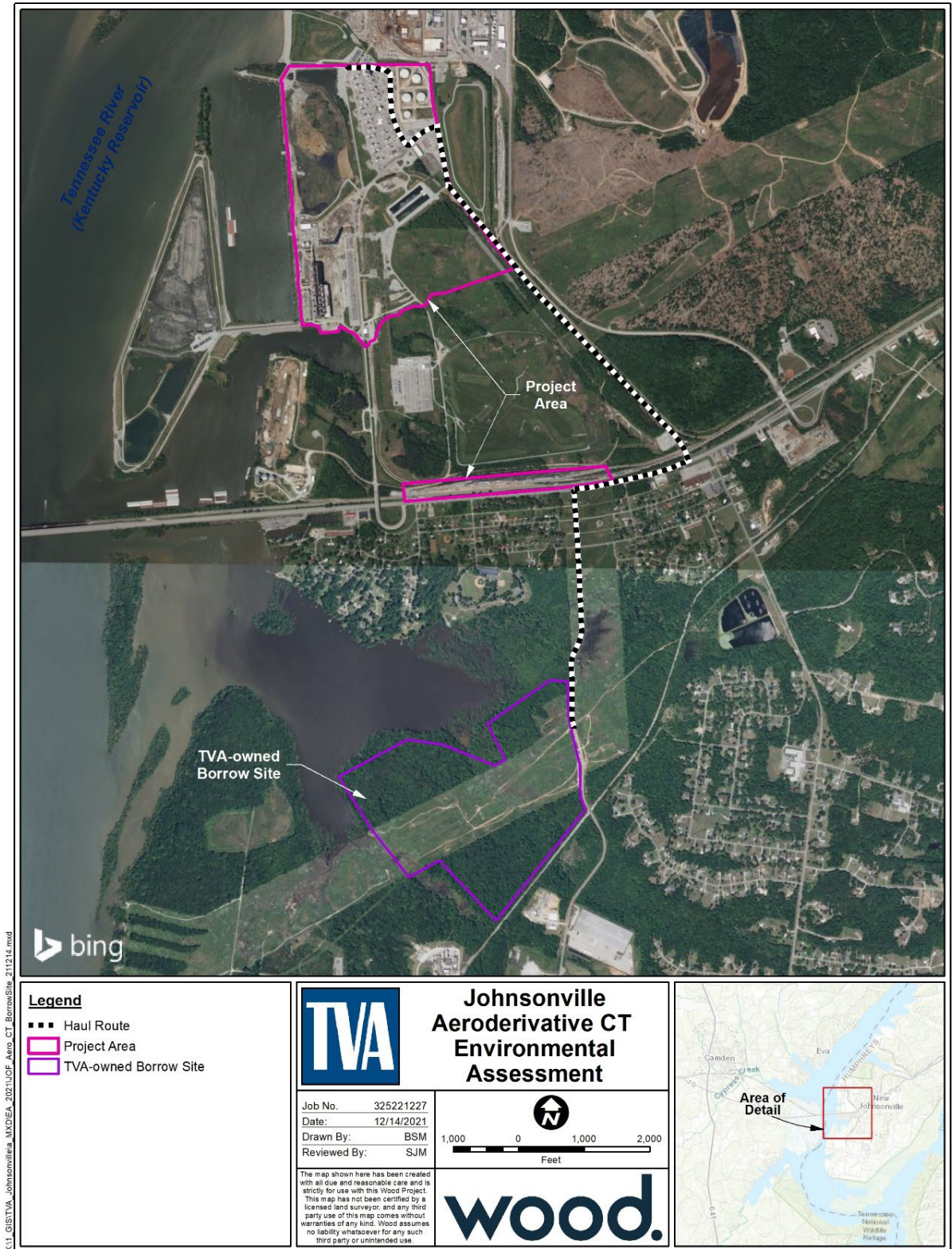


Figure 2-2. Location of TVA-owned Borrow Site

2.3 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.	Temporary minor construction impacts associated with emissions from onsite vehicles and equipment, as well as generation of fugitive dust. Operation of the Aero CTs would result in an incremental increase in emissions as measured against the current baseline. These emissions would be monitored and would comply with permit limits and would not lead to exceedance or violation of applicable National Ambient Air Quality Standards (NAAQS).
Climate Change and Greenhouse Gases	No impact	Temporary localized, minor greenhouse gas emissions during construction activities. Operational emissions would be minor relative to regional and national greenhouse gas (GHG) levels and would not impact climate change. Indirect effects include enabling an overall increase in delivery of clean/renewable energy generation which contributes to an overall decrease in regional and national GHG emissions.
Geology and Soils	No impact	Minor temporary increase in soil erosion, minimized with BMPs.
Groundwater	No impact	Minor impacts to groundwater minimized with the use of BMPs. 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. Impacts would be minimized through implementation of BMPs designed to minimize erosion during construction and operation.
Wetlands	No impact	Minor impact due to the clearing of 0.05 acres of forested/emergent wetland within the transmission line corridor. Temporary, minor impacts associated with erosion and sedimentation from stormwater runoff during construction activities that would be minimized through the implementation of BMPs.
Aquatic Ecology	No impact	Minor, temporary impacts from stormwater runoff during construction activities that would be minimized through the implementation of BMPs. Implementation of BMPs during operation would minimize site stormwater runoff.
Vegetation	No impact	Minor impact. The project would primarily impact locally common vegetation with limited conservation value. A total of 1.05 acres of deciduous forested area would also be cleared. Impacted forest communities are common within project vicinity and impact would be negligible

Resource	Alternative A	Alternative B
		compared to the total amount of forest land in the region.
Wildlife	No impact	Minor impact to heavily disturbed low-quality habitat. Impact associated with the loss of forested habitat is minor due to the abundance of similarly suitable habitat in the vicinity of the Project Area. Several osprey nests exist in the Project Area. Coordination with U.S. Department of Agriculture (USDA)-Wildlife Services would occur as necessary to ensure compliance under federal law.
Threatened and Endangered Species	No impact	This alternative would likely adversely affect the Indiana bat, northern long-eared bat, and gray bat, and would not affect any of the other listed animal or plant species. Project activities are within the bounds of impacts analyzed in TVA's programmatic consultation on routine actions with potential to affect federally listed bats that was completed in April 2018 with the U.S. Fish and Wildlife Service (USFWS). With adherence to identified conservation measures, federally listed bats would not be adversely affected.
Visual Resources	No impact	Minor impacts due to temporary visual discord during construction activities.
Cultural and Historic Resources	No impact	No impact.
Transportation	No impact	Temporary, minor impacts associated with increased traffic on area roadways during construction activities.
Natural Areas, Parks and Recreation	No impact	Minor, temporary impacts during construction activities.
Noise	No impact	Temporary, minor adverse impact associated with increased noise during construction activities. Noise impacts from operation would be minor. TVA would utilize noise abatement technology, if necessary, to ensure that noise levels would not exceed 55 dBA at sensitive offsite noise receptors.
Solid and Hazardous Waste	No impact	No impact as solid and hazardous wastes generated during construction and operation of the Aero CT units 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 Aero CT units 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.

2.4 TVA's Preferred Alternative

TVA has identified Alternative B as its preferred alternative. Under the preferred alternative, TVA would construct 10 natural gas-fired Aero CT units generating approximately 550 MW and support systems at the Johnsonville Reservation. This replacement aligns with the 2019 IRP recommendation to enhance system flexibility and TVA's Strategic Intent and Guiding Principles document.

2.5 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 provided in TVA's fugitive dust control plans required under existing CAA 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 2017) and in specific state regulatory sediment and erosion control handbooks would be outlined in the project-specific Stormwater Pollution Prevention Plan (SWPPP) and 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.
- Equipment washing and dust control discharges would be handled in accordance with BMPs described in the SWPPP for water-only cleaning and/or NPDES Permit TN 100000 to minimize construction impacts to surface waters.

Mitigation measures include:

- To the extent practicable, TVA would establish an average 30-foot buffer around the emergent wetland located adjacent to the Aero 161-kV switchyard and preclude any ground disturbing actions within the buffer to avoid direct impacts to the wetland.
- To the extent possible, TVA would prioritize clearing suitable summer roosting habitat for Indiana bat and northern long-eared bat during the winter months (October 15 – March 31) when bats are in caves and not out on the landscape. Unavoidable impacts to potential suitable summer roosting habitat for the northern long-eared bat and Indiana bat would be addressed using TVA's programmatic consultation on routine actions with potential to affect federally listed bats that was

completed in April 2018 with the USFWS in accordance with ESA Section 7(a)(2). For those activities with potential to affect bats, TVA committed to implementing conservation measures established through the programmatic consultation. The conservation measures required for this project are identified on pages 5-7 of the TVA Bat Strategy Project Review Form (Appendix B), and they would be implemented as part of the proposed project.

- To the extent possible, TVA would prioritize tree removal during the winter clearing window (October 15 – March 31), which would be beneficial to migratory birds. If the timing of proposed construction activities within 660 feet of the osprey nests at the Johnsonville Reservation cannot be modified to avoid nesting seasons, coordination with the USDA-Wildlife Services would be required to ensure compliance under EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds).
- TVA would utilize noise abatement technology, as necessary, to ensure that noise emissions would not exceed 55 dBA at sensitive offsite noise receptors.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Scope of Analysis

This chapter describes the baseline environmental conditions (affected environment) of environmental resources in the Project Area and the anticipated environmental consequences (or impacts) that would occur from implementation of the alternatives described in Chapter 2.

3.1.1 Impact Assessment

Within the environmental consequences sections, impacts may be beneficial or adverse and may apply to the full range of natural, aesthetic, historic, cultural, and socioeconomic resources within the Project Area and within the surrounding area. Impact severity is dependent upon their relative magnitude and intensity and resource sensitivity. In this document, four descriptors will be used to characterize the level of impacts as follows:

- No Impact – resource not present or affected by project alternatives under consideration
- Minor (or “small”) – environmental effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource
- Moderate – environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource
- Large – environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource

3.1.2 Past, Present, and Reasonably Foreseeable Actions

The 1978 CEQ regulations (40 CFR §§ 1500-1508) implementing the procedural provisions of the NEPA of 1969, as amended (42 USC § 4321 et seq.) defined 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” from the 1978 regulations was incorporated in TVA’s amended NEPA regulations that became effective on April 27, 2020. Further, this same definition has been added in substantially the same form to CEQ’s regulations that were recently revised on April 20, 2022, See 87 FR 23453 (definition in Section 1508.1(g)(3) of CEQ’s revised regulations). 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 following sections are based on baseline conditions and, therefore, incorporate the cumulative impacts of past and present actions. The impact analyses also address reasonably foreseeable future actions.

Table 3-1 identifies past, present, and reasonably foreseeable future actions that were identified in the vicinity of the proposed action. The affected environment for each resource describes the environment of the area(s) to be affected by the alternatives under consideration, including the reasonably foreseeable actions in Table 3-1. While the information currently available indicates these projects are all potentially reasonably foreseeable for construction at some point in the future, not all of these projects are guaranteed and the planning details for each project may not yet be available.

On-going operations of adjacent industrial facilities, including emissions from local vehicles and related impacts to air quality, including GHG emissions, are considered part of the existing environmental setting and are not expected to increase in the foreseeable future. Implementation of the other foreseeable future actions that may contribute minor, localized, and short-term air emissions in proximity to the Aero CT project include the closure of Ash Pond 2, construction of the metering station associated with the lateral divestiture project, closure of the coal yard and coal yard runoff pond, construction of simple cycle CT units at Johnsonville for the proposed Cumberland Fossil Plant Retirement project, and construction of the hydrogen hub. Tree removal may be required as part of the lateral divestiture project, the development of the borrow site on TVA property, and construction of off-site transmission lines to support the simple cycle CT units for the Cumberland Fossil Plant Retirement project. Construction activities associated with closure of Ash Pond 2 and the coal yard and coal yard runoff pond, the construction of the simple cycle CT units for the Cumberland Fossil Plant Retirement project, and construction of the hydrogen hub have the potential to release constituents that may impact groundwater. However, all project activities would comply with the applicable state and federal permits and regulations, which would minimize impacts to these resources. The other proposed actions identified in Table 3-1 would be located within TVA-owned lands on the Johnsonville Reservation, which have been disturbed from previous development. Therefore, these other actions would either have a minor, temporary effect during construction or a positive effect on the other resources, including geology/soils, surface water, wetlands, aquatic ecology, wildlife, threatened and endangered species, visual resources, cultural resources, transportation, natural areas, parks, recreation, noise, waste, socioeconomics, and public health and safety. In addition, these minor, temporary effects would not be disproportionate to the environmental justice community within the project vicinity.

Table 3-1. Summary of Past, Present, and Reasonably Foreseeable Future Actions in the Vicinity of the Johnsonville Aero CT Plant Project Area

Action	Description
Operations of Adjacent Industrial Facilities	The reservation is bordered by Chemours chemical plant and OxyChem plant to the north. The two facilities work under an agreement to utilize raw materials and services provided by each other. The facilities also include a shared barge docking facility and wastewater outfall in the reservoir. To the southwest of the reservation is a sand and gravel mining facility, Herbert Sand and Gravel Company. This facility includes material stockpile areas, various supporting buildings, and a barge docking facility. The JCT is located east of the former Johnsonville coal plant and operations at the JCT facility would continue indefinitely after the retirement/deconstruction of the coal plant. These facilities around the reservation collectively are part of the base condition characterized by each of the environmental resources evaluated below and contribute to the previously developed elements of the environmental setting for this EA and on-going disturbance due to their operations.
Decontamination and Deconstruction of Johnsonville Fossil Plant	The Johnsonville Fossil Plant ceased operation in December of 2017 and decontamination and decommissioning activities are underway. Under this action all environmental issues associated with identified structures would be assessed and abated, including the decontamination of all buildings, structures, conveyers, and tunnels associated with plant operations. All removed structures would be demolished to 3 feet below final grade and all basements, pits, and trenches would be backfilled up to the surrounding grade while providing proper drainage. All disturbed areas would have topsoil installed and seeded or otherwise stabilized. Final restoration is expected to be completed in June 2022.
Closure of Ash Pond 2 at Johnsonville Fossil Plant	TVA is currently evaluating alternatives for closure of Ash Pond 2, including closing the impoundment in place or removing coal combustion residuals (CCR) from the impoundment and transporting offsite for disposal. Before closure activities begin, a detailed environmental review would be conducted to evaluate closure alternatives. TVA estimates that closure activities would begin after 2025.
Lateral Divestiture Project	TVA is proposing to divest an approximately 28-mile-long natural gas pipeline, existing metering station, and associated easements and grant an easement over approximately one acre of property on the JCT site for the construction of a future metering station. The pipeline and easements are located in Humphreys and Hickman counties, in the vicinity of JCT. This independent action will be assessed in a separate NEPA document. Work on this project is ongoing and expected to be completed by 2026.

Action	Description
Closure of Coal Yard and Coal Yard Runoff Pond	Due to the retirement of all coal-fired units at the Johnsonville Reservation, TVA no longer has a need for coal and the associated coal yard and coal yard runoff pond. Closure of the coal yard includes the removal of approximately 24,000 cubic yards of unburned coal and 40,000 cubic yards of sediment from the coal yard runoff pond that is stockpiled on the coal yard. TVA may elect to consider implementing a reclamation process to recover the maximum amount of reusable fuel remaining in the coal stockpile (70-90 percent of the stockpile). The useable fuel obtained by this process would be delivered to the nearest TVA facility, Cumberland Fossil Plant. The remaining material would be transported to the West Camden Sanitary Landfill. If TVA does not implement the reclamation process, all of the stockpiled material would be transported to the West Camden Landfill. Closure of the coal yard runoff pond would include dewatering, removal of pumps, pipes, platforms and mechanical equipment, and excavation and stockpiling of sediment onto the coal yard stockpile. Following removal of the coal stockpile and coal yard remnants, CCR underlying the coal yard and soil from the south side of the coal yard would be excavated and consolidated within the north side of the coal yard. The closure system would incorporate a geomembrane liner and cover consisting of either protective/vegetative soil or a turf system, which consists of an engineered turf and sand fill. The remainder of the coal yard would be graded for proper drainage. Vegetation would be established on areas of bare soil on the south side of the former coal yard. Work on this project is expected to begin after 2025. This action was assessed in an earlier NEPA document completed in March 2019 (TVA 2019c).
Development of Borrow Site on TVA Property	TVA has identified a 165-acre borrow site on TVA-owned property located 1.8-miles south of the Johnsonville Fossil Plant. This site may be used for various planned activities within the Johnsonville Reservation. This action was assessed in an earlier NEPA document completed in March 2019 (TVA 2019c).
Retirement of JCT Units 1-16 at Johnsonville Fossil Plant	JCT Units 1-16 will be retired and decommissioned, and their combined generation is being replaced by TVA's Paradise and Colbert CT facilities. The JCT units would be retired and decommissioned after the proposed Aero CTs are operating. The action to build and operate the Paradise and Colbert CT facilities was assessed in an earlier NEPA document completed in June 2021 (TVA 2021c).
Demolition of Warehouse Buildings and Fuel Oil Tanks at Johnsonville Fossil Plant	The demolition and removal of these structures would be completed prior to the construction of the proposed Aero CT plant.

Action	Description
Cumberland Fossil Plant Retirement	TVA's Cumberland Fossil Plant is proposed to be retired and alternative power generation sources would provide replacement power consistent with the 2019 IRP. TVA has prepared a Draft EIS for this project and under Alternative B of that Draft EIS, TVA would construct and operate four simple cycle CT gas units at Johnsonville and three at Gleason Reservation. Construction of the new CTs would be completed before the first Cumberland Fossil Plant unit is retired, which would be as early as 2026 and no later than 2030. Potential impacts from this action were assessed in the Draft EIS which was available for public comment from April 29 to June 13, 2022 (TVA 2022a).
Department of Energy Regional Clean Hydrogen Hubs	TVA is considering participating in submittal of an application to the Department of Energy's anticipated Regional Clean Hydrogen Hubs funding opportunity (DE-FOA-0002768). This application would be for funding to construct a clean hydrogen hub. This Funding Opportunity Announcement has not been issued at this time, and TVA is in the early stages of evaluating the Johnsonville Fossil Plant as a potential location for this project. If TVA participates in submittal of an application to this opportunity and the application was unsuccessful in receiving the award, a hydrogen hub would not be constructed at the Johnsonville site. If the application is successful in seeking funding for a hydrogen hub, an environmental review would be conducted to evaluate the potential effects of construction and operations prior to making any decision to proceed. Construction activities would not be expected to begin prior to 2025. Any application for funding in response to the Funding Opportunity Announcement would be made by a consortium or team of which TVA is a participant.

3.2 Air Quality

3.2.1 Affected Environment

3.2.1.1 Air Quality

The 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 U.S. Environmental Protection Agency (EPA) to establish 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: CO, nitrogen dioxide (NO₂), ozone (O₃), 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 2021d).

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 Johnsonville Reservation, which includes the existing JCT and the proposed Aero CTs, is located in New Johnsonville, Humphreys County, Tennessee. Air quality in Humphreys County is protected under Chapters 1200-03 and 0400-30 of the Tennessee Air Pollution Control Regulations (APCR) promulgated by TDEC, Bureau of Environment, Division of Air Pollution Control. Humphreys County is currently in attainment with ambient air quality standards referenced in Chapter 1200-03-03 and the NAAQS (EPA 2021a).

3.2.1.2 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 O₃, fine particulate matter, regional haze, acid deposition, and nitrogen saturation. Natural sources of NO_x include lightning, forest fires, grass fires, trees, bushes, grasses, and microbial activity; major sources of human-produced NO_x emissions include motor vehicles, industrial boilers, petroleum refineries, nitric acid manufacture, and incinerators (EPA 1999).

Sulfur oxides (SO_x) are compounds of sulfur and oxygen molecules. 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), sometimes 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 2021c). 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 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 several area sources, emissions can be of concern.

3.2.1.3 Characterization of Existing Johnsonville Reservation Site Operations

JCT currently consists of twenty natural gas or oil-fired CTs, four natural gas heaters, and two natural gas auxiliary boilers. CT Unit 20, with the addition of a HRSG and duct burner,

is a combined heat and power (CHP) unit that provides steam to an off-site customer. The two natural gas auxiliary boilers are backup steam generators for the CHP unit. JCT currently operates under Title V Permit No. 572833, issued November 26, 2018.

3.2.2 Environmental Consequences

3.2.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not construct the 10 natural gas-fired Aero CTs or associated support systems at the Johnsonville Reservation. Because no changes to operations are foreseen, air pollutant emissions would be unchanged. Consequently, air quality would not be affected.

3.2.2.2 Alternative B – Construction of Johnsonville Aero CTs and Support Systems

3.2.2.2.1 Construction Impacts

Under Alternative B, construction activities associated with the Aero CT units and support systems would result in emissions from the operation of construction equipment driven on paved and unpaved roads and fugitive dust emissions 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 CAA 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, carbon dioxide (CO₂), O₃, 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. 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.

Some tree clearing is expected to be required as part of the proposed construction. 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 minor.

Proposed activities would primarily occur on previously disturbed land located within the reservation boundary. 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 offsite areas.

Air emissions generated by the other reasonably foreseeable future actions in Table 3-1 would be minor, localized, and short-term. Emissions from ongoing operations of adjacent

industrial facilities, including emissions from local vehicles and related impacts to air quality, together with emissions associated with construction of the Aero CT units, would incrementally increase emissions within Humphreys County under the proposed action. If the potential construction of the simple-cycle CTs at JCT as part of the Cumberland Fossil Plant Retirement project were to occur in addition to the construction of the Aero CT units, the combined projects could cause cumulative minor, temporary effects to air quality in the area during construction. As detailed in the 2022 Cumberland Fossil Plant Retirement Draft EIS, emissions estimates for construction of the CTs under Alternative B were assessed and impacts were anticipated to be temporary and minor. Emissions would occur in attainment areas and potential construction is not anticipated to appreciably change levels of criteria pollutants (TVA 2022a). Such effects would be mitigated through the use of BMPs such as water suppression for dust control and regular inspections and maintenance of construction vehicles. Exceedances of applicable ambient air quality standards are not expected. Therefore, the cumulative impacts of the proposed action combined with the other reasonably foreseeable future actions would not adversely affect regional air quality.

Regulatory Air Permit Requirements

Operation of the proposed Aero CTs and emergency generator 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 regulations; major sources under the PSD regulation are sources that have 250 tpy of potential emissions of any criteria pollutant or 100 tpy for specifically listed source categories.¹

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 (NNSR). As the Aero CTs would be located at the Johnsonville Reservation in Humphreys County, presently designated as an attainment area or “unclassifiable,” any significant emission increases from the proposed project would be subject to PSD pre-construction review to ensure air quality in the area is protected and attainment status is maintained.

The Johnsonville Reservation is a major PSD source. Therefore, operation of the Aero CTs would 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 significant emissions increase of a regulated pollutant and a significant net emissions increase of that pollutant from the major stationary source), and full PSD permitting requirements apply. For all PSD-regulated pollutants other than greenhouse gases, PSD permitting is required if the emissions increase of a specific pollutant exceeds that pollutant’s PSD Significant Emissions Rate (SER). SERs, 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.

Although there are nuances to the PSD program, in general 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

¹ Note: the major source threshold for initial inclusion in the PSD program differs from the Title V major source threshold of 100 tpy.

and any other increases and decreases in baseline actual emissions at the major stationary source that are contemporaneous with the change and otherwise creditable.

The Johnsonville Reservation has an existing Title V permit for JCT operations. The Title V permit includes emission limits (as established by federal/state/local regulation) and includes data tracking, recordkeeping, and reporting measures to verify compliance.

Construction of the Aero CT units would require modification of the existing Title V permit. Permit modifications, established through a PSD permit review process, would incorporate limitations from applicable federal and state regulations, including, but not limited to, the following:

- New Source Performance Standards (NSPS): 40 CFR 60, Subpart JJJJ, is applicable to all stationary spark ignition (SI) internal combustion units (ICE) constructed after June 12, 2006, and would apply to the new natural gas emergency generator. The facility would comply with the requirements of the rule, including, but not limited to, pollutant emission standards, fuel limitations, and limits on engine operation for non-emergency purposes.
- NSPS: 40 CFR 60, Subpart KKKK, is applicable to all stationary gas CT units with a heat input at peak load between 50 and 850 million British Thermal Units (MMBtu) per hour for which construction or modification is commenced after February 18, 2005. NO_x emissions while firing natural gas are limited to 25 parts per million (ppm), corrected to 15 percent oxygen (O₂). SO₂ emissions are limited to 0.06 pounds SO₂ per MMBtu. There are also monitoring and testing requirements associated with this regulation.
- 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 120 pounds CO₂ per MMBtu. Other applicable requirements include purchase records for permitted fuels and initial notifications.
- APCR 1200-03-05-.01 limits opacity from all stationary sources to 20 percent with monitoring and work practice standards; all proposed equipment would be subject to this standard.
- APCR 1200-03-06-.02(2) applies to new and existing fuel burning equipment and provides maximum PM emission rate limits.
- APCR 1200-03-08-.01 requires reasonable precautions to limit fugitive dust, such as use of water or chemicals to control dust in construction operations, limiting visible emissions from fugitive dust beyond the property line to a maximum of five minutes per hour or twenty minutes per day.
- APCR 1200-03-09-.01 and .02 are the requirements for Construction and Operating Permits for new or modified sources.

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

3.2.2.2.2 Operational Impacts

Emissions of SO₂ from natural gas-fired plants are very low, and direct emissions of NO_x and CO₂ are low relative to other fossil plants (TVA 2019b). Natural gas-fired plants emit negligible amounts of mercury.

Each of the 10 GE LM6000 natural gas simple-cycle Aero CTs would be equipped with SCR for minimizing emissions of NO_x, as well as an OC system, which minimizes emissions of CO and VOC. The proposed units 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. As such, an average of two startup and shutdown cycles per day for each turbine is anticipated by TVA.

During combustion at 100 percent operating load, the heat input capacity of each new turbine is estimated to be 465.8 MMBtu/hour at 59°F with a corresponding generator output capacity of approximately 55.5 MW.

Potential annual emission contributions from operation of the Aero CTs and emergency generator based on TVA estimates, and associated SERs, are provided in Table 3-2. As emissions vary with ambient temperature and operating configuration, annual turbine potential emissions are based on a combination of routine operations with time estimated for startup and shutdown events and the capacity threshold of each turbine (as determined by Subpart TTTT), as well as the anticipated emissions from the emergency generator. The annual hours of routine operation for each Aero CT allowed by Subpart TTTT is approximately 3,400 hours. The proposed turbines are anticipated to have, on average, two startup and shutdown cycles per day for each Aero CT, or 730 cycles per year, for a total of 365 hours of startup periods and 109 hours for shutdown. Anticipated annual operating hours is expected to be lower based on TVA's experience at other simple-cycle CT plants.

Although PSD regulations allow use of contemporaneous creditable emission increases and decreases to determine the net emission increase, there are no creditable increases or decreases of emissions in the contemporaneous period.

Table 3-2. Project Annual Emission Estimates and PSD Significant Emission Rates

Pollutant	Emissions (tons/year)		PSD Triggered (Y/N)
	Project Emission Increases	Significant Emission Rates	
CO	238.6	100	Yes
NO _x	246.9	40	Yes
SO ₂	6.3	40	No
Filterable PM	47.4	25	Yes
PM ₁₀	65.0	15	Yes
PM _{2.5}	65.0	10	Yes
VOC	21.9	40	No
Pb	3.80E-03	0.6	No
Sulfuric Acid	0.5	7	No
CO _{2e}	1,141,195	75,000	Yes

Anticipated emissions from the proposed Aero CTs exceed PSD significance 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 and 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 2021e).

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. For the Aero CTs, BACT has been proposed by TVA as SCR, Dry Low NO_x (DLN), an OC system, good combustion and operating practices, and low sulfur fuels.
- 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, would 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.

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. There are three Class I areas in the vicinity of the Johnsonville Reservation: Sipsey Wilderness, Mammoth Cave National Park, and Mingo Wilderness. Class II areas are areas that are in attainment or noted to be unclassifiable. Based on the location of the proposed Aero CTs, both Class I and Class II areas are potentially impacted and are included in the air quality analysis.

- 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/Title V requirements with the submission of a PSD Permit Application, Volumes I and II, to the TDEC in September 2021 (Trinity Consultants 2021). Volume I of the application includes project details, proposed equipment, air emissions calculations, regulatory applicability, BACT analysis, and required TDEC air permit application forms. Volume II includes the approach to evaluating air quality

impacts and dispersion modeling results, notably that the analysis demonstrates that the project would not result in a violation of the NAAQS for PM₁₀, PM_{2.5}, NO₂, CO, and O₃. Compliance with Title V/PSD requirements would ensure no impact on air quality or change of attainment status would occur as a result of implementing the proposed action.

Operation of new Aero CT units would result in increases in local emissions; however, they would not exceed permit limits or air quality standards. The other reasonably foreseeable future actions in Table 3-1 are anticipated to be executed in compliance with applicable regulations and permits. Establishment of a hydrogen hub at an appropriate location on the Johnsonville Reservation would be expected to include many possible end uses for any clean hydrogen produced. This could include co-firing hydrogen in the existing CTs and new Aero CTs to demonstrate the end-use of hydrogen in the electric power generation sector. Co-firing hydrogen in existing generating assets would provide beneficial impacts to air quality due to the reduction of CO₂ emissions. The potential impacts from any future hydrogen fuel blending or other hub project objectives would be evaluated in a separate environmental review when the scope of any future hydrogen hub project is more fully known. Potential operation of CT units under the Cumberland Fossil Plant Retirement project could cause minor impacts on local air quality. As detailed in the 2022 Draft EIS, air emissions due to operation of CTs at JOF would cause an increase in emissions of criteria pollutants (TVA 2022a). However, in accordance with NSPS requirements, the potential CTs would require emissions controls to limit NO_x emissions. SO₂ and CO₂ emissions would be minimized via the use of pipeline quality natural gas and high-efficiency CT units. The existing Title V operating permits for JCT would be revised to incorporate the new plants and associated air quality requirements (TVA 2022a). As such, cumulative effects from the additional increases in emissions due to the operation of the Aero CT units in combination with the other reasonably foreseeable future actions are not expected to result in an exceedance of applicable air quality standards.

3.3 Climate Change and Greenhouse Gas

3.3.1 Affected Environment

The EPA defines climate change as *“any significant change in the measures of climate lasting for an extended period of time.”* In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among others, that occur over several decades or longer. These changes are caused by a number of natural factors, including oceanic processes, variations in solar radiation received by Earth, plate tectonics and volcanic eruptions, as well as anthropogenic (i.e., human-related) activities (EPA 2019).

The Earth’s natural warming process is known as the *“greenhouse effect.”* The Earth’s atmosphere consists of a variety of gases that regulate the Earth’s temperature by trapping solar energy. These gases – including water vapor, CO₂, methane (CH₄), nitrous oxide (N₂O), and chlorofluorocarbons (CFCs) – are cumulatively referred to as GHGs because they trap heat like glass of a greenhouse. Relying on decades of research, the overwhelming majority of the scientific community agree that anthropogenic activities – including the burning of fossil fuels to produce energy, deforestation, and other industrial activities – have contributed to elevated concentration of GHGs in the atmosphere since the Industrial Revolution. The human production and release of GHGs to the atmosphere have caused an increase in the average global temperature. While the increase in global temperature is known as *“global warming,”* the resulting change in a range of global weather patterns is known as *“global climate change.”*

The United Nations (UN) body for assessing climate change science globally is the Intergovernmental Panel on Climate Change (IPCC), composed of 195 members (from the UN or the World Meteorological Organization) and thousands of contributors with backgrounds in climate science. In August 2021, the IPCC issued the Sixth Assessment Report (AR) (IPCC 2021) which states that:

- It is unequivocal that human influence has warmed the atmosphere, ocean, and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere, and biosphere have occurred.
- The scale of recent changes across the climate system as a whole and the present state of many aspects of the climate system are unprecedented over many centuries to many thousands of years.
- Human-induced climate change is already affecting many weather and climate extremes in every region across the globe. Evidence of observed changes in extremes, such as heatwaves, heavy precipitation, droughts, and tropical cyclones, and, in particular, their attribution to human influence, has strengthened since the Fifth AR.
- Improved knowledge of climate processes, paleoclimate evidence, and the response of the climate system to increasing radiative forcing gives a best estimate of equilibrium climate sensitivity of 3 degrees Celsius (°C), with a narrower range compared to the Fifth AR.

The leading scientific body on climate change nationally 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 (NCA4), Volumes I and II (USGCRP 2017 and 2018).²

NCA4 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 GHGs in the atmosphere through combustion of fossil fuels (i.e., coal, petroleum, and natural gas), combined with agriculture, deforestation, and other natural sources. These impacts have accelerated throughout the end of the 20th and into the 21st century (USGCRP 2018).

NCA4 notes the following observations of environmental impacts are attributed to climate change in the Southeast Region of the U.S. (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.

² The Fifth National Climate Assessment (NCA5) is currently under development, with publication anticipated in 2023.

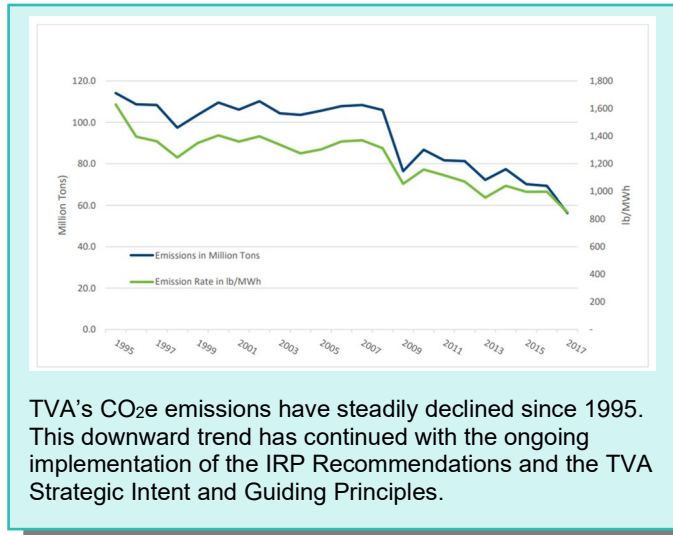
- The length of the freeze free season was 1.5 weeks longer on average in the 2010s compared to any other historical period on record.
- The number of extreme rainfall events is increasing. The number of days with 3 or more inches of rain has been historically high over the past 25 years. The 1990s, 2000s, and 2010s rank first, third, and second, respectively, in terms of the number of such events.
- Approximately 61 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 NCA4 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 normal during the summer. 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.

“Global warming potential” is one type of simplified index based upon radiative properties that can be used to estimate the potential future impacts of emissions of different gases upon the climate system. Because the global warming potential that each GHG has on climate change varies, the common metric of carbon dioxide equivalent (CO₂e) is used to report a combined impact from all of the GHGs. This metric scales the global warming potential of each GHG to that of CO₂. In 2019, U.S. GHG emissions totaled 6,558 million metric tons of CO₂e, or 5,769 million metric tons of CO₂e after accounting for sequestration from the land sector (EPA 2019). This represents a 12 percent decrease below 2005 levels (EPA 2015).

As described in TVA’s 2019 IRP, TVA has one of the largest, most diverse, and cleanest energy-generating systems in the nation. For example, in calendar year 2021 56 percent of TVA’s electricity was generated from carbon-free sources, such as nuclear power and renewable resources including hydropower (TVA 2022b). TVA continues to invest in assets



to reduce reliance on coal, modernize the transmission system, and add new renewable energy resources to ensure safe, reliable, and cleaner energy. With the implementation of the IRP Recommendations, as well as the TVA Strategic Intent and Guiding Principles (see Section 3.3.1.2, *TVA Carbon Trajectory and Strategic Intent*), TVA has planned to achieve an average of 70 percent reduction in carbon emissions by 2030, and up to 80 percent by 2035, from 2005 levels. As of the end of calendar year 2021, TVA has achieved a 57 percent reduction in its mass carbon emissions as compared to 2005

baseline standards (TVA 2022b). 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 these plants 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 approximately half that of coal (TVA 2021f). As a power generation fleet, TVA has demonstrated a commitment to continued reduction and management of GHG emissions while also maintaining a balanced generation portfolio.

3.3.1.1 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 FR 32250), 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 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 EO 13990 (Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis) and on January 27, 2021, President Biden issued EO 14008 (Tackling the Climate Crisis at Home and Abroad). 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°C, and preferably to 1.5°C, 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 emissions by 2025 compared to 2005 levels. On April 22, 2021, the U.S. submitted its nationally determined contribution (NDC) in line with Article 3 of the Paris Agreement. In the NDC, the U.S. is setting an economy-wide target of reducing GHG emissions by 50 to 52 percent below 2005 levels in 2030.

3.3.1.2 TVA Carbon Trajectory and Strategic Intent

At its May 6, 2021 meeting, the TVA Board adopted the TVA Strategic Intent and Guiding Principles, which focus on energy supply and decarbonization initiatives (TVA 2021f). These guiding principles commit TVA to delivering safe, low-cost, reliable power while providing responsible stewardship by caring for the region's natural resources. The guiding principles memorialize the IRP Recommendations and reiterate TVA's plan for 70 percent carbon reduction by 2030, a path to approximately 80 percent carbon reduction by 2035, and aspirations for net-zero carbon emissions by 2050.

To implement the TVA Strategic Intent and Guiding Principles and add new renewables, additional peaking units are needed to operate infrequently during short-duration, high-demand periods. These peaking units are essential for maintaining system reliability requirements, as they can startup quickly to meet sudden changes in either demand or supply resulting from short-term changes in weather that affect renewable resources.

Additional details regarding TVA's carbon trajectory can be found in the Fiscal Year 2021 Sustainability Report (TVA 2022b).

3.3.1.3 Social Cost of Carbon

The "social cost of carbon" (SCC) is an estimate of monetized damages (or benefits) associated with incremental increases (or decreases) in CO₂ emissions, such as human health effects, property damage from increased flood risk, and the value of ecosystem services. While governmental and non-governmental stakeholders have an interest in the costs and impacts of carbon emissions resulting from decisions, there is much uncertainty and controversy surrounding the use of any specific SCC price and associated escalation. The most significant points of controversy include the discount rate that should be used when accounting for future impacts and if global impacts, as opposed to only domestic, should be included. TVA has included a discussion of GHG emissions and their significance for both the Action and No Action alternatives in Section 3.3.2 using two different methods for valuing the cost of carbon in order to provide a directional comparison between the alternatives across a wide spectrum of carbon cost estimates.

3.3.2 Environmental Consequences

3.3.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not construct the 10 natural gas-fired Aero CTs or associated support systems at the Johnsonville Reservation. Therefore, there would be no short-term, temporary construction-related GHG emissions or operational changes in GHG emissions. Any benefits associated with the operation of newer, more efficient Aero CTs that also provide flexibility, thereby reducing the burden on the remainder of the system to integrate renewable resources, would not be realized under this alternative.

3.3.2.2 Alternative B – Construction of Johnsonville Aero CTs and Support Systems

Under Alternative B, construction and operation of the Aero CTs would result in additional GHG emissions, which are described in Section 3.2 (Air Quality).

3.3.2.2.1 Construction

As described for criteria air pollutant emissions in Section 3.2 (Air Quality), heavy equipment used during the approximately two-year construction period would include

trucks, truck-mounted augers and drills, excavators, tracked cranes, bulldozers, and similar equipment. Combustion of gasoline and diesel fuels by internal combustion engines (e.g., vehicles, generators, construction equipment, etc.) would generate short-term, temporary GHG emissions. Such emission levels are expected to be *de minimis* in comparison to the regional and world-wide volumes of GHG.

3.3.2.2.2 Impacts Associated with Forest Clearing

Some tree clearing is also expected to be required as part of the proposed construction. 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.

The EPA's quantification tool was used to estimate the carbon sequestration that may be lost from clearing of 1.05 acres of forested land within the Johnsonville Reservation to support the construction of the Aero CTs (EPA 2020). TVA estimates that the conversion of these forested lands would result in the loss of approximately 0.86 metric tons of carbon sequestration. 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. Based on West Highland Rim Forestry Association (2017) estimates, existing forested lands in Humphreys County (estimated at 210,559 acres) sequester approximately 172,658 metric tons of carbon per year. By comparison, therefore, the loss of 0.86 metric tons of carbon sequestration due to clearing of forested areas during the construction phase would be less than significant.

3.3.2.2.3 Operation

TVA has evaluated potential operational increases in GHG emissions as a result of the proposed Aero CTs. Air Pollution Control Rule 1200-03-09-.01(4)(b) defines "potential emissions" as "the maximum capacity of a stationary source to emit a pollutant under its physical and operational design." Annual turbine emissions are based on a combination of routine operations with time estimated for startup and shutdown event and the capacity threshold of each turbine (as determined by Subpart TTTT), as well as the anticipated emissions from the emergency generator. The routine operations allowed by Subpart TTTT for each proposed Aero CT is approximately 3,400 hours. Startup/shutdown events are estimated at 730 per year for each Aero CT unit, for a total of 365 hours of startup periods and 109 hours for shutdown. Anticipated operating hours would be expected to be lower based on TVA's experience at other simple-cycle CT plants.

CO₂e emissions are a calculation of the sum of the six individual GHGs, including CO₂, CH₄, N₂O, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride with applicable global warming potentials applied pursuant to 40 CFR Part 98. The operation of the proposed Aero CTs at the Johnsonville Reservation would result in an increase of 1,141,183 tons of CO₂e per year, and the operation of the proposed emergency generator would result in an increase of 12 tons of CO₂e per year. This would result in a total emissions increase of 1,141,195 tons of CO₂e per year. Because TVA expects to operate each Aero CT less than the nominal hours allowed by Subpart TTTT, annual CO₂e tons will be less than the amounts presented.

Proxy Analysis

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. Given the incremental contribution of GHG emissions to climate change, 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 CEQ Regulations for Implementing NEPA (40 CFR Parts 1500-1508) and CEQ's Final Guidance for Federal Departments and Agencies on Consideration of GHG Emissions and the Effects of Climate Change in NEPA Reviews (CEQ 2016). While GHG emissions from the operation of the proposed Aero CTs could have a minor impact on the climate, the pro-rata effect cannot be determined with precision based on current scientific techniques. Even so, the analysis includes other information (i.e., comparative emissions analysis at a state, national, and global level) that can credibly serve as a reasonable proxy of the contribution to climate change.

Based on the most recent estimates of CO₂ emissions for the state of Tennessee by the U.S. Energy Information Administration, total emissions of CO₂ for the state in 2018 were 94.7 million metric tons (U.S. Energy Information Administration 2020). As previously described, in 2019, U.S. GHG emissions totaled 6,558 million metric tons of CO₂e, or 5,769 million metric tons of CO₂e after accounting for sequestration from the land sector (EPA 2019). Therefore, the increase in potential emissions of 1,141,195 tons of CO₂e per year associated with the operation of the proposed Aero CTs and emergency generator would represent approximately 1.1 percent of total statewide emissions, approximately 0.02 percent of the total U.S. emissions, and 0.002 percent of the estimated 55.6 billion metric tons of total global GHG emissions for 2019 (Olivier and Peters 2020). As such, the operation of the proposed Aero CTs and the emergency generator would represent a less than significant contribution to state, national, and global GHG emissions. It should also be noted that the evaluation of potential emissions is highly conservative in that the proposed Aero CTs are peaking units that are intended to operate intermittently during short-duration, high-demand periods. Additionally, as described in the EIS prepared for the 2019 IRP, implementation of the IRP recommendations, including the construction of peaking units such as the proposed Aero CTs, would result in an overall reduction in GHG emissions. While the individual construction and operation of peaking units would result in an increase in GHG emissions, these peaking units are necessary to support the addition of new renewables in keeping with TVA's Strategic Intent and Guiding Principles. Therefore, the indirect effects from the implementation of the proposed action would include enabling an overall increase in delivery of clean/renewable energy generation which contributes to an overall decrease in regional and national GHG emissions.

Social Cost of Carbon

TVA received comments on the Draft EA urging the agency to consider the SCC metric in its climate assessment. 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 use of the SCC metric is not appropriate or informative because: (1) there is a lack of consensus on the appropriate discount rate, which 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. Importantly, the SCC metric does not account for the fact that the proposed Aero CT units would support the system-wide addition of renewables consistent with the IRP Recommendations and TVA Strategic Intent and Guiding Principles. Nevertheless, for comparative purposes, TVA conducted an SCC analysis using two different carbon cost valuations as described below. As shown by the variability of results, it is difficult for the SCC metric to provide meaningful results at an absolute level; therefore, these carbon cost estimates are provided strictly for comparative purposes. In conducting such an SCC analysis, TVA performed modeling for the entire TVA-wide power system that included anticipated generation and CO₂ emissions for the proposed alternative over a 20-year period. This analysis includes anticipated changes to unit operation through time based on the expected evolution of the TVA system, based on TVA's asset strategy (TVA's asset strategy is further explained in Section 1.1). Model results represent TVA's current forecast for electric load, asset performance, and commodity prices, among other things. Differences in any of these forecasts could result in higher or lower unit generation, and therefore carbon emissions, from the proposed action. Model results also represent TVA's current practice of reliably meeting electric load at the lowest possible dispatch cost, without a penalty applied to unit carbon emissions. Future regulatory requirements would likely result in lower overall system emissions, depending on the structure of the requirements and TVA's fleet composition at the time. Aero CT additions included in Alternative B are, in part, meant to assist in the integration of renewable resources with 10,000 MW of solar currently planned by 2035. For comparison purposes, the No Action Alternative assumes that an equivalent amount of generation supplied by the proposed Aero CTs at Johnsonville would instead have to come from TVA's existing fleet of frame-type, simple-cycle CTs. While this does not meet the purpose and need of this EA, it provides a comparison of the efficiency gains the simple-cycle CT fleet will achieve with the addition of the new, highly efficient Aero CTs in the proposed action.

Table 3-3 illustrates carbon costs when using the SCC values from the Biden Administration's *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990* (February 2021). This table uses SCC estimates at an average 3 percent discount rate and features the higher of the two estimates for carbon costs. Table 3-4 illustrates carbon costs when using the SCC values from Trump Administration's *EPA Regulatory Impact Analysis for the Repeal of the Clean Power Plan, and the Emission Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units* (June 2019). This table uses SCC estimates at a 7 percent discount rate and features the lower of the two estimates for carbon costs. As shown in these tables, the No Action Alternative would have the higher carbon cost over the 20-year period and the higher Net Present Value in 2021 dollars, regardless of the carbon cost valuation used.

As of the end of calendar year 2021, TVA has achieved a 57 percent reduction in its mass carbon emissions as compared to 2005 baseline standards (TVA 2022b). As stated in the Strategic Intent and Guiding Principles, with the implementation of the IRP Recommendations – including the construction of peaking units to support the addition of renewables by maintaining system reliability requirements – TVA has a plan to achieve an average of 70 percent reduction in carbon emissions by 2030 and a path to an approximately 80 percent carbon reduction by 2035 as compared to 2005 levels. Furthermore, TVA aspires to achieve net-zero carbon emissions by 2050.

GHG emissions from the proposed action, as well as the emissions from the other reasonably foreseeable future actions in Table 3-1, would incrementally increase GHG

emissions within Humphreys County, but such increases would not be notable on a regional, national, or global scale. The other reasonably foreseeable future actions related to the proposed retirement of JCT Units 1-16 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 target portfolio adopted by TVA through the 2019 IRP would result in an overall 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. The installation of the 10 Aero CT units is part of the implementation of the 2019 IRP. The potential establishment of simple-cycle CTs at JOF under the Cumberland Fossil Plant Retirement project would be expected to have long-term, moderate, beneficial effects on regional climate change, due to decreases in CO₂ emissions as implementation of this alternative would represent approximately 9 percent decrease in statewide emissions (TVA 2022a). Potential establishment of a hydrogen hub at the Johnsonville Reservation may provide beneficial impacts to GHG emissions and climate change due to the reduction of CO₂ emissions as a result of co-firing hydrogen in the existing CTs and new Aero CTs. Potential impacts from any future hydrogen fuel blending or other hub project objectives would be evaluated in a separate environmental review. Furthermore, the potential establishment of simple-cycle CTs at Johnsonville under Alternative B of the Cumberland Fossil Plant Retirement project would provide additional opportunities for system-wide reduction of CO₂e operational emissions by co-firing hydrogen in those CTs.

Table 3-3. Social Cost of Carbon Calculation under Biden Administration Guidance

	Calendar Year (CY)																			
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
CO₂ Emissions (thousand short-tons [kTons]):																				
No Action Alternative				124	131	119	74	136	138	139	166	213	339	338	390	377	404	405	422	406
Alternative B				88	93	85	53	97	98	99	119	152	241	240	277	268	287	287	299	288
SCC Cost																				
(\$/metric ton, nominal)	\$55	\$58	\$60	\$62	\$65	\$67	\$70	\$73	\$75	\$78	\$81	\$84	\$88	\$91	\$94	\$98	\$101	\$105	\$109	\$113
(\$/short ton, nominal)	\$50	\$52	\$54	\$57	\$59	\$61	\$63	\$66	\$68	\$71	\$74	\$77	\$79	\$82	\$85	\$89	\$92	\$95	\$99	\$102
Carbon Cost (\$M):																				
No Action Alternative	\$ -	\$ -	\$ -	\$7	\$8	\$7	\$5	\$9	\$9	\$10	\$12	\$16	\$27	\$28	\$33	\$33	\$37	\$39	\$42	\$42
Alternative B	\$ -	\$ -	\$ -	\$5	\$5	\$5	\$3	\$6	\$7	\$7	\$9	\$12	\$19	\$20	\$24	\$24	\$26	\$27	\$30	\$29
Carbon Cost	Net Present Value (20-yr, 2021\$)			Difference (\$M)			Difference (%)													
No Action Alternative	\$138																			
Alternative B	\$98			(\$40)			-29%													

Table 3-4. Social Cost of Carbon Calculation under Trump Administration Guidance

	Calendar Year (CY)																			
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
CO₂ Emissions (kTons):																				
No Action Alternative				124	131	119	74	136	138	139	166	213	339	338	390	377	404	405	422	406
Alternative B				88	93	85	53	97	98	99	119	152	241	240	277	268	287	287	299	288
SCC Cost																				
(\$/metric ton, nominal)	\$1	\$1	\$1	\$1	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$3	\$3	\$3
(\$/short ton, nominal)	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$2	\$3
Carbon Cost (\$M):																				
No Action Alternative	\$-	\$-	\$-	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1
Alternative B	\$-	\$-	\$-	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1	\$1	\$1	\$1	\$1	\$1
Carbon Cost	Net Present Value (20-yr, 2021\$)			Difference (\$M)			Difference (%)													
No Action Alternative	\$3																			
Alternative B	\$2			(\$1)			-29%													

3.4 Geology and Soils

3.4.1 Affected Environment

3.4.1.1 Site Geology

The Johnsonville Reservation is located within the Western Highland Rim Physiographic Province of Middle Tennessee. The Highland Rim is comprised of a series of ridges and valleys underlain by Mississippian aged limestone, chert, shale, and sandstone. The site is underlain by alluvium and terrace deposits varying in thickness from less than 20 feet along the tributary stream banks to more than 100 feet within the floodplain of the Tennessee River. Underlying bedrock consists of the Lower Mississippian age Fort Payne Formation and Devonian age Chattanooga Shale and Camden Formations. The Camden Formation is the principal aquifer in the region (TVA 2019c).

3.4.1.2 Geologic Hazards

3.4.1.2.1 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 sinkholes, caves, springs, and underground drainage systems. Karst topography forms in areas where limestone and dolomite are near the surface (TVA 2019c). The carbonate bedrock at the site is susceptible to karst development; however, the 2021 geotechnical exploration did not identify any surface signs of sinkhole activity, nor did the soil borings indicate sinkhole conditions (S&ME, Inc. 2021).

3.4.1.2.2 Seismic Events

The Johnsonville Reservation is located within an area with a moderate seismic hazard. The hazard is attributed to an earthquake having a magnitude of 7.5 to 8 in the New Madrid Seismic Zone (NMSZ) located approximately 125 miles from the site (S&ME, Inc. 2021).

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, Inc. 2021).

3.4.1.2.3 Faulting and Liquefaction Potential

There are two general categories of earthquake hazards: primary and secondary. Primary hazards include fault ground rupture and strong ground shaking. If an earthquake is larger than about magnitude 5.5, ground rupture may occur on the fault. The amount of displacement generally increases with the magnitude of the earthquake (TVA 2019c). A review of the U.S. Geological Survey (USGS) Quaternary Faults and Folds database, 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 most recent geologic period), shows there are no known faults of this age located within the vicinity of the Johnsonville Reservation (USGS 2021b).

Secondary hazards include liquefaction/lateral spreading, landsliding, and ground settlement (TVA 2019c). Liquefaction is the loss of a soil’s shear strength due to an

increase in porewater pressure resulting from seismic vibrations and is a concern for strong shaking of loose, saturated, granular soils. Subsurface conditions at the Johnsonville Reservation are generally not susceptible to liquefaction (S&ME, Inc. 2021).

3.4.1.3 Soils

According to the USDA Natural Resources Conservation Service (NRCS) web soil survey (USDA NRCS 2021), most of the soils (92 percent) in the Project Area are mapped as Paden silt loam. Other mapped soils in the Project Area include Melvin silty clay loam, Robertsville silt loam, Wolftever silty clay loam, Taft silt loam, and Melvin silt loam. Most of the soils within the reservation boundary have been disturbed or replaced by anthropogenic fill to support development or operations of the plant facilities. This includes the areas proposed for the Aero CT plant, 161-kV Aero switchyard, and the temporary use areas. In addition, the proposed laydown area is located on the former ash pond, which does not contain native soil.

3.4.2 Environmental Consequences

3.4.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not construct the Aero CTs and the associated support systems. Therefore, there would be no impacts to the site's geologic resources.

3.4.2.2 Alternative B – Construction of Johnsonville Aero CTs and Support Systems

Under Alternative B, TVA would construct Aero CTs and the associated support systems at the Johnsonville Reservation. Construction activities, such as excavation, would be done at a maximum depth of 20 feet and would not disrupt bedrock geology. Therefore, construction activities are anticipated to have minor impacts on geologic features.

The proposed Aero CTs and support systems would be constructed on a site that is heavily disturbed and comprised largely of fill material. Onsite and local geologic and geomorphic features within and around the proposed site were evaluated during the geotechnical investigation. The geotechnical exploration did not encounter any onsite features that would prohibit development of Aero CTs at the Johnsonville Reservation. As identified in the geotechnical report, the design of the Aero CTs and support systems would address liquefaction, seismic considerations, and fill material selection and compaction requirements (S&ME, Inc. 2021). These design considerations are expected to minimize any effects on geological resources.

Onsite construction activities would include grading and site preparation that would result in minor impacts to soil resources. BMPs outlined in the SWPPP would be implemented to minimize erosion during land clearing and site preparation. Construction activities would not overlap with the foreseeable future actions in Table 3-1, therefore there would be no cumulative impact to geological or soil resources. Operation of the Aero CT plant would not impact soils or geological resources. Therefore, cumulative effects due to the operation of the Aero CTs and support systems in combination with the other reasonably foreseeable future actions in Table 3-1 would not impact geological or soil resources.

3.5 Groundwater

3.5.1 Affected Environment

3.5.1.1 Regional Aquifers

The Johnsonville Reservation is located within the Mississippi Carbonate aquifer region, which consists of limestone and dolomite and is underlain with Chattanooga Shale (TDEC 2018). Regional aquifers within five miles of the Johnsonville Reservation are represented by the Camden Formation, which consists of thin beds of cherty limestone interbedded with softer clay layers, and is the principal aquifer in the region. Groundwater movement at Johnsonville Reservation is generally from east to west towards Kentucky Reservoir on the Tennessee River. Depth to water typically ranges from 10 to 30 feet below ground surface. Groundwater recharge is generated by local infiltration of precipitation at the surface and occurs laterally from upland areas east of the Johnsonville Reservation (TVA 2018).

3.5.1.2 Groundwater Use

Public water supply in New Johnsonville, Tennessee is sourced from the Tennessee River and provided by the New Johnsonville Water Department (New Johnsonville Water Department 2020). There are 16 public water wells within a 2-mile radius of the proposed Aero CTs; 13 of the wells are registered as residential usage, one well is registered as commercial usage, and the remaining two wells are unclassified (TDEC 2021a).

3.5.1.3 Groundwater Quality

Groundwater has been monitored at the Johnsonville Reservation since 1982. The monitoring wells currently located within the Reservation are shown on Figure 3-1. Monitoring currently consists of CCR Rule sampling at Ash Pond 2 and state-permit compliance (TDEC Rule 0400-11-01-04) at the South Rail Loop Area 4 and the DuPont Dredge Cell. The Dupont Dredge cell is located adjacent to the northeast portion of the Project Area, and the South Rail Loop Ash Disposal Area is located approximately 850 feet southeast of the Project Area. The wells at these locations range from 17.1 to 86.1 feet deep, and groundwater depth ranges from 10.88 to 28.43 feet (TVA 2018).



Figure 3-1. Groundwater Monitoring Well Network within Johnsonville Reservation

Sampling events performed at the DuPont Road Dredged Ash Disposal Area since the third quarter of 2016 have exhibited radium 226/228 exceedances above the Maximum Contaminant Level (MCL) at a background well and in a duplicate sample. There have been no other exceedances of MCLs or upper prediction limits (UPLs) since 2004. Groundwater analyses from 1990 to 2014 show a trend of increasing concentrations of chloride, calcium, magnesium, and sodium in the background well. These results are attributed to dissolution and migration of chloride salts from DuPont process waste landfills situated upgradient of the reservation (TVA 2018).

Results from the South Rail Loop Area 4 monitoring wells from samples taken in March 2021 show boron, calcium, chloride, sulfate, zinc, and total dissolved solids detected above the groundwater protection standards and radium 226/228 and nickel exceedances above UPLs. Groundwater analyses from 2017-2021 indicate groundwater constituent concentrations are either decreasing or stabilizing, although there is some variability between sampling events. The site is currently being evaluated for additional assessment and further corrective measures that may be required under the TDEC Commissioner's Order (TVA 2021a).

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 (EPA 2021b).

3.5.2 Environmental Consequences

3.5.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not construct Aero CTs and there would be no change in groundwater conditions at Johnsonville Reservation that would be associated with construction or operation of the proposed Aero CTs.

3.5.2.2 Alternative B – Construction of Johnsonville Aero CTs and Support Systems

Under Alternative B, construction of the Aero CTs and proposed support facilities, including the natural gas compressor, administration/control building, warehouses, and the Aero 161-kV switchyard and associated transmissions lines, would occur on TVA property and on previously disturbed areas.

Groundwater monitoring wells JOF-112, -113, -114 and -117 (Figure 3-1) are located in and adjacent to the proposed project construction and laydown areas. These wells would remain in place to support ongoing monitoring activities related to CCR Rule sampling and state-permit compliance. These wells would be marked and avoided during construction activities and would not be impacted by operations. Temporary wells (JOF-TW-08, -TW-09 and -TW-10 in Figure 3-1) would likely be abandoned prior to construction of the Aero CTs and support facilities. Therefore, there would be no impacts to existing groundwater monitoring wells.

Construction of the Aero CTs and other associated support systems at the Johnsonville Reservation would require below ground construction activities that may encounter groundwater. TVA estimates the maximum excavation depth for all below ground construction activities would be 20 feet. If groundwater is encountered during any construction activities, dewatering processes would be used to control groundwater infiltration into the excavation site and all state and federal requirements relating to

groundwater protection would be followed. The described construction activities and below ground excavation are localized and limited to the construction phase of the proposed project; therefore, any impacts to groundwater would be minor.

The existing JCT plant has adequate capacity of demineralized water that would be used for the proposed Aero CTs. Potable water would be obtained from the existing public supply. Therefore, there would be no impacts to groundwater associated with operation of the Aero CT plant. Construction activities associated with other reasonably foreseeable future actions in Table 3-1 have the potential to release constituents that may impact groundwater. However, these activities would be conducted in accordance with any applicable environmental and safety regulations, minimizing the potential for a release of contaminants. The closure of the coal yard and Ash Pond 2 would have an overall positive impact on groundwater quality. Therefore, cumulative effects from the Johnsonville Aero CT project in combination with the other actions identified in Table 3-1 would not result in incrementally greater cumulative effects to groundwater quality or quantity.

3.6 Surface Water Resources

3.6.1 Affected Environment

3.6.1.1 Kentucky Reservoir

TVA's Johnsonville Reservation is situated on the east bank of the Tennessee River, just south (upstream) of the confluence of the Tennessee River and Trace Creek. This reach of the lower Tennessee River is part of Kentucky Reservoir, the largest reservoir in the eastern U.S. This reservoir extends for 184 miles and drains the entire Tennessee Valley watershed. The segment of the Tennessee River adjacent to the proposed Project Area is classified for the uses of domestic water supply, industrial water supply, fish and aquatic life, recreation, livestock watering and wildlife, irrigation, and navigation (TDEC 2013).

TVA assesses the ecological health of its reservoirs on a cyclical basis and has assessed Kentucky Reservoir annually from 1991 to 2019. Reservoirs receive qualitative ratings based on a range of physical and biological characteristics at multiple locations (TVA 2021d). Ecological health evaluations focus on five indicators: dissolved oxygen (DO), chlorophyll, sediment quality, benthic macroinvertebrate community (bottom life), and the fish assemblage.

TVA monitors four locations on Kentucky Reservoir—the forebay, the mid-reservoir transition, Big Sandy embayment, and the inflow. Health ratings include good, fair, and poor (from high to low), and an overall reservoir rating and score are provided based on the combined health ratings from all measured reservoir locations. In 2019, Kentucky Reservoir received an overall reservoir ecological health score of 78 and a reservoir rating of “Good.” Water quality data were not collected at the inflow. Habitat parameters, DO, and sediment were rated “Good” at all locations. Chlorophyll rated “Poor” at the forebay and embayment and “Good” at the transition. Elevated chlorophyll concentrations are common on Kentucky Reservoir except mid-reservoir due to increased mixing (TVA 2021d).

The CWA requires 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 lower Tennessee River is not listed on the Final 2020 TDEC 303(d) List (TDEC 2020); therefore, it is not considered impaired and is assumed to fully meet its designated uses.

3.6.1.2 Existing Wastewaters and Drainage Areas

There are several existing wastewater streams at Johnsonville Reservation permitted to be discharged through NPDES Outfall 001 (Permit Number TN0005444) (TDEC 2011) and NPDES Outfall 001 (Permit Number TN0082023). Additionally, stormwater discharges are authorized by the Tennessee Multi-Sector (TMSP) Stormwater General Permit No. TNR053188. An Interim Flow Management system located on Ash Pond 2 receives process flow from the plant station sump and the coal yard runoff pond. The flows are routed to treatment tanks and discharged through the NPDES Outfall 001 (Permit Number TN0005444) to Kentucky Reservoir on the Tennessee River. Process water from the JCT plant discharges directly to Outfall 001 (Permit Number TN0082023). Water discharges at the spillway outlet are monitored according to NPDES Permit requirements. The NPDES permit requires monitoring of flow, total aluminum, total antimony, total arsenic, total cadmium, total copper, total iron, total lead, total mercury, total nickel, total selenium, total silver, total thallium, total zinc, total cyanide, asbestos, and acute toxicity. The NPDES permit also has established limitations on the following: pH, total suspended solids, and oil and grease.

Based on surveys conducted in 2020 and 2022 of jurisdictional streams and wetlands within the Aero CT Project Area, there is one perennial stream located in the southeast corner of the Project Area (Figure 3-2). In addition, one emergent wetland was identified near the proposed Aero 161-kV switchyard, one emergent wetland was identified near the existing transmission line west of the craft trailer area, and a forested/emergent wetland was delineated south of the proposed shuttle bus road and transmission line. More information regarding the wetlands identified are described in Section 3.7.

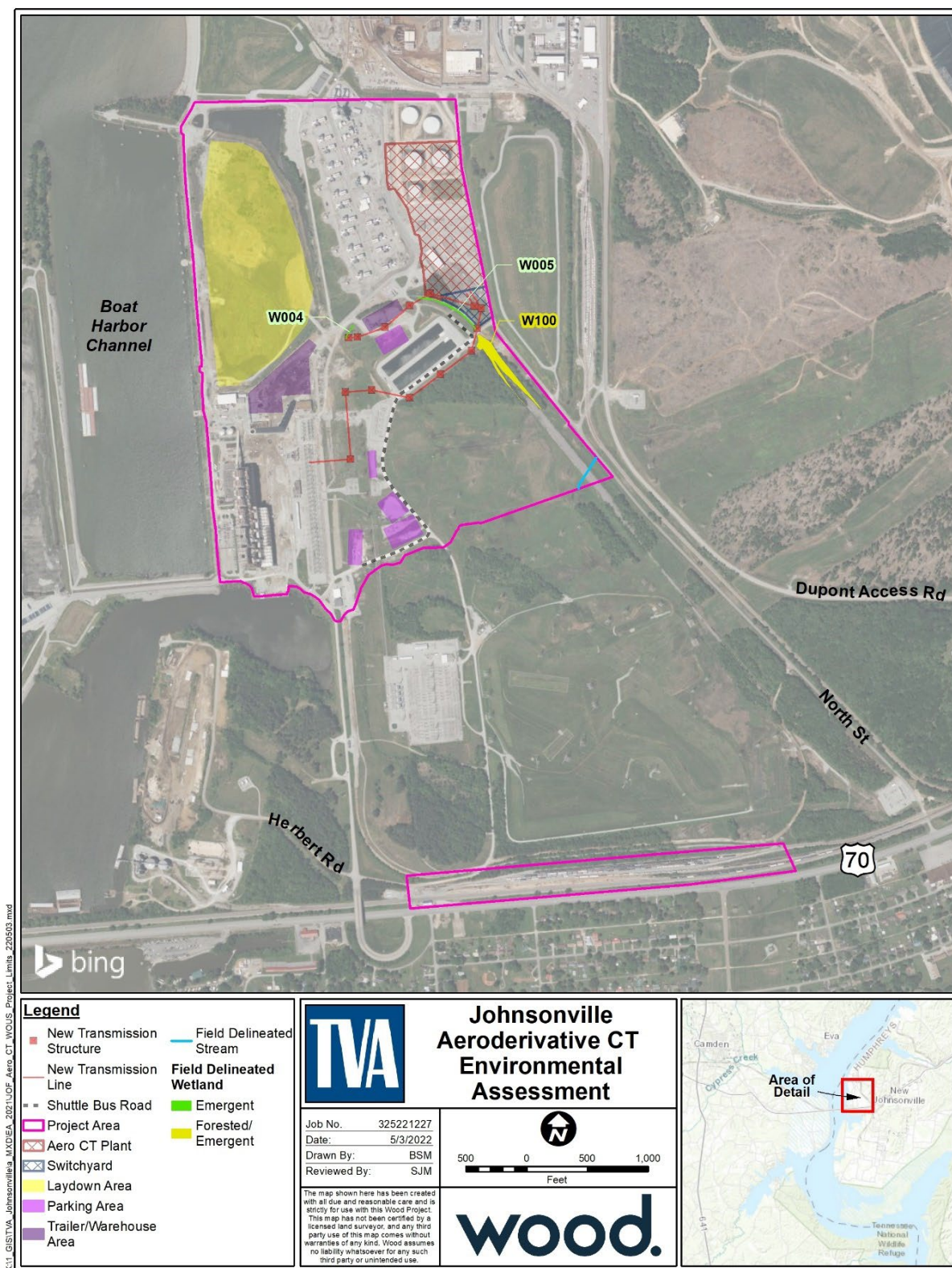


Figure 3-2. Surface Water Features within the Project Area

3.6.2 Environmental Consequences

3.6.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not construct the proposed Aero CT plant and associated support structures and therefore there would be no project-related impacts to surface waters.

3.6.2.2 Alternative B – Construction of Johnsonville Aero CTs and Support Systems

3.6.2.2.1 Construction

Under Alternative B, construction activities associated with the Aero CT plant and associated support structures would involve ground disturbance resulting in the potential for increased sediment release and erosion, which has the potential to temporarily affect surface water via stormwater runoff. Appropriate BMPs would be followed, and all construction activities would be conducted in a manner to ensure that waste materials are contained so as to minimize introduction of pollutants to receiving waters. A General Permit for Storm Water Discharges Associated with Construction Activities (TDEC 2021b) would be required for this project, and this permit would require development of a project-specific SWPPP. The Tennessee Erosion and Sediment Control Handbook would be referenced to ensure that the appropriate BMPs are used (TDEC 2012). Areas where soil disturbance could occur would be stabilized and vegetated with native or non-native, non-invasive grasses and mulched.

Stormwater discharges during construction would be sent to the Process Water Basin, and the site NPDES permit would be modified accordingly. Due to the implementation of BMPs, no discernable change in the discharge from Outfall 001 is expected from the proposed construction.

With an increased onsite workforce, it would be necessary to make arrangements for 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.

Equipment washing and dust control discharges would be handled in accordance with BMPs described in the SWPPP for water-only cleaning and/or NPDES Permit TN082023 to minimize construction impacts to surface waters.

With proper implementation of sediment and erosion control BMPs, only minor temporary impacts to local surface waters would occur during the construction phase. There is no project activity planned near the perennial stream; therefore, it would not be impacted. As no jurisdictional streams would be permanently impacted by the proposed activities, no additional permitting or stream mitigation would be required.

3.6.2.2.2 Operation

The Aero CT units would require up to 300 gpm of potable water and 300 gpm of demineralized water for evaporative cooling and wet compression for power augmentation. The JCT plant already has adequate capacity for demineralized water production that would be used for the Aero CTs. Any process water discharges would be directed to the existing Johnsonville Process Water Basin, and the site NPDES permit would be modified accordingly. Additional potable water for evaporative cooling, domestic use, and safety

showers would be obtained from the existing public supply. The water supply for the fire protection system would be provided from the existing fire water supply.

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 stormwater flows. Construction of the Aero CT plant and Aero 161-kV switchyard would increase the impervious cover on the Project Area, thus altering and possibly increasing the concentrated stormwater runoff. This flow would be properly treated through implementation of the proper stormwater BMPs or by diverting the stormwater discharges to the Process Water Basin and ultimately released through permitted Outfall 001. No negative impacts to the surface waters would occur from the operation of this facility, as any discharges would be required to meet NPDES limits and TDEC Water Quality Standards that are developed to be protective of designated waters.

Process water from the JCT plant is routed to the Process Water Basin and discharged directly to Outfall 001.

With the implementation of appropriate BMPs, described in the project-specific SWPPP, impacts of the proposed action would not be significant and the other reasonably foreseeable future actions in Table 3-1 would not result in incrementally greater cumulative effects.

3.7 Wetlands

3.7.1 Affected Environment

Wetlands are those areas inundated or saturated by surface or groundwater such that vegetation adapted to saturated soil conditions are prevalent. Examples include bottomland forests, swamps, wet meadows, isolated depressions, shallow embayments, and shoreline fringe wetland along the edges of watercourses, impoundments, or lake systems. Wetlands provide many societal benefits, such as toxin absorption and sediment retention for improved downstream water quality, stormwater impediment and attenuation for flood control, shoreline buffering for erosion protection, and provision of fish and wildlife habitat for commercial, recreational, and conservation purposes.

Activities in wetlands are regulated by state and federal agencies to ensure no net loss of wetland resources. Under the CWA Section 404, activities resulting in the discharge of dredge, fill, and associated secondary impacts to waters of the U.S., including wetlands, must be authorized by the U.S. Army Corps of Engineers (USACE) through a Nationwide, Regional, or Individual Permit. CWA Section 401 mandates state water quality certification for projects requiring USACE approval. In Tennessee, TDEC certifies CWA Section 404 permits and impacts to intrastate wetland resources through a general or individual aquatic resources alteration permit. In Tennessee, this permit is required for any alteration to the physical, chemical, or biological properties of any waters of the state, including wetlands, pursuant to the Tennessee Water Quality Control Act (§69-3-108, 0400-40-07). TDEC's permit process ensures compliance with Tennessee's anti-degradation policy as well (§69-3-108, 0400-40-04). Lastly, EO 11990 requires federal agencies to minimize wetland destruction, loss, or degradation, and avoid new construction in wetlands wherever there is a practicable alternative.

Field assessments were conducted by TVA on the Johnsonville Reservation in fall of 2020 during a comprehensive site survey to locate wetland areas within the reservation boundary. Due to ongoing project activities related to the construction of the Johnsonville Process Water Basin, TVA conducted a new wetland delineation in January 2022 to confirm wetland features in the vicinity of the Process Water Basin. Both the 2020 and 2022 wetland determinations were performed according to the USACE standards, which require documentation of hydrophytic (wet-site) vegetation, hydric soil, and wetland hydrology (Environmental Laboratory 1987; Lichvar et al. 2014; USACE 2012).

The Project Area encompasses predominantly previously disturbed areas of the Johnsonville Reservation, which is located within the Tennessee River watershed (10-HUC 0604000504) along the east banks of the Tennessee River. Wetlands delineated in 2020 and 2022 within the Project Area comprise three features totaling 1.14 acres (Figure 3-2 and Table 3-5). The three wetland features are scattered along the central and eastern portion of the Project Area. The emergent wetlands (W004 and W005) consist of linear, emergent/scrub-shrub wetland drainage features. The forested/emergent wetland (W100) consists of a wetland flat and associated wetland drainage features.

While both the 2020 and 2022 wetland determinations were performed according to the USACE standards, the wetland type and location did vary somewhat between the two surveys. This is not considered to be out of the ordinary since conditions can change over time. There were two wetlands mapped in the 2020 survey that were determined to be upland in 2022 (W002 and W003 as shown in Figure 3-1 in the Draft EA), as they lacked one or more of the three USACE required components to the USACE wetland definition: hydrology, hydric soil, and hydrophytic vegetation (USACE 2012). Likewise, W100 did meet the USACE criteria as a wetland in 2022 when it did not in 2020 (USACE 2012).

Table 3-5. Wetland Features Within the Project Area

Wetland ID	Wetland Type¹	Latitude / Longitude	Total Size (acres)	Impact (acres)
W004	PEM	36.032151 / -87.98377	0.03	0.0
W005	PEM	36.032603 / -87.981013	0.15	0.0
W100	PFO/PEM	36.031639 / -87.979893	0.96	0.05
Total			1.14	0.05

¹Classification codes as defined in Cowardin et al. (1979):

PFO = Palustrine forested wetland; PEM = Palustrine emergent wetland.

Land use/land cover data within a 5-mile radius of the Project Area shows that emergent herbaceous and woody wetlands comprise approximately 12.9 percent (8,074 acres) of the surrounding lands (see Table 3-6). Therefore, the emergent and forested wetlands within the proposed Project Area comprise less than 0.01 percent of the wetlands within a 5-mile radius.

3.7.2 Environmental Consequences

3.7.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not construct the Aero CT plant and associated support structures. Therefore, no impacts to wetlands would occur.

3.7.2.2 Alternative B – Construction of Johnsonville Aero CTs and Support Systems

Efforts were made during project planning and siting to avoid wetlands to the extent practicable. The proposed locations for the Aero CTs and associated support structures would be sited outside of all wetland features within the Project Area; however, up to 0.05 acres of the forested/emergent wetland W100 would potentially be cleared within the transmission line right-of-way (ROW). A number of factors were considered when choosing the preferred route for the new transmission line and multiple routes were considered for the line. Due to the proximity of the retention pond and the other lines in the area and considering line outage constraints and clearance requirements, there was no practical alternative that would eliminate all impact. The chosen route minimized the impact to the wetlands and avoids placing structures within the wetland area. TVA was able to avoid placing transmission structures directly in wetlands and reduce the wetlands to be spanned as much as practicable. After avoidance and minimization measures had been considered, the preferred route was analyzed in this EA. Based on the environmental component of the siting process and the site-specific considerations described above, along with the analysis and proposed mitigation measures, TVA determined there would be no practicable alternative available that would allow complete avoidance of wetlands. Effects of wetland impacts would be minor when viewed in the context of the 5,645 acres of forested wetland resources within the surrounding 5-mile region (Table 3-6), as this impact corresponds to less than 0.01 percent of wetlands within this region.

Potential minor indirect impacts during the construction process could include erosion and sedimentation from stormwater runoff into nearby wetlands. BMPs and site-specific erosion control plans would be implemented to minimize this potential. To the extent practicable, TVA would establish an average 30-foot buffer around the emergent wetland located adjacent to the Aero 161-kV switchyard and preclude any ground disturbing actions within the buffer to avoid placing fill material into the wetland and minimize sedimentation. Therefore, indirect impacts to emergent wetland areas due to construction activities would be short-term and minor. Overall, impacts from the proposed action would be minor and together with the other reasonably foreseeable future actions in Table 3-1, would not result in incrementally greater cumulative effects.

TVA will coordinate with the USACE and TDEC 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. If required, mitigation measures would be incorporated into the final design of the project. Therefore, implementation of Alternative B would be consistent with EO 11990.

3.8 Aquatic Ecology

3.8.1 Affected Environment

The Johnsonville Reservation is located in Humphreys County, Tennessee, in the Western Highland Rim subregion of the greater Interior Plateau ecoregion (Griffith et al. 1998). Streams in this region are relatively clear with moderate gradients, with substrates consisting primarily of coarse chert gravel and sand with some bedrock. Much of the region is heavily forested, with some agriculture in the stream and river valleys.

The reservation is located on the eastern shore (right descending bank) of Kentucky Reservoir on the Tennessee River at TRM 100. The reach of the river adjacent to the reservation has been altered from its former free-flowing character by the presence of

Kentucky Dam, located approximately 76 river miles downstream from Johnsonville Reservation, and Pickwick Dam, located approximately 107 river miles upstream.

As noted in Section 3.6 (Surface Water Resources), TVA began a program to monitor the ecological conditions of its reservoirs systematically in 1990. Reservoir (and stream) monitoring programs were combined with TVA's fish tissue and bacteriological studies to form an integrated Vital Signs Monitoring Program. The Program activities focus on physical/chemical characteristics of waters and sediments, benthic macroinvertebrate community sampling, and fish assemblage sampling (TVA 2021d).

In 2019, benthic communities of Kentucky Reservoir rated "Good" at the forebay and transition and "Fair" at the inflow and embayment. Samples from the inflow and embayment contained fewer individuals and a lesser variety of organisms than those from the other monitoring locations (TVA 2021d). Fish communities were rated "Good" at the four locations monitored. A total of 60 different species was observed reservoir-wide in previous years (TVA 2021d). Some of the more interesting species observed included American eel, rainbow darter, river darter, and silver chub. Silver carp were observed at the forebay, transition, and embayment locations. Common sportfish in Kentucky Reservoir include largemouth bass, crappie, and catfish.

Based on previous surveys of jurisdictional streams and wetlands within the Aero CT Project Area, there is one perennial stream located in the southeast corner of the Project Area (Figure 3-2). Due to their relatively small size, the fish and benthic invertebrate communities in this stream are expected to have a simpler species composition similar to that of other small tributary streams that drain to Kentucky Reservoir. The coal yard runoff pond does contain free-standing water but does not provide habitat for aquatic biota since it is considered a treatment system. Discharge from the coal yard runoff pond is currently pumped and discharged through the NPDES permitted Outfall 001.

3.8.2 Environmental Consequences

3.8.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not construct the Aero CT plant and associated support structures. Therefore, there would be no change to the existing conditions of the onsite aquatic habitat and Kentucky Reservoir on the Tennessee River.

3.8.2.2 Alternative B – Construction of Johnsonville Aero CTs and Support Systems

Through efforts made during project planning and siting, TVA has been able to site the proposed temporary and permanent use areas in locations outside of the streams to avoid direct impacts. Therefore, direct impacts to aquatic biota associated with the construction of the Aero CT plant and supporting structures are not anticipated.

Soil disturbances associated with construction activities could potentially result in indirect adverse water quality impacts and could clog small streams and threaten aquatic life. Construction activities would adhere to SWPPP and construction stormwater permit limit requirements, including the use of BMPs, to minimize indirect effects on aquatic resources during the construction phase. Following construction, site-wide management of stormwater using appropriate BMPs would minimize indirect impacts to the aquatic community in the receiving waters. Therefore, impacts to aquatic resources due to the proposed action would be minor and temporary, and construction activities would not overlap with the other

reasonably foreseeable future actions in Table 3-1 and therefore would not result in incrementally greater cumulative effects.

3.9 Vegetation

3.9.1 Affected Environment

The Western Highland Rim of the Interior Plateau is characterized by dissected, rolling terrain of open hills, with elevations of 400 to 1,000 feet. Soils in this region tend to be acidic, cherty, and moderate in fertility (Griffith et al. 1998). Historically, this area was dominated by oak-hickory forests that were mostly removed in the 1800s in association with iron-ore mining. Currently, portions of this ecoregion are once again heavily forested with some agriculture occurring along the stream and river valleys (Griffith et al. 1998).

The Aero CT Project Area is an intensely developed site that has been heavily disturbed by construction, maintenance, and operation of the facility. As a result of this wholesale alteration of the physical landscape, most areas within the Project Area are unvegetated, but a few small locations do contain early successional vegetation dominated by non-native weeds and/or fragmented deciduous and mixed deciduous-evergreen forested stands.

The vegetation within a 5-mile radius surrounding the Johnsonville Reservation was evaluated with land use/land cover information obtained from the National Land Cover Dataset (NLCD) (Dewitz 2019). Analysis of the NLCD indicates that land cover within a 5-mile radius of the reservation is primarily forested land (26,113 acres) and open water (14,031 acres) (Table 3-6). Land cover within a 5 mile-radius is shown on Figure 3-3.

Field surveys of plant communities were conducted for the Project Area in November 2017 and August 2018. Land cover within the Project Area was developed using the NLCD data modified based on the previous field survey data and updated aerial photography (Figure 3-4). The most common land cover within the Project Area is developed low intensity (192.7 acres), followed by herbaceous (41.2 acres), with smaller amounts of deciduous forest (6.7 acres), open water (3.9 acres), woody wetlands (1.0 acres), and emergent herbaceous wetlands (0.2 acres).

Table 3-6. Land Cover in the Johnsonville Aero CT Project Area and Vicinity

Land Cover Type	Project Area¹ (ac)	5-mi Radius² (ac)
Barren Land		296
Cultivated Crops		2,934
Deciduous Forest	6.7	24,127
Developed, High Intensity		315
Developed, Low Intensity	192.7	626
Developed, Medium Intensity		441
Developed, Open Space		2,787
Emergent Herbaceous Wetlands	0.2	2,430
Evergreen Forest		397
Hay/Pasture		5,109
Herbaceous	41.2	705
Mixed Forest		1,987
Open Water	3.9	14,031
Shrub/Scrub		629
Woody Wetlands	1.0	5,645
Total	245.7	62,458

Source:

¹ Obtained from Dewitz 2019 and modified based on updated aerial photography and previous survey data² Land Cover within 5-mi radius obtained from Dewitz 2019

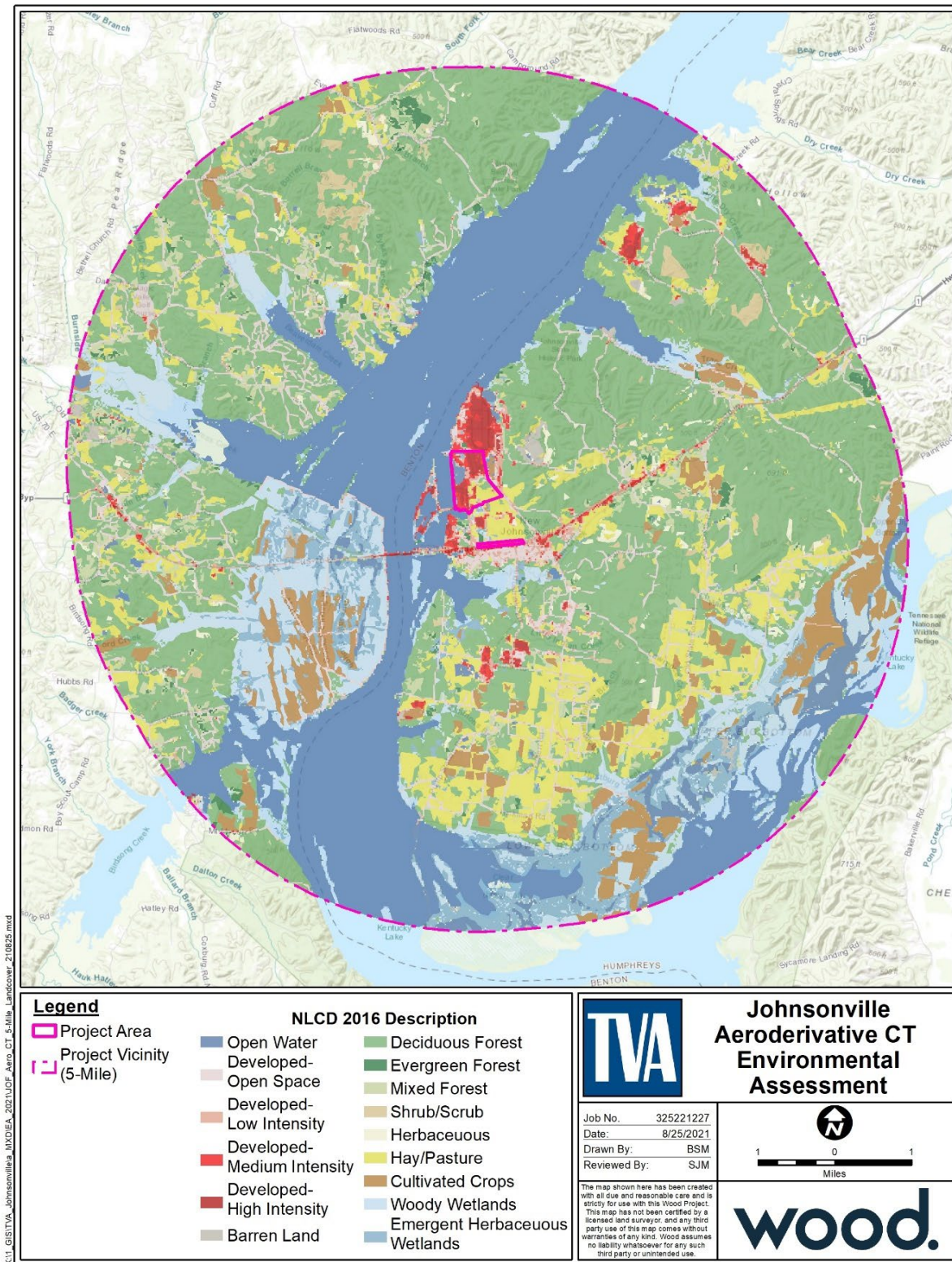


Figure 3-3. Land Cover within 5-mile Radius of Project Area

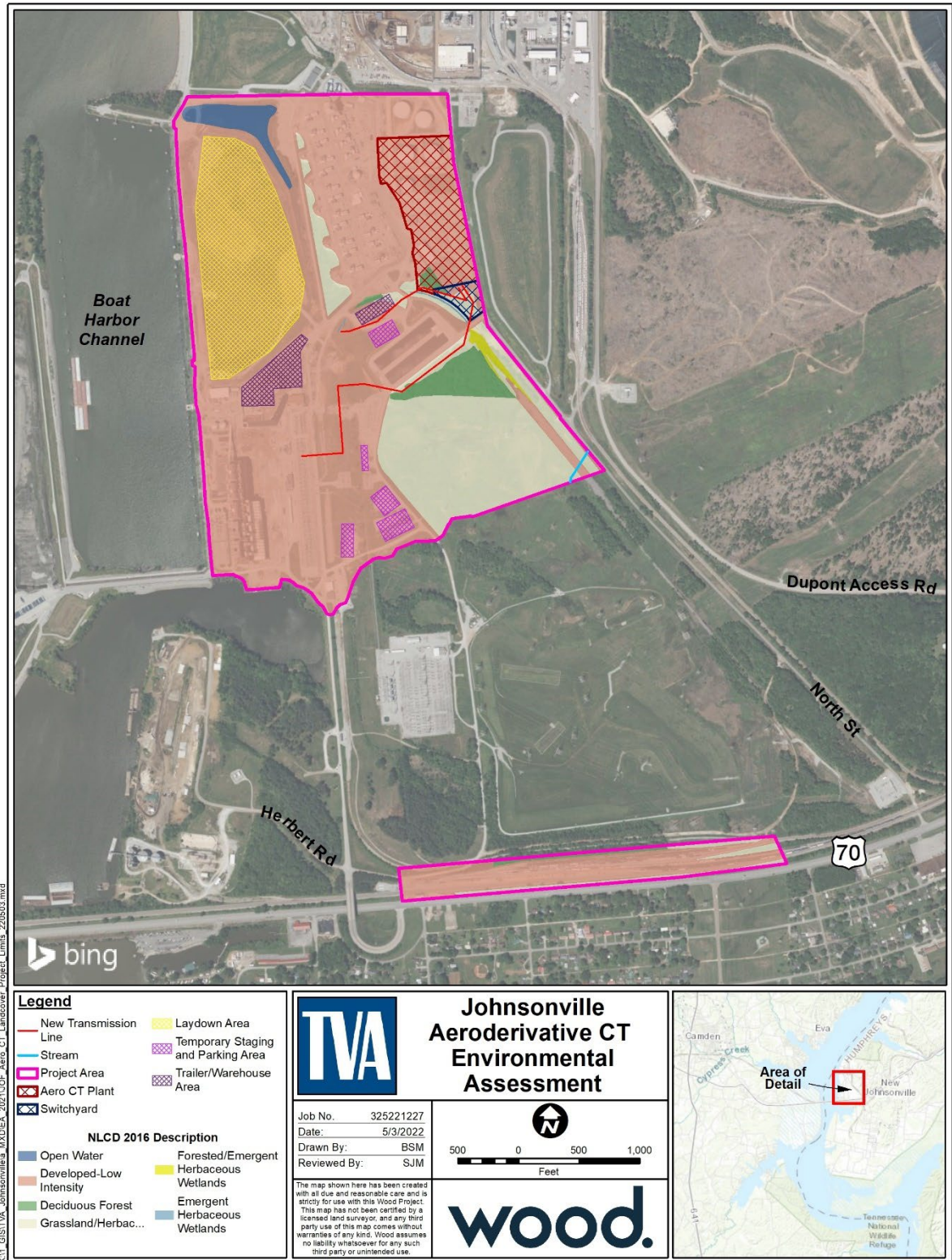


Figure 3-4. Land Cover within the Project Area

Based on a desktop review and field surveys, no unique plant communities are present within the Project Area. Mowed and maintained upland lawns and early successional herbaceous communities were dominated by dallisgrass, Johnsongrass, tall fescue, sericea lespedeza, tall goldenrod, tall fescue, Johnsongrass, lanceleaf plantain, little bluestem, and horseweed. Disturbed, infrequently maintained herbaceous wet ditches and small wetlands were commonly occupied by woolgrass, small carpetgrass, common reed, and several species of smartweeds, bonesets, water primroses, true sedges, rushes, and flatsedges. Upland deciduous forest commonly included trees of southern red oak, black oak, sweet gum, black locust, and loblolly with winged elm, winged sumac, Japanese honeysuckle, and trumpet creeper in the shrub and vine stratum over a poorly developed herbaceous layer.

Certain non-native species are considered invasive and pose a significant threat to the natural environment. EO 13112 of February 3, 1999, 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 issued on December 8, 2016, amends EO 13112 and directs actions to continue coordinated federal prevention and control efforts related to invasive species. Invasive plants are common in and near the Project Area. Some of the invasive plant species observed within the Project Area include Japanese honeysuckle, Bradford pear, common reed, Chinese privet, Johnsongrass, tall fescue, and sericea lespedeza.

3.9.2 Environmental Consequences

3.9.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not construct the Aero CT plant and associated support structures. Therefore, no impacts with respect to vegetation would occur under this alternative.

3.9.2.2 Alternative B – Construction of Johnsonville Aero CTs and Support Systems

Under Alternative B, impacts to vegetation would generally result from earthmoving and vegetation clearing activities associated with the construction of the proposed Aero CT plant. TVA has identified previously disturbed land to be used for temporary laydown and storage areas during the construction phase.

As shown in Figure 3-4, the majority (193 acres or 78 percent) of the Project Area, including the laydown, temporary use areas and parking areas, is classified as developed low intensity, which describes areas with a mixture of constructed areas and vegetation. The laydown area consists of the former ash pond that has been closed and an herbaceous cover has developed. Other temporary staging and parking areas include gravel parking lots with some herbaceous land cover, primarily consisting of turfgrass and vegetation associated with disturbed areas found at the edge of gravel parking lots. The laydown and temporary staging areas would be impacted mostly by storage of equipment, materials, and vehicles during construction. Post-construction, these areas would revert to their current use; therefore, the impact to any vegetation present in the laydown area and temporary staging areas would be short-term and minor.

The locations of the proposed Aero CT plant and Aero 161-kV switchyard are mostly within areas classified as developed low intensity and herbaceous land cover. Each of these areas also includes a small portion of deciduous forest, with 0.5 acres and 0.1 acres within the Aero CT plant and Aero 161-kV switchyard areas, respectively. The proposed

transmission line corridor that would connect the Aero 161-kV switchyard to the existing switchyard would impact 0.4 acres of deciduous forest and 0.05 acres of forested/emergent wetland. Therefore, construction within the Project Area for the Aero CT plant, Aero 161-kV switchyard, and transmission line would result in the permanent loss of approximately 1.05 acres of forest resulting in long-term adverse impacts. Construction activity within the rail area would avoid impacts to the approximately 1.0 acre of deciduous forest located near the rail line. As shown in Table 3-6, there is abundant deciduous forest habitat (24,127 acres) of similar quality within a 5-mile radius of the reservation, and the deciduous forested vegetation in the transmission corridor is common and representative of the region. Therefore, no impacts to unique or important terrestrial plant communities are anticipated.

Invasive species have the potential to affect native plant communities adversely because of their ability to spread rapidly and displace native vegetation. Post construction, the laydown and temporary staging and parking areas would revert to their original use. It is likely that project-related construction would result in localized increases of invasive plants, but the plants most likely to colonize the area are distributed widely throughout the region; therefore, implementation of the proposed project would not likely increase the proportion of invasive plants in the area. BMPs consisting of erosion control measures and use of approved, non-invasive seed mixes or sod designed to establish desirable vegetation would mitigate the risk of the spread of invasive species. Due to these control measures, the proposed action would be in compliance with the requirements of EO 13751 and EO 13112.

Overall, the construction and operation of the Aero CT plant is expected to result in short-term impacts to existing disturbed land cover types. As described in Section 3.1.2, the lateral divestiture project and development of the borrow site on TVA property may result in some tree removal. Based on the small acreage of impacted forest in comparison to the abundance of similar habitats within the 5-mile vicinity, cumulative impacts to forest resources as a result of the proposed action in combination with the other reasonably foreseeable future actions in Table 3-1 would be minor.

3.10 Wildlife

3.10.1 Affected Environment

Habitat assessments for terrestrial animal species were conducted for the Johnsonville Reservation in 2019, 2020, and 2021, including osprey nest and wading bird colony surveys in 2020 and 2021. Landscape features within and surrounding the Project Area consist of a variety of fragmented forest habitat, stream corridors, wetlands, and developed or otherwise disturbed areas.

Fragmented pockets of deciduous forested stands occupy approximately 6.7 acres of the Project Area within the Aero CT plant area and rail area. These forest types provide habitat for an array of common terrestrial animal species. Birds typical of this habitat include chuck-will's-widow, downy and hairy woodpecker, eastern screech-owl, eastern wood-pewee, great horned-owl, red-tailed hawk, wood thrush, and wild turkey (National Geographic 2002). This area also provides foraging and roosting habitat for several species of bat, particularly in areas where the forest understory is partially open. Bat species likely found within this habitat include eastern red bat and evening bat. Eastern chipmunk, gray fox, and woodland vole are other mammals likely to occur within this habitat (Whitaker 1996). Eastern black kingsnake, black ratsnake, eastern box turtle, and ring-necked snake are common reptiles of deciduous forests in this region (Gibbons and Dorcas 2005).

Developed areas, and areas otherwise previously disturbed by human activity, make up the majority (192.7 acres) of the Project Area, including the proposed Aero CT plant site, the laydown area, and the temporary staging and parking areas. This habitat type is home to many common species. American robin, Carolina chickadee, blue jay, European starling, house sparrow, mourning dove, northern cardinal, northern mockingbird, black vulture, and turkey vulture are birds commonly found along road edges, residential neighborhoods, and industrial properties (National Geographic 2002). Mammals commonly found in this habitat include eastern gray squirrel, northern raccoon, and Virginia opossum (Whitaker 1996). Roadside ditches and ephemeral streams provide potential habitat for amphibians including American toad, upland chorus frog, and spring peeper. Reptiles potentially present include eastern garter snake and midland brown snake (Gibbons and Dorcas 2005).

Stream and wetland habitat within the Project Area is fairly limited and includes a perennial stream, small linear emergent/scrub-shrub wetlands, and forested wetland flats. Aquatic habitat within the Project Area provides resources for birds including Canada goose, cedar waxwing, northern harrier, northern parula, red-winged blackbird, swamp sparrow, and white-throated sparrow (National Geographic 2002). American beaver, golden mouse, and muskrat are common mammals in wetlands and aquatic communities. Northern water snake, ribbon snake, and rough green snake are common reptiles likely present within this habitat type (Gibbons and Dorcas 2005). Amphibians likely found in forested wetlands include eastern newt, marbled salamander, slimy salamander, spotted salamanders, eastern narrowmouth toad, eastern spadefoot toad, Fowler's toad, Cope's gray treefrog, and southern leopard frog (Conant and Collins 1998, Redmond and Scott 1996).

Review of the TVA Regional Natural Heritage Database in March 2021 indicated the presence of 10 osprey nests within 3 miles of the Project Area. Field surveys conducted in April 2021 confirmed the presence of seven active osprey nests either located within the Project Area or whose 660-foot disturbance buffers are located within the Project Area. The locations of these 660-foot disturbance buffers are shown on Figure 3-5. According to the TVA Regional Natural Heritage Database, there are also three wading bird colonies within 3 miles of the Project Area, the nearest of which occurs within approximately 1.8 miles.

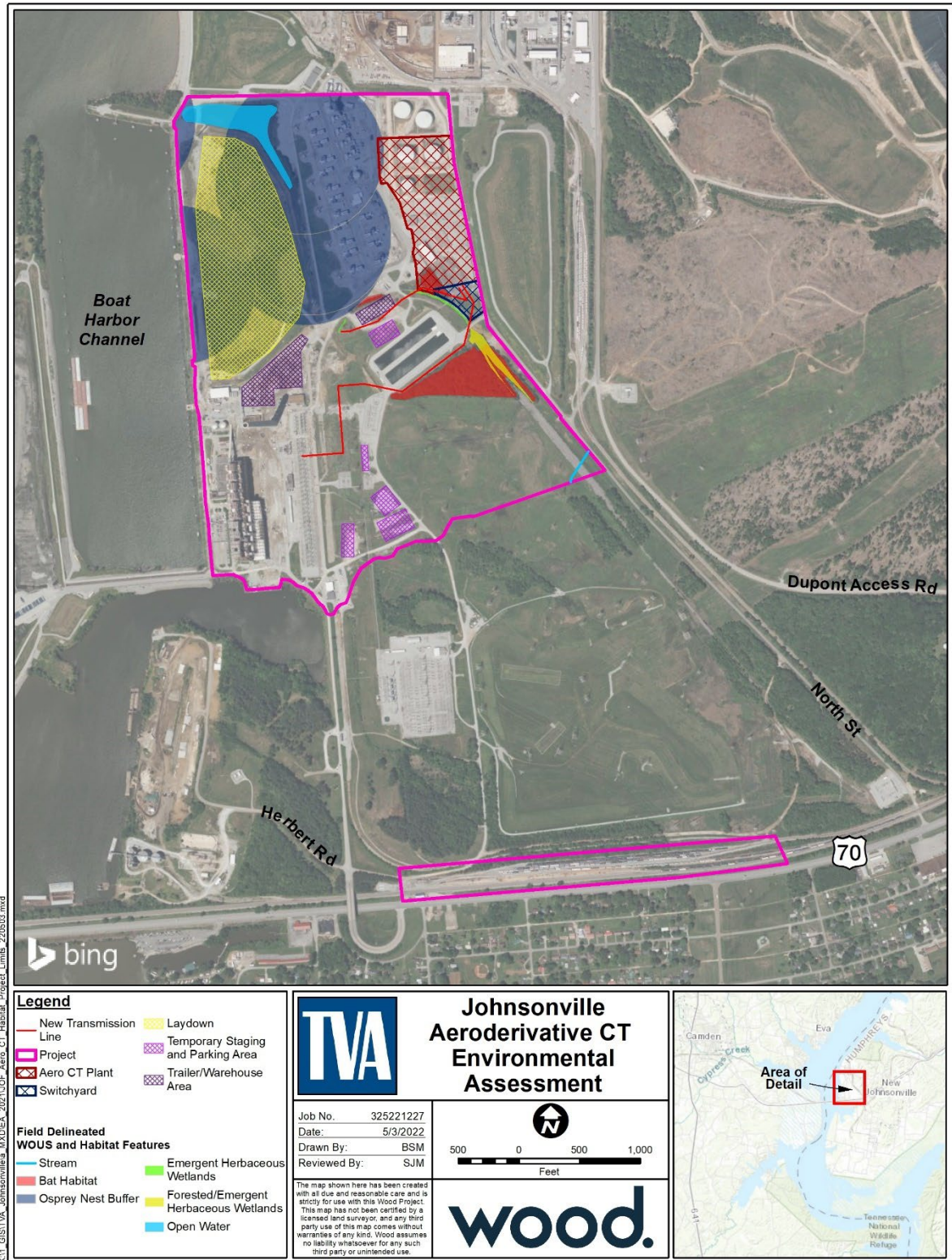


Figure 3-5. Osprey Nest Buffers and Potentially Suitable Bat Roosting Habitat within the Project Area

Additional review of the USFWS Information for Planning and Consultation (IPaC) project planning tool resulted in the potential for the following eleven migratory bird species of conservation concern to occur within the Project Area: bald eagle, blue-winged warbler, golden eagle, Kentucky warbler, Le-Conte's sparrow, lesser yellowlegs, prairie warbler, red-headed woodpecker, rusty blackbird, semipalmated sandpiper, and wood thrush. Habitat is not present within the Project Area for golden eagle, Kentucky warbler, Le Conte's sparrow, lesser yellowlegs, rusty blackbird, or semipalmated sandpiper. Suitable nesting and/or foraging habitat exists within the Project Area for bald eagle, blue-winged warbler, prairie warbler, red-headed woodpecker, and wood thrush. An abundance of similarly suitable habitat occurs across the adjacent landscape. No bald eagles or their nests were observed in or adjacent to the Project Area during 2021 field surveys. See Section 3.11 (Threatened and Endangered Species) for review of potential impacts to bald eagle.

3.10.2 Environmental Consequences

3.10.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not construct the Aero CT plant and associated support structures. All forested habitats would remain in place and soil and vegetation would remain as-is because TVA would continue to use the property in its current state. Therefore, terrestrial animals and their habitats would not be affected under the No Action Alternative.

3.10.2.2 Alternative B – Construction of Johnsonville Aero CTs and Support Systems

Under Alternative B, the construction and operation of the Aero CT plant and associated structures would occur within a highly disturbed and fragmented industrial landscape that offers minimal habitat for wildlife.

Both forested and herbaceous vegetation that may provide habitat for common wildlife species would be removed in association with the proposed actions. TVA would clear up to 1.05 acres of forest to construct the proposed Aero CT plant, Aero 161-kV switchyard, and associated transmission lines that would connect the proposed Aero CTs to the existing TVA transmission system. Some vegetation within the previously disturbed 41.2-acre grassy/herbaceous habitats could also be impacted, as ground disturbance would likely occur in these areas. The forest fragments are divided by roads and early successional habitats. Due to the small size of these forest fragments and the heavy disturbance that consistently occurs in the Project Area, it is likely that mostly common, habituated, and/or opportunistic species would utilize these areas.

Wildlife may be displaced by increased levels of disturbance during construction activities. These disturbances and habitat removal are expected to disperse wildlife into surrounding areas in an attempt to find new food and shelter sources and to reestablish territories. Forested areas that are cleared for the transmission line would likely be maintained as early successional or developed habitat for the foreseeable future. It is expected that over time, displaced species that utilize early successional habitat, fragmented forest, and otherwise developed habitats would return to the Project Area upon completion of project actions. Direct effects to some individuals that are immobile during the time of construction may occur, particularly if construction activities transpire during breeding/nesting seasons. However, the actions are not likely to affect populations of species common to the area, as similarly suitable and superior forested habitat is abundant throughout the adjacent landscape.

Suitable nesting and foraging habitats are present within the Project Area for some migratory bird species of conservation concern, including bald eagle, blue-winged warbler, prairie warbler, red-headed woodpecker, and semipalmated sandpiper. See Section 3.11 (Threatened and Endangered Species) for a discussion on impacts to the bald eagle. The schedule for tree removal activities is dependent on final project design and planning. If tree clearing takes place during breeding and nesting seasons for migratory birds, direct effects to immobile individuals (e.g., eggs and nestlings) could occur. To the extent possible, TVA would prioritize tree removal during the winter clearing window (October 15 – March 31) to avoid directly affecting threatened and endangered bats. This measure would also be beneficial to migratory birds. Similarly suitable foraging habitat is abundant throughout the adjacent landscape such that Alternative B would have no measurable effect on migratory bird foraging habitat.

Seven active osprey nests were observed during field surveys within the Project Area in April 2021. Bush hogging, mowing, and selective herbicide treatments are the only acceptable means of vegetation removal between March 1 and July 31 within 660 feet of active nests. Broadcast herbicide application is not permissible within the 660-foot disturbance buffer areas. Given the amount of time that would pass between the 2021 breeding season field surveys and the onset of construction activities, new nests are likely to be built and some existing nests may no longer be active. As such, the osprey conservation commitments are applicable within 660 feet of any active nest during construction activities. Prior to activities in the vicinity of these nests, TVA would conduct additional field surveys to identify any new or active nests, with the intention of avoiding them. If needed, TVA would coordinate with USDA-Wildlife Services to ensure compliance under EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds).

The temporary laydown area, staging, and parking areas within the Project Area are located on land previously disturbed, fragmented, and of poor quality for use by wildlife. Wildlife habituated to these areas are expected to move to other suitable environments offsite, which are plentiful; however, as described above, immobile species may be impacted should they be present in the laydown area and other temporary use areas at the time of use. Post construction, these areas would return to their previous state. Overall, impacts to wildlife utilizing these areas would be minor and temporary.

While the proposed actions would result in alteration of habitats and displacement of resident wildlife species, impacts to wildlife are not expected to result in notable large-scale habitat alteration or destabilization of any wildlife species. Therefore, impacts to wildlife resulting from the implementation of Alternative B would be minor and together with the other reasonably foreseeable future actions in Table 3-1 would not result in incrementally greater cumulative effects.

3.11 Threatened and Endangered Species

3.11.1 Affected Environment

The ESA requires federal agencies to conserve endangered and threatened species and to determine the effects of proposed actions on endangered and threatened species and Designated Critical Habitat. Endangered species are those determined to be in danger of extinction through all or a significant portion of their range. Threatened species are those likely to become endangered within the foreseeable future. Section 7 of the ESA requires federal agencies to consult with the USFWS when proposed actions may affect endangered or threatened species or Designated Critical Habitat.

The State of Tennessee provides protection for species considered threatened, endangered, or deemed in need of management within the state other than those already federally listed under the ESA. Plant species are protected in Tennessee through the Rare Plant Protection and Conservation Act of 1985. The listing of species is managed by TDEC. Additionally, TVA also maintains databases of aquatic and terrestrial animal and plant species that are considered threatened, endangered, or of special concern, or are otherwise tracked in Tennessee because the species is rare and/or vulnerable within the state. Tracked species are those that are not currently listed but are populations at risk for decline and may warrant official listing in the future.

A review of the TVA Natural Heritage Database and the USFWS IPaC online system for protected species potentially present within the Project Area was conducted in March 2021 for terrestrial species and in June 2021 for aquatic species (TVA 2021e; USFWS 2021a). A list of these species is included in Table 3-7.

Table 3-7. Federally Listed Species Reported from Humphreys County, Tennessee and Other Species of Conservation Concern Documented in the Vicinity of the Johnsonville Aeroderivative CT Project

Common Name	Scientific Name	Status		Suitable Habitat Present within Project Area ⁷
		Federal ⁴	State Rank ⁵ (Status ⁶)	
Birds¹				
Bald eagle	<i>Haliaeetus leucocephalus</i>	DM	D(S3)	P
Little blue heron	<i>Egretta caerulea</i>	--	D (S2B,S3N)	P
Piping plover	<i>Charadrius melodus</i>	T	--(S2N)	N
Mammals¹				
Gray bat	<i>Myotis grisescens</i>	E	E(S2)	P
Indiana bat	<i>Myotis sodalis</i>	E	E(S1)	P
Northern long-eared bat	<i>Myotis septentrionalis</i>	T	T(S1S2)	P
Reptiles¹				
Alligator snapping turtle	<i>Macrochelys temminckii</i>	PT	T(S2S3)	N
Northern pine snake	<i>Pituophis melanoleucus</i>	--	T(S3)	N
Western pygmy rattlesnake	<i>Sistrurus miliarius streckeri</i>	--	T(S2S3)	P
Fish²				
Slenderhead darter	<i>Percina phoxocephala</i>	--	D(S3)	N
Mollusks²				
Orange-foot pimpleback	<i>Plethobasus cooperianus</i>	LE	E(S1)	N
Pink mucket	<i>Lampsilis abrupta</i>	LE	E(S2)	N
Ring pink	<i>Obovaria retusa</i>	LE	E(S1)	N
Plants³				
Hairy umbrella-sedge	<i>Fuirena squarrosa</i>	--	S(S1)	N
Harper's fimbristylis	<i>Fimbristylis perpusilla</i>	--	E(S1)	N
Lamance iris	<i>Iris brevicaulis</i>	--	E(S1)	N
River bulrush	<i>Bolboschoenus fluviatilis</i>	--	S(S1)	P (limited)
Smaller mud-plantain	<i>Heteranthera limosa</i>	--	T(S1S2)	N
Walter's barnyard grass	<i>Echinochloa walteri</i>	--	S(S1)	P (limited)

¹ Federally listed species documented in Humphreys County, Tennessee and state-listed species within 3 miles of the Project Area (sources: TVA Natural Heritage Database, accessed March 19, 2021; USFWS IPaC)

Common Name	Scientific Name	Status		Suitable Habitat Present within Project Area ⁷
		Federal ⁴	State Rank ⁵ (Status ⁶)	
resource list (https://ecos.fws.gov/ipac/), accessed March 19, 2021; Tennessee Bat Working Group County Occurrence Maps (TNBWG.org), accessed March 19, 2021).				
² Documented within Humphreys County and the 10-digit HUC watershed of the Project Area (sources: TVA Natural Heritage Database, accessed June 1, 2021; USFWS IPaC resource list, accessed June 1, 2021)				
³ Documented in Humphreys County, Tennessee, and/or within 5 miles of the Project Area (source: TVA Natural Heritage Database, accessed March 5, 2021; USFWS IPaC resource list, accessed June 1, 2021)				
⁴ Federal Status Codes:				
LE = Listed Endangered		PT = Proposed Threatened		
-- = Not Listed by USFWS				
LT = Listed Threatened;		DM = Recovered, Delisted, and Being Monitored		
⁵ State Status Codes:				
E = Listed Endangered		S = Species of special concern		
T = Listed Threatened		D = Deemed in Need of Management		
CE = Commercially Exploited		SH = possibly extirpated		
⁶ State Rank:				
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 = Breeds in Tennessee		S#N = Occurs in Tennessee in a non-breeding status		
⁷ Habitat Codes:				
Y = Yes, species has been documented in existing habitats in Project Area and suitable habitat is present				
N = No, no records of species within Project Area and no suitable habitat is present				
P = Potentially suitable habitat is present, but no records of species in Project Area				
P (limited) = Only limited parts of the Project Area are consistent with species recorded habitat preferences, no records of species in Project Area. Not likely to occur as habitat is fragmented and marginal.				

3.11.1.1 Terrestrial Animals

A review of the TVA Regional Heritage Database on March 19, 2021, resulted in records for four state-listed species (alligator snapping turtle, little blue heron, northern pine snake, and western pygmy rattlesnake) and one record of a federally listed species (piping plover). Additionally, a federally protected species (bald eagle) is known to be found in Humphreys County, Tennessee. Review of the USFWS' IPaC online database determined that the federally listed Indiana bat, northern long-eared bat, and gray bat also have the potential to occur within the Project Area. As such, these species have been included in this assessment (Table 37).

3.11.1.1.1 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 nests are usually found near larger waterways where the eagles forage (USFWS 2007). Records document the occurrence of four bald eagle nests in Humphreys County, Tennessee, the nearest of which occurs approximately 4.2 miles from the Project Area. No bald eagles or their nests were observed in or adjacent to the Project Area during field surveys, although suitable foraging and nesting habitat exists for bald eagles within the Project Area.

The little blue heron is listed as in need of management by the State of Tennessee. It inhabits bodies of calm shallow water such as marshes, ponds, lagoons, and streams. Little blue herons build nests in trees and shrubs about 4 meters above the ground or water, primarily in freshwater habitat and often with other colonial wading birds (NatureServe 2021). Records document the occurrence of one little blue heron approximately 1.8 miles from the Project Area. No little blue herons or nests were observed during field surveys in March 2021, although suitable nesting and foraging habitats for little blue heron are present within the Project Area.

The federally endangered piping plover can be found during migration stopovers on expansive sand flats, sandy mudflats, and ash ponds, particularly in manmade reservoirs where habitat has a high level of heterogeneity (NatureServe 2021). The nearest known piping plover was documented at a migration stopover on Kentucky Reservoir on the Tennessee River in August 2007, approximately 0.5 miles from the Project Area. Suitable foraging habitat is not present for this species within the Project Area.

3.11.1.1.2 Mammals

The federally endangered gray bat roosts in caves year-round and migrates between summer and winter roosts during spring and fall (Brady et al. 1982, Tuttle 1976). Bats disperse over bodies of water at dusk where they forage for insects emerging from the surface of the water (Harvey 1992). While the USWFS IPaC online database determined that gray bats have the potential to occur within the Project Area, to date there are no known records of gray bat presence in Humphreys County. No caves are known within 3 miles of the Project Area, and none were observed during field surveys of the Project Area. Drinking water and foraging habitat for gray bat exists over small streams and wetlands within the reservation, as well as in Kentucky Reservoir on the Tennessee River adjacent to the Project Area.

The federally endangered Indiana bat hibernates in caves in winter and uses areas around them for swarming (mating) in the fall and staging in the spring, prior to migrating back to summer habitat. In summer, Indiana bats roost under the exfoliating bark of dead snags and living trees in mature forests with an open understory and a nearby source of water (Pruitt and TeWinkel 2007, Kurta et al. 2002). Indiana bats are known to change roost trees frequently throughout the season, while still maintaining roost site fidelity, returning to the same summer roosting areas in subsequent years (Pruitt and TeWinkel 2007). Although less common, Indiana bats have also been documented roosting in buildings (Butchkoski and Hassinger 2002). Indiana bats eat terrestrial and aquatic insects while foraging in forested stream corridors, upland and bottomland forests, forested wetlands, and along wooded edges of agricultural fields, pastures, and impounded bodies of water at night (USFWS 2021b). While the USWFS IPaC online database determined that Indiana bats have the potential to occur within the Project Area, known Indiana bat presence has not been documented in Humphreys County to date. No caves are known within 3 miles of the Project Area, and none were observed during field surveys of the Project Area.

The federally threatened northern long-eared bat predominantly overwinters in large hibernacula, such as caves, abandoned mines, and cave-like structures. During spring and fall, northern long-eared bats 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). While the USFWS IPaC online database determined that northern long-eared bat have the potential to occur within the Project Area, known northern long-eared bat presence has not been documented in Humphreys County to date. No caves are known within 3 miles of the Project Area, and none were observed during field surveys.

TVA surveyed the Project Area for the presence of potentially suitable habitat for federally listed bats in 2019 following the 2019 Range-Wide Indiana Bat Survey Guidelines (USFWS 2019). Of the 7.7 acres of deciduous forest and woody wetland habitat in the Project Area, 6.9 acres were determined to be potentially suitable for use by summer roosting Indiana bat and northern long-eared bat based on the presence of trees with exfoliating bark, a hollow trunk, and/or cracks and crevices. Potentially suitable bat roosting habitat is shown in Figure 3-5 in Section 3.10 (Wildlife). Suitable foraging habitat was also identified within the Project Area and vicinity for gray bat, Indiana bat, and northern long-eared bat in and around forests, forested edges, and over Kentucky Reservoir on the Tennessee River, which also provides a source of drinking water for all three listed bat species.

3.11.1.1.3 Reptiles

The proposed federally threatened alligator snapping turtle is a highly aquatic reptile, emerging from water only for nesting, rarely for basking. This species is restricted to river and stream drainages that flow into the Gulf of Mexico. Adults generally inhabit the deepest waters of large rivers, canals, lakes, and swamps, while hatchlings and juveniles typically inhabit smaller streams. Eggs are laid approximately 160 feet from a body of water in sandy floodplain soils. This species is believed to be extirpated from much of its former range (NatureServe 2021). The nearest known alligator snapping turtle record was documented in 1971 approximately 1.7 miles from the Project Area. Suitable nesting habitat is present for alligator snapping turtle around the shoreline of Kentucky Reservoir on the Tennessee River. However, the shoreline in the action area is predominantly along the boat harbor channel, which is steep and covered with riprap. Only two small, narrow strips of shoreline vegetation remain intact above the riprap. These are immediately bordered by a road. Suitable habitat for alligator snapping turtle is not present in the Project Area.

The state-threatened northern pine snake is a non-venomous snake found in pine or mixed pine-dominated forests with well-drained sandy soils and an open understory on mountain slopes, ridges, or hills, sometimes with abundant rock cover. This species overwinters in underground hibernacula and constructs shallow, underground summer dens (Gibbons and Dorcas 2005). One northern pine snake record has documented presence in Humphreys County, approximately 2.2 miles from the Project Area. Suitable habitat is not present within the Project Area for northern pine snake.

The state-threatened western pygmy rattlesnake is a secretive species that inhabits areas near water where ample coverage is present, such as in river floodplains, swamps, marshes, wet prairies, and temperate forests. This species covers itself in debris or takes refuge in burrows when the weather drops below freezing, but it does not go into hibernation during winter. Western pygmy rattlesnakes breed in spring and give birth to live young. Snakelets are born precocial but stay near their mother for the first 7-10 days of their life for protection (NatureServe 2021). Two records of western pygmy rattlesnake have

been documented within 3 miles of the Project Area, the nearest of which occurs approximately 1.1 miles from the Project Area. Suitable habitat for western pygmy rattlesnake is present within forested wetlands found in the Project Area.

3.11.1.2 Aquatic Animals

Listed aquatic animal species documented on the TVA Regional Heritage Database as occurring within the Tennessee River 10-digit HUC watershed (HUC 0604000504) include three federally listed mollusk species and one state-listed fish (see Table 3-7). Although habitat for these mollusks occurs within Kentucky Reservoir on the Tennessee River outside of the Project Area, two of these (ring pink and orange-foot pimpleback) are either historical or extirpated records and are no longer considered extant in this portion of the river. No federally Designated Critical Habitat for any of these species is present within Humphreys County, Tennessee.

The slenderhead darter is listed as in need of management by the State of Tennessee. It is commonly found in gravel shoal areas of medium to large rivers with moderate to swift current (Etnier and Starnes 1993). No suitable habitat was observed in the Project Area.

The three federally endangered mollusk species that have historically occurred in the Tennessee River include orangefoot pimpleback, pink mucket, and ring pink. 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. This species is considered to be tachytictic but host fish for glochidia are currently unknown (Parmalee and Bogan 1998). The pink mucket is typically a big river species but occasionally individuals become established in small to medium sized tributaries of large rivers. It inhabits rocky bottoms with swift current usually in less than three feet of water (Parmalee and Bogan 1998). The ring pink is typically found in large rivers with gravel bars. No suitable habitat for the listed mussels is present within the Project Area.

3.11.1.3 Plants

A review of the TVA Regional Natural Heritage Database indicated that no federally listed plant species or associated designated critical habitat are known to occur on or within 5 miles of the Johnsonville Reservation. No federally listed plant species have been previously reported in Humphreys County, Tennessee. However, six species of plants listed by TDEC as threatened, endangered, or of special concern have been previously reported within 5-miles of the Project Area (see Table 3-7). The TVA Regional Natural Heritage Database indicated that there are 14 occurrences of state-listed plant species within 5-miles of the Project Area. Preferred habitat for each species and the possibility of habitat within the Project Area are addressed in Table 3-8.

For the six state-listed species known to have occurred within 5-miles of the Project Area, a comprehensive site survey performed by TVA of the Johnsonville Reservation did not find habitat that could support any of these species within the Project Area. Therefore, no state-listed species are present within the Project Area.

Table 3-8. Habitat Requirements for Plant Species of Conservation Concern Within 5 Miles of the Project Area

Common Name	Scientific Name	Habitat Requirements	*Habitat within Project Area
Hairy umbrella-sedge	<i>Fuirena squarrosa</i>	Shores/margins of rivers, lakes, ponds	N
Harper's fimbriatylis	<i>Fimbristylis perpusilla</i>	Depressions in low woods	N
Lamance iris	<i>Iris brevicaulis</i>	Bottomlands	N
River bulrush	<i>Bolboschoenus fluviatilis</i>	Marshes	N
Smaller mud-plantain	<i>Heteranthera limosa</i>	Mud flats	N
Walter's barnyard grass	<i>Echinochloa walteri</i>	Bottomlands and marshes	N

Sources: TDEC 2021c; Shaw et al. 2021

*Habitat Codes:

Y = Yes, species has been documented in existing habitats in Project Area and suitable habitat is present

N = No, no records of species within Project Area and no suitable habitat is present

P = Potentially suitable habitat is present, but no records of species in Project Area

P (limited) = Only limited areas in the Project Area are consistent with species recorded habitat preferences, no records of species in Project Area. Not likely to occur as habitat is fragmented and marginal.

3.11.2 Environmental Consequences

3.11.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not construct the proposed Aero CT plant. Therefore, no impacts to threatened or endangered species, or species of conservation concern or any suitable habitat, would occur under this alternative.

3.11.2.2 Alternative B – Construction of Johnsonville Aero CTs and Support Systems

Under Alternative B, potential impacts to threatened and endangered species would be associated with earthmoving activities and disturbance related to construction of the Aero CTs and support systems. Most of these activities would be conducted on previously disturbed land. However, construction of the Aero CT plant, Aero 161-kV switchyard, and transmission line would result in the permanent loss of approximately 1.0 acre of forest that is considered potentially suitable bat roosting habitat.

Proposed actions under this alternative would not impact nesting bald eagles, as no nests are known within 3 miles of the Project Area and no nests were observed in the Project Area during field surveys. Foraging habitat is present for bald eagles over Kentucky Reservoir on the Tennessee River. During construction and operation, 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 pollutants to the receiving waters, including Kentucky Reservoir on the Tennessee River, are minimized. As such, significant impacts to this habitat are not anticipated. The proposed actions would be in compliance with the National Bald Eagle Management Guidelines, and bald eagles would not be significantly impacted by proposed activities under Alternative B.

Suitable foraging habitat is present within the Project Area for little blue heron along the shoreline on the western perimeter of the Project Area. Suitable foraging habitat is also present for alligator snapping turtle in Kentucky Reservoir. No impacts to the reservoir or its shoreline are anticipated, as BMPs would be utilized during proposed construction

activities. Therefore, there would be no impacts to alligator snapping turtle and little blue heron under Alternative B.

Based on a review of the TVA Natural Heritage Database on March 19, 2021, and results of field surveys performed throughout 2019, 2020, and 2021, no suitable habitat exists in the Project Area for piping plover or northern pine snake. Therefore, these species would not be impacted under Alternative B.

A small amount of suitable western pygmy rattlesnake habitat is present within the forested wetlands in the Project Area. If individuals (snakelets and adults) are active within the Project Area at the time construction disturbances occur, it is expected that these individuals would disperse into surrounding areas. The schedule for tree removal activities is dependent upon final project design and planning. If vegetation clearing takes place at the time when western pygmy rattlesnakes are active in these areas, direct effects to individuals could occur. To the extent possible, TVA would prioritize tree removal during the winter season (October 15 – March 31) to prevent directly affecting threatened and endangered bats. This measure would also benefit the western pygmy rattlesnake because they are typically inactive during winter months and would reside underground or in dens or other enclosed areas. Therefore, Alternative B is unlikely to affect populations of western pygmy rattlesnake.

The federally listed gray bat, Indiana bat, and northern long-eared bat have the potential to utilize the Project Area. No caves exist within 3 miles of the Project Area, and none would be impacted by the proposed actions. Suitable foraging habitat is present for all three species over Kentucky Reservoir on the Tennessee River; however, no impacts to the lake are anticipated, as BMPs designed to minimize the introduction of pollutants into this waterbody would be utilized during construction activities. Additional foraging habitat for Indiana bat and northern long-eared bat is present over and around forested edges and tree lines. Some or all of this habitat would be removed in association with project activities. The project site is in the vicinity of the Duck River National Wildlife Refuge and other public lands; as such, an abundance of superior foraging habitat occurs within the surrounding area.

A total of 1.0 acre of the potentially suitable summer roosting habitat for Indiana bat and northern long-eared bat would be removed in association with the proposed actions under Alternative B, which may affect Indiana bat and northern long-eared bat. The schedule for tree removal activities is dependent on final project design and planning. However, to the extent possible, TVA would prioritize clearing suitable summer roosting habitat for Indiana bat and northern long-eared bat during the winter months (October 15 – March 31) when bats are in caves and not out on the landscape. A number of activities associated with the proposed project (including tree removal) were addressed in TVA's 2018 programmatic consultation with the USFWS on routine actions and federally listed bats in accordance with ESA Section 7(a)(2). For those activities with potential to affect bats, TVA would require the project to implement specific conservation measures. These activities and associated conservation measures are identified on Table 4 of the TVA Bat Strategy Project Review Form (Appendix B). With the use of BMPs and identified Conservation Measures, proposed actions are not likely to adversely affect Indiana bat, northern long-eared bat, or gray bat.

Because no state- or federally listed aquatic species or their habitats are known to occur within the Project Area, and BMPs would be implemented to protect Kentucky Reservoir on

the Tennessee River and the onsite drainage feature, there would be no effects to federal or state-listed endangered or threatened aquatic species or designated Critical Habitats.

No federally listed plant species are known from the county, and no habitat suitable for federally listed plant species have been observed during previous field surveys at the Johnsonville Reservation. Consequently, the proposed project would have no effect on federally listed plant species. Since suitable habitat for state-listed plant species is not present within the Project Area, there would be no effects to state-listed species.

Alternative B is not expected to result in long-term significant effects to listed species populations. There are no records of listed species within the proposed Project Area. Although the project would impact potential suitable habitats for several of the species, these species were not found during surveys of the reservation, and there is an abundance of suitable habitat in the surrounding areas. Use of BMPs and timing of tree removal to occur during winter months would help to ensure that any potential direct impacts to individuals using those habitats would be minimized or avoided. Overall, Alternative B would likely adversely affect the Indiana bat, northern long-eared bat, and gray bat, but with the use of BMPs and identified conservation measures, impacts would not be significant, and would not affect any of the other animal or plant species. Therefore, there would be no cumulative effects to threatened and endangered species.

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 Johnsonville Reservation that encompass both permanent and temporary impact areas (Figure 2-1), as well as the physical and natural features of the landscape. The Johnsonville Reservation is located along an impounded section of the Tennessee River (Kentucky Reservoir), in the city of New Johnsonville. The surrounding topography ranges from relatively flat near the banks of the reservoir to moderately sloping at Johnsonville State Historic Park to the north. Large-scale industrial development, including the Chemours facility, is visible immediately north of the reservation, while areas to the east and northeast are forested. Residential and commercial development associated with the city of New Johnsonville are present to the south and low-density residential areas are visible to the west, across Kentucky Reservoir on the Tennessee River.

Portions of the Johnsonville Reservation are devoid of vegetation, and much of it has been heavily disturbed by previous industrial and utility activities. This, in combination with the large-scale development associated with the existing JCT plant, transmission system, and the retired coal-fired plant, provide a sharp visual contrast to the surrounding rural and natural landscape. Historically, the dominant visual components of the Johnsonville Reservation included the fossil plant powerhouse and the 600-foot-high emissions stack; however, these were recently decommissioned and demolished. Other major visual components of the site that remain following the demolition include the twenty existing CT units and associated storage buildings, multiple switchyards and switch houses, and a network of high-voltage transmission lines (TVA 2018).

Based on the above characteristics, the scenic attractiveness of the affected environment at the Johnsonville 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 reduced 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 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 Aero CT plant would generally be limited to employees and visitors to the Johnsonville Reservation and recreational boaters on Kentucky Reservoir on the Tennessee River. There are no residences or other sensitive visual receptors located in the foreground.

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 10 natural gas-fired Aero CTs or associated support systems at the Johnsonville Reservation and the 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 – Construction of Johnsonville Aero CTs and Support Systems

Implementation of Alternative B would result in short-term visual impacts associated with construction activities within the Project Area, including potential modifications to the rail system located along the southern boundary of the reservation. During the approximately 2-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, parking, and trailer 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 2017). 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 Aero CT plant onsite support systems would include visible alterations to the existing landscape associated with the 10 new Aero CT units (with stack heights of 150 feet), as well as the proposed Aero 161-kV switchyard, the new transmission structures, and overhead wires associated with the transmission lines. 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 existing CT units, switchyards, and numerous high-voltage transmission lines. These elements contribute to the landscape's ability to absorb negative visual change and would minimize the visual impact of the new Aero CT units and associated onsite components. Furthermore, the Aero CT plant facilities would have minimal public visibility, with unobstructed views generally limited to employees and visitors to the Johnsonville Reservation. Components of the proposed facilities may also be visible to boaters on Kentucky Reservoir on the Tennessee River. However, from most locations on the reservoir (i.e., at middleground distances or further), 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 and cemeteries, are located at distances of greater than 0.5 miles and would have minimal views of the Aero CT plant components due to topography and intervening vegetation or existing development.

The industrial elements and utility structures already in place within the Project Area 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 Aero CT plant and associated support systems, it would 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 Aero CT plant would contribute to minor differences in the visual environment, it would not change the overall scenic value class, as the industrial character of the reservation would remain consistent. Therefore, overall visual impacts resulting from the implementation of Alternative B would be minor. The potential addition of the simple-cycle CTs under the Cumberland Fossil Plant Retirement project would result in similar changes to the visual environment; however, the overall scenic value class would not change as the added elements would be visually similar to other industrial structures within the Johnsonville Reservation. Therefore, the cumulative impacts of the proposed action combined with the other reasonably foreseeable actions identified in Table 3-1 would not result in incrementally greater cumulative effects.

3.13 Cultural and Historic Resources

Federal agencies are required by the NHPA and by NEPA to consider the possible effects of their undertakings on cultural resources that qualify as historic properties. Cultural resources include but are not limited to: prehistoric and historic archaeological sites, districts, buildings, structures, and objects, and locations of important historic events that lack material evidence of those events. Cultural resources that are included in, or considered eligible for inclusion in, the National Register of Historic Places (NRHP) maintained by the National Park Service are called historic properties.

3.13.1 Affected Environment

TVA determined the area of potential effects (APE) to include the entire project boundary for the proposed Aero CTs and associated support systems (Figure 2-1), where ground disturbance may occur ("footprint"), plus areas within a one-half-mile radius surrounding the permanent use areas within the proposed Project Area from which the completed project would be visible ("viewshed").

Wood completed a background literature review of previous surveys and previously recorded sites within the Aero CT Project Area. One archaeological site, 40HS277, was previously recorded within/adjacent to the Project Area where the Johnsonville Fossil Plant condenser intake and water treatment plant were later constructed. According to its site form on file at the Tennessee Division of Archaeology (TDOA), site 40HS277 was recorded in 1994 and contained Paleoindian and Early Archaic projectile points in a deposit along the bank of Kentucky Reservoir on the Tennessee River. However, a 2006 investigation concluded that the site had been destroyed by the construction of the plant's condenser water intake structure in the 1950s (Deter-Wolf 2006). Based on this information, TVA finds that site 40HS277 is no longer extant.

Six archaeological surveys have been previously conducted within the APE (Table 3-9), none of which identified any archaeological sites within the current Project Area.

Table 3-9. Previously Completed Archaeological Surveys

Author / Year	Area Surveyed	Findings
Cable 1999	Three proposed gas line routes, including portions on Johnsonville Reservation	Nine archaeological sites were identified, but none are located

Author / Year	Area Surveyed	Findings
		on or near the Johnsonville Reservation
Ezell 2000	Two proposed ash disposal sites for the TVA Johnsonville Steam Plant totaling 49 acres	No archaeological sites
McKee 2001	40 acres located near the main entrance to the Johnsonville Steam Plant	No archaeological sites
Dison et al. 2018a	An 8.6-hectare (ha) (21.3-acre) tract of land slated for the construction of the process water basin	One prehistoric isolated find that is not eligible for listing in the NRHP
Dison et al. 2018b	A 1.6-ha (3.97-acre) area consisting of two tracts of land planned for use as laydown yards and two smaller tracts under consideration for a guard shack location	No archaeological sites
Blankenship et al. 2019	Six separate areas throughout Johnsonville Fossil Plant that covered a total of 69.2 ha (171 acres)	No archaeological sites

TVA previously consulted with the Tennessee State Historic Preservation Office (SHPO) for the construction of the HRSG in 2015, which includes a portion of the Aero CT APE, and concluded that there were no historic properties within the archaeological or architectural APE of that project. These findings were coordinated with the SHPO under Section 106 of the NHPA, and a concurrence letter was received on February 23, 2015. Therefore, TVA has also determined that there are no historic architectural properties within the architectural APE for Alternative B.

Part of the area affected by the Johnsonville Coal Yard Closure, Coal Yard Runoff Pond Closure, Process Water Basin, and Borrow Site project extends into the proposed laydown area on the former coal yard and was discussed in a March 21, 2018 letter to the SHPO documenting TVA's "no effect" finding for that undertaking. In evaluating the potential for intact Holocene deposits in the coal yard and coal yard runoff pond areas, TVA Cultural Compliance staff examined TVA's 1937 land acquisition map for Kentucky Reservoir on the Tennessee River, TVA's original plant grading plan from 1949, current satellite imagery, and previous archaeological investigations (Cable 1999, Ezell 2000, McKee 2001). Prior to construction of the Johnsonville Fossil Plant, these areas consisted of two branches of a small creek and its terraces. As documented in TVA's technical report on the Johnsonville Fossil Plant (TVA 1958) and by the 1949 grading plan, TVA excavated and graded soil to depths ranging from approximately 3 feet to nearly 20 feet throughout the coal yard and surrounding area during plant construction. Based on these historical documents, TVA finds that the coal yard and coal yard runoff pond areas have no potential to contain intact archaeological sites due to these past land disturbing activities. The SHPO agreed with this finding by letter dated April 5, 2018.

TVA also consulted TVA's internal databases for information on Trail of Tears/Removal routes (routes taken by Native American tribes in 1838/39 as they were forcibly removed from their lands to western territories). These routes have potential for historic significance, including archaeological sites, and are regarded as highly significant cultural resources by many of the Indian tribes with which TVA consults. The nearest known Trail of Tears/Removal Route to the Johnsonville Reservation is located four miles north and runs west along Scepter Road (north of Johnsonville State Park) to a historic ferry location on the Tennessee River. In addition, the Tennessee River was used as a water route during the Indian removals. However, there are no terrestrial Trail of Tears/Removal routes or associated archaeological sites within the APE.

Most of the project footprint is comprised of areas which underwent large earth-moving activities during the construction of the JCT plant. Previous surveys conducted within and near the archaeological APE did not identify any intact archaeological sites. Given the degree of ground disturbance that has taken place within the project footprint during construction and maintenance of the Johnsonville Reservation and the results of previous surveys, TVA has determined that this part of the APE has low probability for the presence of significant, intact archaeological sites.

The entire viewshed has been previously surveyed and/or disturbed as part of other activities on the reservation and no eligible or listed historic structures were identified. Section 106 consultation with the SHPO was conducted on these previous projects and concurrence was received (Appendix C). Therefore, TVA considers the architectural APE to be lacking in historic architectural properties. As such, in accordance with Section III.C of TVA's Section 106 Programmatic Agreement, TVA has not completed a new archaeological or architectural survey of the APE.

3.13.2 Environmental Consequences

3.13.2.1 Alternative A – No Action Alternative

Under Alternative A, the proposed Project Area would remain in its current condition, as no project related activities would occur that would affect any cultural and historic resources. While natural ecological processes and anthropogenic disturbances would continue, changes would not result from the proposed project.

3.13.2.2 Alternative B – Construction of Johnsonville Aero CTs and Support Systems

The entire archaeological and architectural APEs defined for the proposed project have been previously surveyed and/or disturbed and no significant cultural resources are present/ were identified. TVA has received SHPO concurrence on the previous surveys and findings that were conducted in the APEs. Therefore, TVA finds that impacts due to the proposed undertaking would not affect any historic properties and therefore there would be no cumulative impact to historic properties.

3.14 Transportation

3.14.1 Affected Environment

The transportation network surrounding the Johnsonville Reservation contains federal, state, and county roads and bridges, rail, and a barge facility located along a small channel off Kentucky Reservoir on the Tennessee River. US 70 (also locally known as Broadway Avenue) is the primary arterial roadway serving the reservation. The road has four transitions from two lanes to four lanes just west of the reservoir before crossing east over

the bridge into Humphreys County with an additional center turn lane. Current activities that generate traffic at the reservation and surrounding areas include the decontamination and deconstruction of the fossil plant, operation of the remaining JCT units, and continued operation of surrounding industrial facilities, such as the Oxychem and Chemours manufacturing facility located adjacent to the reservation to the north, and the Herbert Sand and Gravel Company located adjacent to the reservation to the west. As such, existing traffic generated at the facility is composed of a mix of cars and light duty trucks, as well as medium duty (larger delivery trucks) to heavy duty trucks (semi-tractor trailers).

Locations of surrounding roadways and those that provide access to the reservation are shown on Figure 3-6. There are three points of access into the reservation from US 70. The western access utilizes Steam Plant Road, a two-lane road which runs along the western edge of the reservation. Access to Steam Plant Road consists of an at-grade intersection on the south side of US 70 that loops around to the north, crosses over the road and railroad tracks, then enters the site. Access is also provided via North Street located approximately 0.83 miles east of Steam Plant Road. This entrance, which would be the primary access to the site for the construction workforce, is an at-grade intersection at North Street on the north side of US 70. North Street is a two-lane road that crosses the railroad tracks then continues north along the east side of the reservation. The at-grade railroad crossing is signalized with crossing gates. The eastern-most access is a service interchange to County Highway 929 (DuPont Access Road), a two-lane roadway. This interchange has a diamond configuration on the westbound ramps and a directional ramp/cloverleaf serving the eastbound ramps.

Average Annual Daily Traffic (AADT) for key roadways near the reservation are presented in Table 3-10. In general, during the period between 2018 and 2021, traffic has remained relatively consistent on surrounding roadways with traffic counts diminishing as drivers travel west of the reservation on US 70. However, AADT on US 70 east of the reservation was noticeably lower in 2020 as compared to other years, which could be associated with a reduction in traffic volumes related to the COVID-19 pandemic experienced during that time period. Overall, traffic volumes have not significantly changed during the period evaluated.

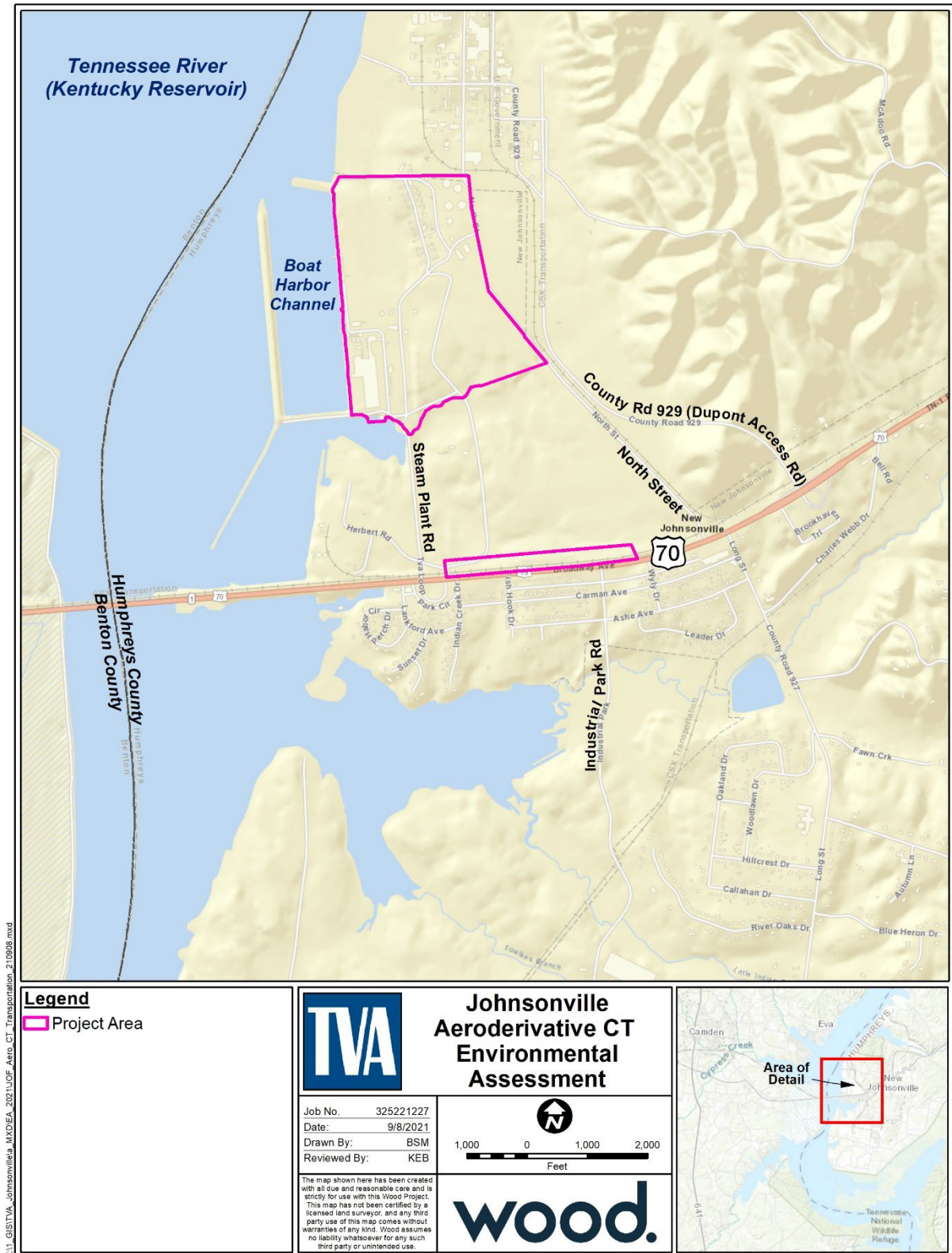


Figure 3-6. Roadways in the Vicinity of the Project Area

Table 3-10. Average Annual Daily Traffic Volume on Roadways in Proximity to the Johnsonville Reservation

Roadway	Year	AADT
US Route 70 east of the Johnsonville Reservation	2021	9,006
	2020	7,168
	2019	8,216
	2018	7,866
US Route 70 west of the Johnsonville Reservation	2021	NA ¹
	2020	5,120
	2019	5,620
	2018	5,591
County Road 929 (DuPont Access Road)	2021	1,905
	2020	1,529
	2019	1,428
	2018	1,992

¹ NA – Not available
Source: TDOT 2021

The CSX Railroad operates a main line between Memphis and Nashville, Tennessee, that runs roughly parallel to US 70 south of the reservation (CSX 2021). The Johnsonville Fossil Plant is no longer directly connected to the rail line but was at one time and historically included a rail unloading facility (TVA 2018). Currently, the Chemours plant adjacent to the reservation is connected to this rail line.

3.14.2 Environmental Consequences

3.14.2.1 Alternative A – No Action Alternative

Under Alternative A, there would be no project-related impact to transportation, as there would be no changes at the Johnsonville Reservation that would change the traffic or roadway conditions.

3.14.2.2 Alternative B – Construction of Johnsonville Aero CTs and Support Systems

Under Alternative B, vehicular traffic on public roads near the Johnsonville Reservation would increase due to commuting of construction workers and delivery of materials and equipment for the project. Construction activities would last for approximately 2 years, with work primarily occurring during daytime hours, typically on weekdays, but potentially up to seven days a week and limited nighttime hours if warranted to meet construction schedules.

The daily workforce during the construction phase is expected to be 200 workers per day. Traffic is expected to be distributed during a peak morning period (to the Project Area) and a peak evening period (away from the Project Area). Assuming one person per commuting vehicle, there would be a daily morning inbound traffic volume of 200 vehicles per day and a daily outbound traffic volume of 200 vehicles per day for a total of 400 trips per day. Construction traffic would access the site via the North Street entrance. As this would be a dedicated construction entrance, the increase of 400 trips per day on this road would be minor and the effects of construction traffic on other roadways accessing the reservation would have a minor impact on traffic conditions.

The effects of construction traffic on US 70 are also expected to be minor. During the peak construction period, the additional daily commuters would result in minor increases in traffic volumes along this roadway (approximately 4.4 percent on the roadway east of the reservation and 8.0 percent west of the reservation). As a result, morning and evening commuters on public roadways near the reservation may experience congestion; however, disruptions to local traffic circulation would mostly occur in 15- or 20-minute periods around the major shift changes and would be short term in duration.

Additional truck traffic would also occur in the area during the construction phase due to material and equipment deliveries to the Project Area. However, as this increase would primarily occur during the mobilization and demobilization phases, impacts to the surrounding transportation network are not anticipated. Most project components are anticipated to be delivered by truck; however, larger project equipment may be delivered to the site by rail. If required, modifications to the rail onsite may be necessary.

If borrow material is needed to support construction activities, it could be obtained from the TVA borrow site located approximately 1.8 miles south of the reservation just west of Industrial Park Road. Material obtained from the borrow site would be transported to the Project Area via Industrial Park Road north to US 70. AADT values are not available for Industrial Park Road, indicating traffic counts are low. Alternatively, borrow could be obtained from an off-site, permitted commercial source if needed. Although exact borrow needs are not known at this time, the demand for borrow would vary over the course of construction; thus, it is expected to be intermittent and dependent upon specific construction needs. Based on the intermittent nature of borrow transport, impacts to traffic operations are expected to be minor and short term, if borrow is required.

Increased traffic associated with construction of the proposed Aero CTs may overlap with increased traffic associated with the potential construction of simple-cycle CTs at JCT as part of the Cumberland Fossil Plant Retirement project. The maximum construction workforce for that project is anticipated to be 180 workers, during the construction period. If these projects occur concurrently or overlap construction schedules, 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. None of the other identified reasonably foreseeable future actions identified in Table 3-1 are anticipated to temporally overlap with the construction period for the Aero CTs. Therefore, with implementation of these mitigation measures, cumulative effects associated with increased traffic related to construction of the Aero CT are expected to be minor and short term.

Operation of the Aero CT plant would require approximately 20 workers, most of whom would transfer from the JCT Units 1-16. Therefore, the operation of the proposed Aero CTs would not result in any changes to the existing conditions on the surrounding roadways and the other reasonably foreseeable actions identified in Table 3-1 would not result in incrementally greater cumulative effects.

3.15 Natural Areas, Parks and Recreation

3.15.1 Affected Environment

Natural areas include managed areas, such as Wildlife Management Areas, National Wildlife Refuges, Habitat Protection Areas, ecologically significant sites, and Nationwide Rivers Inventory streams. Parks and recreation facilities include open areas, boat ramps,

community centers, swimming pools, and other public places. There are 12 managed and natural areas, parks, and recreational facilities that are immediately adjacent to (within 0.5 miles) or within the region (within a 3-mile radius) of the Project Area (Table 3-11 and Figure 3-7).

A review of the TVA Natural Heritage database indicates that no natural areas are present within the proposed Project Area.

Table 3-11. Managed and Natural Areas, Parks, and Recreational Facilities within 3 Miles of the Project Area

Natural Areas, Parks, or Recreational Facilities	Approximate Distance from the Project Area at its Closest Location
CL Edwards Memorial Park	0.2 mile south
New Johnsonville Harbor Campground and Marina	0.3 mile southwest
New Johnsonville Tennessee Wildlife Resources Agency Boat Ramp	0.4 mile southwest
Camden State Wildlife Management Area	0.9 mile west
Johnsonville State Historic Park	1.2 miles northeast
Johnsonville State Historic Area	1.4 miles east
Ashworth Property – Land Trust for Tennessee Conservation Easement	1.4 miles east
Eva Beach Park	1.6 miles northwest
Pebble Isle Marina	2.2 miles northeast
Beaver Dam Resort	2.3 miles northwest
Nathan Bedford Forrest State Wildlife Management Area	2.9 miles north
Tennessee National Wildlife Refuge	3.0 miles southeast

Source: TVA's Regional Natural Heritage Database 2021

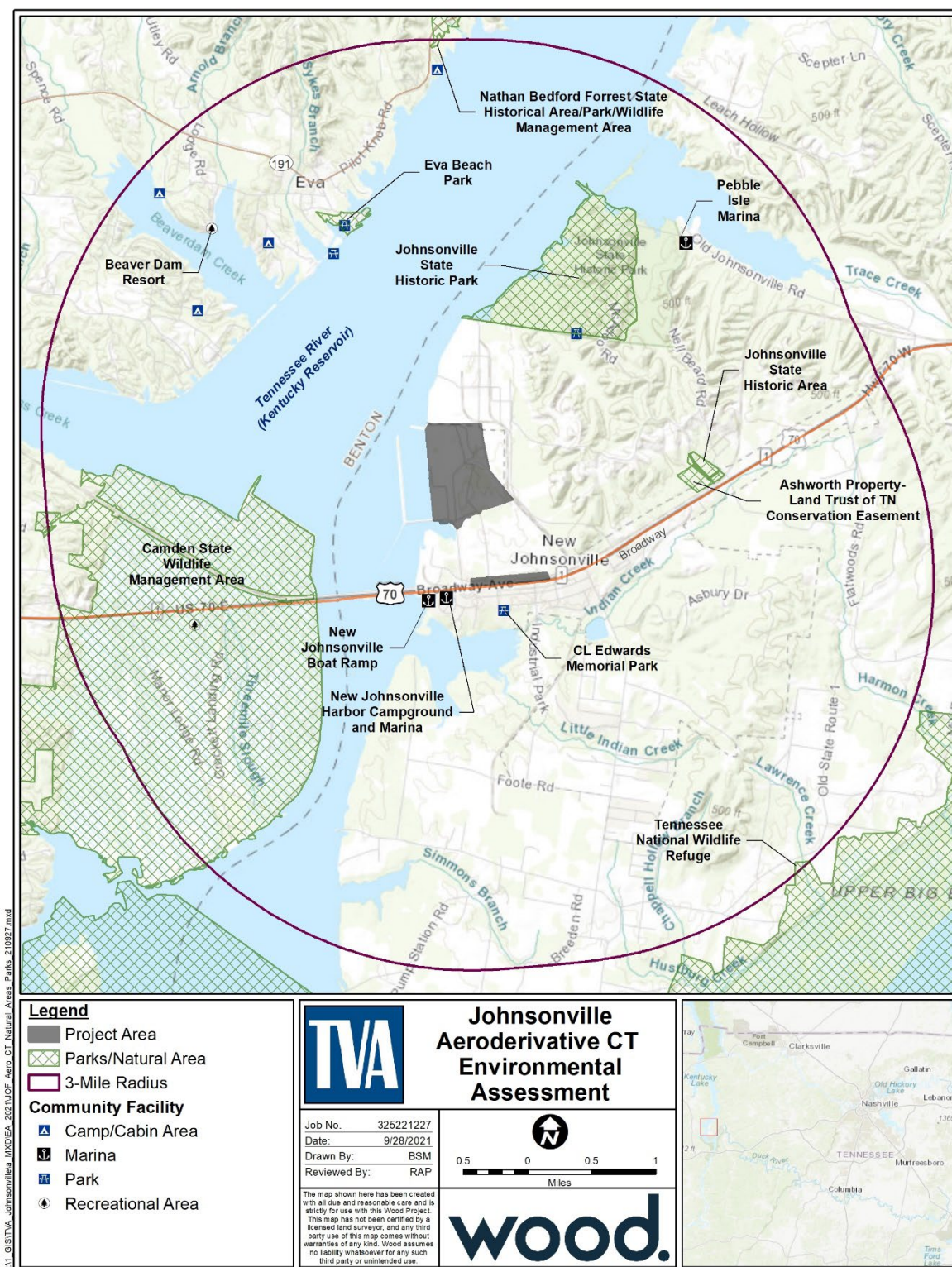


Figure 3-7. Managed and Natural Areas, Parks, and Recreational Facilities within a 3-Mile Radius of the Project Area

3.15.1.1 Managed and Natural Areas

Managed and natural areas within 3 miles of the Project Area are described below.

Camden State Wildlife Management Area – This area is located on the western shore of Kentucky Reservoir on the Tennessee River in Benton County. This area is managed by Tennessee Wildlife Resources Agency (TWRA) in cooperation with TVA, who oversees the yearly drawdown and flooding of the area (TWRA 2021). Cropland and bottomland hardwood forest habitats are intertwined within the 3,682-acre area, and it provides hunting opportunities for deer, quail, wild turkey, and waterfowl. Some grassy fields are present that are likely good habitat for sparrows and other grassland birds. River front access with boat ramps provides views of expanses of water.

Johnsonville State Historic Park – Serving as a day-use park named for former President Andrew Johnson, this 1,075-acre park in Humphreys County is managed by Tennessee State Parks. It commemorates the site of the Johnsonville Depot, the Battle of Johnsonville, and the historic town site of Johnsonville that existed from 1864-1944 prior to the formation of Kentucky Reservoir on the Tennessee River (TN State Parks 2021a). The Johnsonville State Historic Area is a small, separate portion of the Johnsonville State Historic Park that is located approximately 1.4 miles east of the Project Area on US 70 (Figure 3-7). This site consists of the park visitor center, museum, and park office. It is adjacent to the Ashworth Property described below.

Ashworth Property – This 19-acre site is private property under a conservation easement by the Land Trust for Tennessee.

Nathan Bedford Forrest State Park – This site is managed by Tennessee State Parks. Nathan Bedford Forrest State Park and Historic Area are situated on the western shore of Kentucky Reservoir on the Tennessee River and consists of approximately 2,600 acres. Fishing is prominent in this park, and it is a popular destination for smallmouth, largemouth and striped bass, sauger, crappie, bream and catfish. Commercial marinas and public boat docks are located nearby, and three boating accesses are available in the park at no cost. The park contains more than 20 miles of hiking trails (TN State Parks 2021b).

Tennessee National Wildlife Refuge – This site is in Benton County and is managed by the USFWS. Due to an abundance of habitat types, the refuge harbors 51 mammals, 89 reptiles and amphibians, and 144 species of fish. An abundance of white-tailed deer can also be found throughout the area, along with smaller animals such as raccoons, foxes, squirrels, beaver, rabbits, and wild turkey. The refuge also offers many recreational opportunities such as hunting, fishing, hiking, wildlife viewing, and photography (USFWS 2020).

3.15.1.2 Parks and Recreational Facilities

The Kentucky Reservoir on the Tennessee River is a major focal point for outdoor recreation, and most of the recreation areas in the vicinity of the project include water-based or water-oriented recreation services and facilities, such as boat launching ramps, boat moorage and fueling, and shoreline camping and picnic facilities. Accordingly, the reservoir is used for water-based recreation activities including general boating, fishing, and swimming.

As shown in Figure 3-7, there are three recreational areas adjacent to and across US 70 from the Project Area (within 0.5 miles). C.L. Edwards Memorial Park is located about 0.2 miles south of the Project Area. This is a small community park that offers ball fields, walking paths, and pavilions. The privately owned New Johnsonville Harbor Campground is located approximately 0.3 miles southwest of the Project Area. This campground is accessed from US 70 and offers RV and tent camping and a marina with access to the reservoir. A public boat launching ramp on TVA land that is managed by the TWRA is located approximately 0.4 miles southwest of the Project Area.

Other recreational facilities within 3 miles of the Project Area include Eva Beach Park, Pebble Island Marina, and the Beaver Dam Resort (Figure 3-7). Eva Beach Park is located approximately 1.6 miles northwest of the Project Area in Benton County and is a popular park and recreation area for swimming and boating along the western shore of Kentucky Reservoir on the Tennessee River. Recreational features of the park include year-round, 24-hour public access, swimming, launch site for vessels up to 26 feet, and onsite fishing and parking. Pebble Island Marina and Beaver Dam Resort, also with access to the reservoir, are located approximately 2.2 miles and 2.3 miles, respectively, from the proposed Project Area.

3.15.2 Environmental Consequences

3.15.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not construct 10 natural gas-fired Aero CTs or associated support systems at the Johnsonville Reservation. Therefore, there would be no impacts to natural and managed areas, parks, or recreational facilities.

3.15.2.2 Alternative B – Construction of Johnsonville Aero CTs and Support Systems

There are no natural or managed areas, parks, or recreational facilities located within the boundaries of the Johnsonville Reservation. Therefore, because all proposed activities under Alternative B would be located within the reservation, no direct impacts to parks or recreational facilities would occur with this alternative.

Twelve natural and managed areas, parks, and recreational facilities are within 3 miles of the Project Area. Because of their distances from the site (0.2-3.0 miles), and with the implementation of BMPs (fugitive dust control measures, soil erosion prevention measures, etc.), no direct impacts to these areas are anticipated. Further, because the existing character of the Project Area would not change under this alternative, and because there would be no impact to Kentucky Reservoir on the Tennessee River, there would be no impact to the water-based recreation activities on the reservoir.

Given the number of parks and recreational facilities in the surrounding area, it is possible that offsite impacts could occur as a result of additional truck traffic, noise, and dust from construction vehicles. However, these impacts would be minor and would not impact the use or enjoyment of these areas because of the relatively short-term nature of this action. In addition, the preferred use of existing arterial or interstate roadways to transport construction equipment, personnel, and construction materials would minimize the impact to motorists accessing these areas. Therefore, impacts to natural and managed areas, parks, and recreational facilities under this alternative would be minor and temporary and would not overlap with implementation of the other reasonably foreseeable actions identified in Table 3-1 and would not result in incrementally greater cumulative effects.

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 3-12.

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, and 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 the Johnsonville Reservation or the surrounding area. However, the EPA noise guideline recommends outdoor noise levels not exceed 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 3-12. 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)
Diesel Truck at 15 m (49.2 ft)		Garbage Disposal at 1 m (3.3 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
	40	Small Theater, Large Conference Room
Quiet Urban Nighttime		Library
Quiet Suburban Nighttime		
	30	
		Bedroom at Night
Quiet Rural Nighttime		Concert Hall (Background)
	20	
		Broadcast and Recording Studio
	10	
		Threshold of Hearing
	0	

Source: FHWA 2018

3.16.1.1 Sources of Noise

Primary sources of noise in the vicinity of the Johnsonville Reservation include periodic barge operations on Kentucky Reservoir on the Tennessee River, railroad operations, and routine vehicle operations and maintenance at the project site and the adjacent Chemours industrial facility. In addition, the existing JCT plant generates localized noise through operation of turbines, generators, and other ancillary equipment. However, as the existing JCT Units 1-16 are slated for retirement, noise emissions would be reduced accordingly. In addition, coal unloading and operation of the coal-fired fossil plant units that were historically dominant noise-generating activities at the Johnsonville Reservation have ceased following the fossil plant retirement and decommissioning (scheduled to be completed in June 2022).

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 closest populated area to the Johnsonville Reservation is a residential neighborhood located immediately south of US 70, with the closest residences located approximately 1 mile south of the proposed Aero CT plant footprint, 0.5 mile south of the primary Project Area (which contains the proposed Aero CT plant, Aero 161-kV switchyard, and laydown, parking, and trailer areas), and approximately 160 feet south of the rail yard portion of the Project Area. This neighborhood also includes C. L. Edwards Memorial Park, the New Johnsonville Harbor Campground and Marina, and the New Johnsonville Church of Christ, all located at distances of approximately 0.2 to 0.3 miles from the rail yard portion of the Project Area. In addition, Johnsonville State Historic Park is located approximately 0.8 miles northeast of the Project Area. Densely forested areas of Johnsonville State Historic Park separate public use areas within the park from the proposed Project Area.

3.16.2 Environmental Consequences

3.16.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not construct 10 natural gas-fired Aero CTs or associated support systems at the Johnsonville Reservation. 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 – Construction of Johnsonville Aero CTs and Support Systems

Under Alternative B, onsite construction activities for the proposed Aero CT plant 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 2 years, with work primarily occurring on weekdays during daytime hours, though weekend and night shift construction may occur should the schedule necessitate. 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).

The closest sensitive noise receptors to the Aero CT Project Area are residences located south of US 70, approximately 0.5 miles south of the primary Project Area and 160 feet south of the rail yard portion of the Project Area. Based on straight line noise attenuation, it is estimated that maximum noise levels from construction equipment operated within the primary Project Area would attenuate to 50.5 dBA at the closest residence. Thus, typical construction noise in this residential area, which also encompasses a church and two recreational sites (C. L. Edwards Memorial Park and the New Johnsonville Harbor Campground and Marina), would fall below the recommended EPA outdoor noise guideline of 55 dBA. Similarly, noise levels from construction equipment would attenuate to 46.3 dBA or less at Johnsonville State Historic Park.

Noise associated with potential rail modifications may result in a temporary increase over recommended noise levels at the closest sensitive receptors, immediately south of US 70, as they are located approximately 160 feet to the rail yard portion of the Project Area. However, rail modification activities would be short-term and associated noise would likely

be comparable to existing rail and highway traffic noise already present in the vicinity. Therefore, noise impacts from construction of the Aero CT plant and associated support systems would be temporary and minor.

There is also a potential for indirect noise impacts associated with an increase in traffic related to workforce vehicle traffic and borrow transport. 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 2-year construction period would consist of approximately 200 personnel per day. Assuming one person per commuting vehicle, there would be a maximum daily morning inbound traffic volume of approximately 200 vehicles and a daily outbound traffic volume of approximately 200 vehicles each working day. If offsite borrow is needed, material would be obtained from the TVA owned borrow site south of the Johnsonville Reservation or a permitted commercial site. Borrow transport would be intermittent over the construction period and would be bounded by the 150 truckloads of borrow per day analyzed in TVA's 2019 EA (TVA 2019c). As noted in Section 3.14 (Transportation), the increase in traffic associated with construction activities is relatively small compared to existing traffic volumes. Therefore, the increase in current noise levels is estimated to be less than 3 dBA and as such, traffic noise is not anticipated to increase perceptibly.

During base load operation of the proposed Aero CT plant, noise levels for each piece of equipment (with the exception of the anti-icing Waste Heat Recovery Units) would not exceed 85 dBA at a horizontal distance of 3 feet. Based on straight line noise attenuation, it is estimated that noise levels from this Aero CT plant equipment would attenuate to 21.2 dBA at Johnsonville State Historic Park and 20.3 dBA at the nearest residence, well under the recommended EPA noise guideline of 55 dBA. Estimates of noise emissions from the Waste Heat Recovery Units are not available; however, due to distance from the Aero CT plant site, it is unlikely that operational noise from the Waste Heat Recovery Units would result in notable noise increases at offsite sensitive receptors. Based on straight line noise attenuation, noise from the Aero CT plant would have to be considerable (i.e., greater than 94 dBA at a distance of 50 feet from the equipment) in order to produce noise levels of 55 dBA or higher at the closest sensitive receptors. TVA would utilize noise abatement technologies, if necessary, to ensure that typical operational noise emissions would not exceed 55 dBA at sensitive offsite noise receptors. Therefore, noise impacts from operation of the Aero CT plant would be minor. Noise emissions associated with construction and operation of the proposed Aero CTs may overlap with the potential construction of simple-cycle CTs at JCT as part of the Cumberland Fossil Plant Retirement project that could result in short-term, cumulative increases in construction and traffic noise in the area.

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. 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 of as required by state and federal regulations.

For gas- and oil-fired plants the solid waste concerns are the by-products 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 generated at Johnsonville Reservation 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 transmission line ROW may generate solid waste, such as vegetative wastes (limbs, tree trunks, and resulting mulch) and domestic solid waste (trash, refuse). Use of herbicides would result in waste containers, unused herbicide products, outdated herbicides, and other vegetation control chemicals requiring proper disposal (TVA 2019d). Small amounts of hazardous waste may be 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.

3.17.2 Environmental Consequences

3.17.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not construct the Aero CTs or support systems at the Johnsonville Reservation; however, 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, there would be no impact to solid waste and hazardous waste generation.

3.17.2.2 Alternative B – Construction of Johnsonville Aero CTs and Support Systems

Construction of the Aero CTs and support systems at the Johnsonville Reservation 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 procedure, which includes 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. 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.

CT plants produce very small quantities of solid waste during normal operation. The generation of solid and hazardous waste during the Aero CT operations would be similar to the current waste generation rates. Operation of the new compressor station would be in compliance with measures identified in TVA's Spill Prevention and Response Procedures 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. The Aero 161-kV switchyard and transmission line would operate very similarly to existing facilities located on the Johnsonville Reservation and would produce very small quantities of solid and hazardous waste.

Solid and hazardous wastes generated during construction and operation of the Aero CTs would be managed in accordance with established procedures and applicable regulations. Therefore, impacts associated with the generation of solid and hazardous waste from the proposed action would be minor and impacts as a result of the other reasonably foreseeable actions identified in Table 3-1 would not result in incrementally greater cumulative effects.

3.18 Socioeconomics and Environmental Justice

3.18.1 Affected Environment

The study area for socioeconomic and environmental justice analysis is defined as any census block group that falls within a 5-mile radius of the proposed Johnsonville Aero CT Project Area and includes portions of Humphreys and Benton counties in western Tennessee. Therefore, both counties and the state of Tennessee are included as appropriate secondary geographic areas of reference. 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 area were assessed using the most recent U.S. Census Bureau (USCB) data available, including 2020 Decennial Census counts (USCB 2021a) for total population and racial characteristics, and 2015-2019 American Community Survey 5-year estimates (USCB 2021b) for the remaining datasets.

3.18.1.1 Demographic and Economic Conditions

Demographic and economic characteristics of the study area and of the secondary reference geographies are summarized in Table 3-13. The block groups that make up the study area have a combined resident population of 11,395, which accounts for less than 0.2 percent of the total population of the state of Tennessee. The study area is a mixture of rural and suburban development, with population centers limited to the city of New Johnsonville (resident population of 1,804) and the unincorporated communities of Eva and Denver. Since 2010, the study area population has remained relatively stable, experiencing a decline of less than 1 percent. During the same period, the population of Benton County declined by approximately 4 percent, while Humphreys County grew by approximately 2 percent, both in notable contrast to the growth rate of almost 9 percent experienced at the state level.

Approximately 91 percent of the population within the study area is white. The largest single minority groups in the study area are Black or African American and Hispanic or Latino, each representing 2 percent of the population, while persons who identified as two or more races represent 4 percent of the population. There are also small numbers who are Asian, American Indian and Alaska Native, or who identify as some other race. Minority percentages in the study area are generally comparable to those of the surrounding counties and somewhat lower than those of the state of Tennessee (Table 3-13).

The average median household income in the block groups that make up the study area is \$48,700, which is higher than the median household income reported for Humphreys and Benton counties (\$45,667 and \$37,512, respectively) but slightly lower than that of the state of Tennessee (\$53,320) (Table 3-13). The percentage of the study area population falling below the poverty level (15 percent) is slightly lower than that of the surrounding counties and is relatively consistent with the state. The total civilian labor force within the block groups that make up the study area is 4,050, with an unemployment rate of 6.1 percent. This unemployment rate is lower than the unemployment rates of Humphreys and Benton counties (7.5 percent and 6.8 percent, respectively), but higher than the unemployment rate in the state of Tennessee (5.3 percent) (Table 3-13).

Table 3-13. Demographic and Socioeconomic Characteristics

	Study Area (Block Groups within 5-Mile Radius)	Humphreys County, Tennessee	Benton County, Tennessee	State of Tennessee
Population^{1,2,3}				
Population, 2020	11,395	18,990	15,864	6,910,840
Population, 2010	11,485	18,538	16,489	6,346,105
Percent Change 2010-2020	-0.8%	2.4%	-3.8%	8.9%
Persons under 18 years, 2019	18.6%	21.0%	19.5%	22.4%
Persons 65 years and over, 2019	24.1%	19.3%	23.8%	16.0%
Racial Characteristics¹				
Not Hispanic or Latino				
White alone, 2020 (a)	91.1%	90.1%	90.6%	70.9%
Black or African American, 2020 (a)	2.0%	2.6%	2.0%	15.7%

	Study Area (Block Groups within 5-Mile Radius)	Humphreys County, Tennessee	Benton County, Tennessee	State of Tennessee
American Indian and Alaska Native, 2020 (a)	0.2%	0.2%	0.3%	0.2%
Asian, 2020 (a)	0.5%	0.3%	0.7%	1.9%
Native Hawaiian and Other Pacific Islander, 2020 (a)	0.0%	0.0%	0.0%	0.1%
Some Other Race alone, 2020 (a)	0.6%	0.4%	0.2%	0.3%
Two or More Races, 2020	3.8%	4.1%	3.8%	3.9%
Hispanic or Latino, 2020	1.9%	2.4%	2.4%	6.9%
Income and Employment³				
Median household income, 2019	\$ 48,700	\$ 45,667	\$ 37,512	\$ 53,320
Persons below poverty level, 2019	15.0%	15.6%	19.5%	15.2%
Persons below low-income threshold, 2019 (b)	39.0%	36.3%	44.7%	34.9%
Civilian Labor Force, 2019	4,050	7,998	6,322	3,282,671
Percent Employed, 2019	93.9%	92.5%	93.2%	94.7%
Percent Unemployed, 2019	6.1%	7.5%	6.8%	5.3%

(a) Includes persons reporting only one race.

(b) Low-income threshold is defined as two times the poverty level

Sources: ¹USCB 2021a; ²USCB 2011; ³USCB 2021b

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 the Project Area.

Based on a review of aerial imagery and online information, including the USGS Geographic Names Information System database (USGS 2021a), community facilities and services available within a 5-mile radius of the Aero CT Project Area include 15 churches, 33 cemeteries, two post offices, and an elementary school. The Project Area is also served by the New Johnsonville Police and Fire Departments. The closest community facilities, which include the New Johnsonville Post Office, Fire Department, and Church of Christ, are located approximately 0.25 mile east of the rail yard portion of the Project Area. No community facilities are located adjacent to (i.e., within a 0.5-mile radius) the proposed Aero CT Project Area.

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

their NEPA analyses. 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. In addition, on January 27, 2021, President Biden issued EO 14008 (Tackling the Climate Crisis at Home and Abroad). Amongst other objectives, the EO calls for the federal government to make environmental justice a defining feature of the response to climate crisis by developing programs, policies, and activities to address current and historic injustices, and by investing and building a clean energy economy that spurs economic opportunity for disadvantaged communities. For these reasons, TVA routinely considers environmental justice impacts as part of the project decision-making process. A more detailed assessment of potential climate change impacts is in Section 3.3 (Climate Change and Greenhouse Gas).

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 2020 USCB Poverty Threshold for an individual under the age of 65 is an annual income of \$13,465, and for a family of four it is an annual household income of \$26,695 (USCB 2021c). 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 review of the EPA's EJSCREEN tool, the Project Area is not located in an area with high concentrations of environmental justice populations, and minority groups make up relatively small percentages of the total population. In addition, as part of this analysis, TVA conducted a more detailed evaluation using 2020 USCB Decennial Census data and 2015-2019 American Community Survey data to identify whether any specific block groups within the vicinity of the Project Area exceed environmental justice thresholds. Figure 3-8 identifies the block groups within the study area 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 29 percent of the population of Tennessee but only 9 to 10 percent of the population in Humphreys and Benton counties. The study area as a whole has a total minority percentage of 8.9 percent, with percentages for individual block groups ranging from 5.5 to 12.1 percent of the population. As none of the block groups within the 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 of Humphreys and Benton counties, they do not meet the criterion for consideration as minority population groups.

The percentage of the population of Tennessee living below the low-income threshold is approximately 35 percent. The percentage of low-income residents in Humphreys County is similar to the state, at approximately 36 percent of the population, while Benton County is notably higher at approximately 45 percent. Approximately 39 percent of people living within the study area are considered low-income, with percentages for individual block groups ranging from 28.0 to 50.9 percent of the population. One block group in the study area has a low-income population that exceeds 50 percent of the total population. Figure 3-8 identifies the block group determined to meet the criterion for consideration as a low-income population group subject to environmental justice considerations.

As specific demographic information is not available below the block group level, there is the potential for isolated minority, low-income, or otherwise vulnerable populations to be overlooked via this method of analysis. Thus, additional investigation, including review of local social services and HUD resources (HUD 2021), was also conducted. No additional populations subject to environmental justice considerations were identified during this review or through TVA's previous community engagement regarding activities at the Johnsonville Reservation.

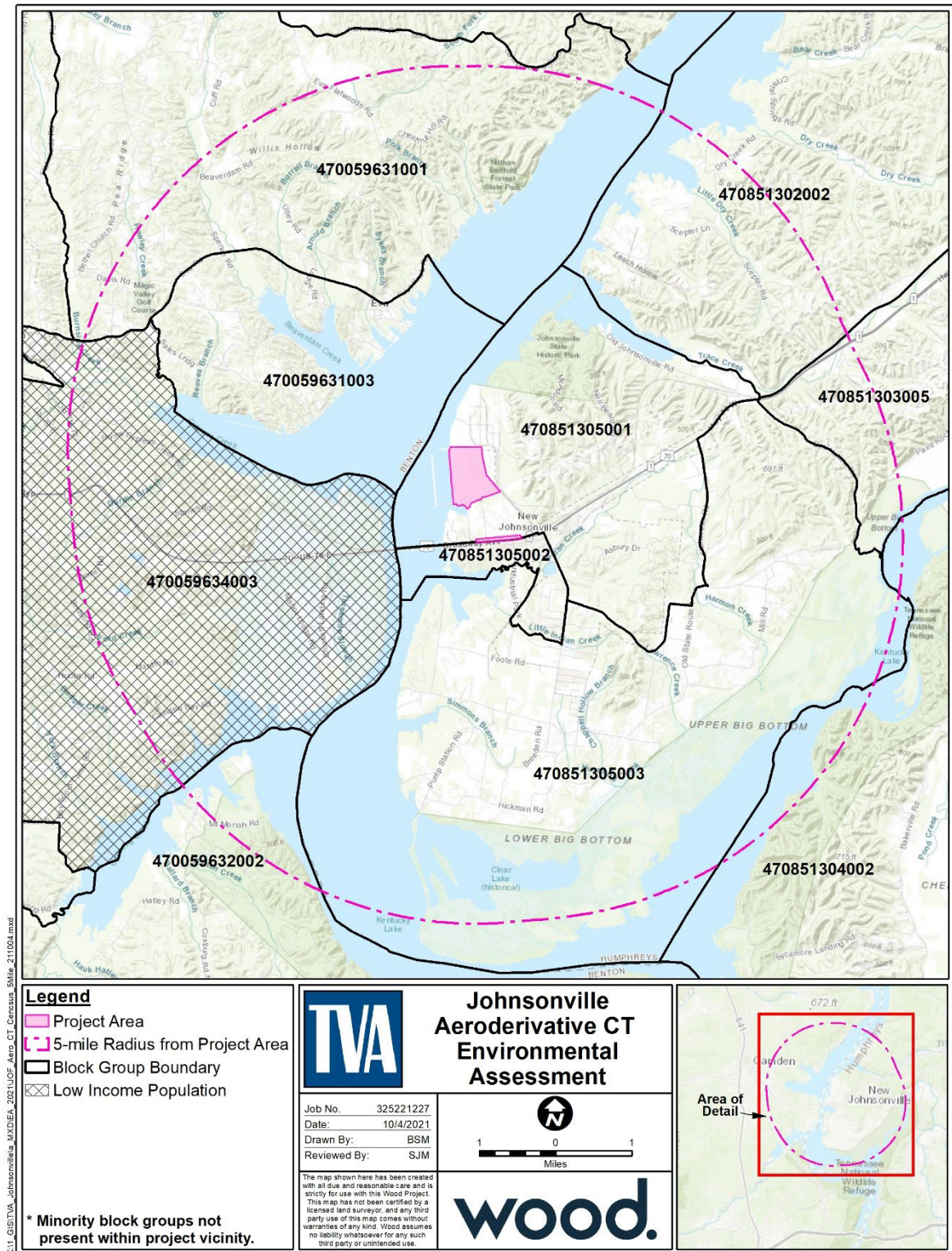


Figure 3-8. Environmental Justice Populations within the Study Area

3.18.2 Environmental Consequences

3.18.2.1 Alternative A – No Action Alternative

Under Alternative A, TVA would not construct 10 natural gas-fired Aero CTs or associated support systems at the Johnsonville Reservation. 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 this alternative.

3.18.2.2 Alternative B – Construction of Johnsonville Aero CTs and Support Systems

3.18.2.2.1 Demographic and Economic Impacts

As described in Chapter 2, construction of the Aero CT plant and associated support systems would take approximately 2 years and would require a temporary workforce of approximately 200 people at the peak of construction. Workers would be drawn from the labor force that currently reside 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. Given that the maximum number of workers needed for construction would equate to less than 20 percent of the unemployed civilian workforce in Humphreys and Benton 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. The current COVID-19 pandemic has caused a shortage of construction workers in some regions; however, even if workers must be pulled from areas farther away, they would represent a minor, temporary increase in population.

Construction activities associated with the Aero 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.

Following construction, permanent staffing associated with the operation of the Aero CT is expected to require approximately 20 personnel. It is expected that staff from JCT Units 1-16 could transition to fill these positions upon retirement of these units, and thus there would be no notable change in the operations staff or local population growth.

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. Activities associated with construction of the proposed Aero CT plant and associated support systems would be limited to the Johnsonville Reservation and previously established roadways and borrow site, as necessary. Therefore, project construction would not result in the displacement of any community facilities or impede access to any facilities. 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 the Aero CT plant, local law enforcement, fire, and/or emergency medical service response would likely be required. However, given the relative magnitude of the proposed Aero CT plant and TVA's adherence to stringent

workplace health and safety regulations, implementation of 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. Additionally, as construction and operation of the plant would not 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 3-8, one block group within the study area, located across Kentucky Reservoir on the Tennessee River to the west, meets the criteria for consideration as an environmental justice population under EO 12898. The closest residences within this block group are located approximately 3 miles or more from the proposed Aero CT plant Project Area, and thus would not be affected by noise or fugitive dust from onsite construction activities. During construction, potential modification of the rail system and increased traffic related to workforce vehicles and transport of borrow material could result in increased traffic on local roads, noise, and fugitive dust in the communities directly south of the reservation, which are not identified as environmental justice populations. These impacts would be short-term and minor and would not be disproportionate on environmental justice communities, as impacts would be greatest in block groups that have minority and low-income populations below the environmental justice thresholds discussed above.

As described in Section 3.2 (Air Quality), air emissions associated with the operation of the Aero CT plant would be in compliance with PSD requirements, which ensures there is no significant impact to or deterioration of air quality due to the proposed project. While the operation of peaking units would result in an increase in emissions, these peaking units are necessary to support the addition of new renewables in keeping with the TVA Strategic Intent and Guiding Principles (TVA 2021f). Minor impacts to air quality associated with operation of the Aero CT plant would be borne primarily by the population within the study area, consisting of the census block groups within a 5-mile radius of the Project Area. As noted in Table 3-13, only 12 percent of the study area population belongs to a minority and 39 percent of the population are considered low-income. Thus, a considerable majority of the study area population is White alone (i.e., not Hispanic or Latino), and more than half are above the low-income threshold. Therefore, while operation of the Aero 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.

As described in Sections 3.12, 3.17 and 3.19, construction and operation of the proposed Aero CT plant would not have a significant impact on visual resources, solid and hazardous waste generation, or public health and safety. Operation of the Aero CT plant would not result in a disproportionate impact to the environmental justice community identified within the vicinity of the Project Area, as these impacts, even at insignificant levels, would similarly affect environmental justice and non-environmental justice communities.

Overall, the proposed Aero CT plant would have minor, localized, temporary impacts on the surrounding community; however, these impacts would not be disproportionate, as impacts would be consistent across all communities (i.e., environmental justice and non-environmental justice) in the study area. Therefore, implementation of the proposed action together with the reasonably foreseeable actions identified in Table 3-1 would not result in

an incrementally greater cumulative impact, and the minor cumulative impacts would not be disproportionate to environmental justice communities.

3.19 Public Health and Safety

3.19.1 Affected Environment

The Johnsonville Reservation is located in New Johnsonville, in Humphreys County, Tennessee, which is a rural, sparsely populated area, located on the south side of US 70/State Highway 1.

Public emergency services in the area include urgent care clinics, hospitals, law enforcement services, and fire protection services. West Tennessee Healthcare Camden Hospital is the closest hospital located approximately 7.2 miles northwest of the Project Area in Camden, Tennessee. The closest urgent care is the Fast Pace Health Urgent Care located 7.8 miles northwest of the Project Area in Camden, Tennessee. Police and fire protection services are provided by the city of New Johnsonville. The Tennessee Emergency Management Agency has the responsibility and authority to coordinate with state and local agencies in the event of a release of hazardous materials.

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 OSHA Act of 1970 is the main statute protecting the health and safety of workers in the workplaces. 29 CFR 1926 contains health and safety regulations specific to the construction industry. 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.

Transmission lines generate both electric and magnetic fields (EMFs). The voltage on the conductors of a transmission line generates an electric field that occupies the spaces between the conductors and other conducting objects such as the ground, transmission line structures, or vegetation. A magnetic field is generated by the current in the conductors; most of the energy is dissipated on the transmission line ROW. Existing transmission lines within the Johnsonville Reservation have been designed to minimize the potential for shocks by maintaining sufficient clearance between conductors and objects on the ground. Stationary conducting objects, such as metal fences, pipelines, and guardrails, 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 not construct 10 natural gas-fired Aero CTs or support systems at the Johnsonville Reservation. TVA would continue to apply the safety-conscious culture and activities performed at the site would be in accordance with applicable standard and specific TVA guidance. Occupational and public health hazards would continue to be addressed and managed through implementation of safety practices, training, and control measures. Due to the adherence to robust safety programs and a culture of safety-minded employees, impacts to public health and safety would be minimal.

3.19.2.2 Alternative B – Construction of Johnsonville Aero CTs and Support Systems

Under Alternative B, workers on the project site would have an increased safety risk during construction. However, because construction work has known hazards, it is TVA's policy

that contractors establish and maintain site-specific health and safety plans in compliance with OSHA regulations. The contractor site-specific health and safety plans address the hazards and controls, as well as contractor coordination for various construction tasks. Health and safety plans emphasize BMPs for site safety management to minimize potential risks to workers. Examples of BMPs include employee safety orientations; establishment of work procedures and programs for site activities; use of equipment guards, emergency shutdown procedures, lockout procedures, site housekeeping, and personal protective equipment; regular safety inspections; and plans and procedures to identify and resolve hazards.

Potential public health and safety hazards could result from increased traffic on roadways during construction. Residential and other human use areas along roadways used by construction traffic to access the project site would experience increased commercial and industrial traffic. Awareness of these residences and establishment of traffic procedures to minimize potential safety concerns would be addressed in the health and safety plans followed by construction contractor(s).

Health hazards are also associated with waste generation; these wastes include solid wastes, hazardous waste, liquid wastes, discharges, and air emissions. Construction debris and wastes would be managed in accordance with federal, state, and local requirements. General public health and safety would not be at risk in the event of an accidental spill onsite. An emergency response plan developed to address these potential releases would be developed and discussed with local emergency management agencies. Emergency response for the project site would be provided by the local, regional, and state law enforcement, fire, and emergency responders, as described above.

The operation of the proposed Aero CTs would adhere to TVA guidance and be consistent with standards established by OSHA and applicable state requirements. Occupational and public health hazards would be reduced or eliminated through TVA's implementation of health and safety practices. Through its safety programs, TVA fosters a culture of safety-minded employees, and, as such, impacts would be minimal.

Under Alternative B, the proposed 161-kV transmission line would produce EMFs. The strength of the electric and magnetic fields within and near the ROW varies with electric load on the transmission line and within the terrain. However, EMF strength attenuates rapidly with distance from the transmission line and is usually equal to ambient levels at the edge of the ROW. Public exposure would be minimal as the proposed transmission line is located on the TVA-owned Johnsonville Reservation. Therefore, public and worker exposure to EMFs would be minimal and would not deviate from existing conditions. Impacts to worker and public health and safety would be minimal.

TVA's Standard Programs and Processes related to safety would be strictly adhered to during implementation of 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. They also establish responsibilities for implementing Section 19 of OSHA. Therefore, impacts to public health and safety from the proposed action are not anticipated and therefore there would be no cumulative impact.

3.20 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 below significance. Impacts associated with the construction and operation of the proposed Aero CT plant and associated support systems 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 2.5) to further reduce potential adverse effects to certain environmental resources.

Construction of the proposed Aero CT plant and support systems would require the permanent conversion of 1.05 acres of deciduous forest vegetation 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 1.0 acres of potentially suitable summer roosting habitat for Indiana bat and northern long-eared bat consisting of upland forest and woody wetlands would be removed. 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.

Seven active osprey nests were observed during field surveys within the Project Area in April 2021. Bush hogging, mowing, and selective herbicide treatments are the only acceptable means of vegetation removal between March 1 and July 31 within 660 feet of active nests. Broadcast herbicide application is not permissible within the 660-foot disturbance buffer areas. Given the amount of time that would occur between the 2021 breeding season field surveys and the onset of construction activities, new nests are likely to be built and some existing nests may no longer be active. As such, the osprey conservation commitments are applicable within 660 feet of any active nest during construction activities. Prior to activities in the vicinity of these nests, TVA would conduct additional field surveys to identify any new or active nests with the intention of avoiding them. If needed, TVA would coordinate with USDA-Wildlife Services to ensure compliance under the EO 13186 [Responsibilities of Federal Agencies to Protect Migratory Birds].

The construction of the proposed Aero CT plant and support systems would avoid placing fill material into surface water and wetland resources. Development of the transmission line ROW would result in the clearing of 0.05 acres of forested/emergent wetland. Temporary impacts to water quality from runoff during construction, as well as ongoing vegetation maintenance along the transmission lines, could impact nearby receiving water bodies but would be reduced with application of appropriate BMPs.

The Johnsonville Reservation currently operates under a Title V operating permit, which would require a significant modification for the proposed project. TVA has begun the process of complying with PSD/Title V requirements with the submission of a PSD Permit Application to TDEC in September 2021. As the Aero CT plant would operate within the parameters of the PSD/Title V permit requirements, the overall unavoidable 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 water bodies, and nearby residents. 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.

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.

3.21 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 Aero CT plant and associated support systems. 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 Aero CT plant 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 site.

Construction of the Aero CT plant and associated support systems 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 to minimize emissions of fugitive dust. Operational impacts to air quality would be minor because appropriate emission controls are included within the Aero CT plant infrastructure to allow the plant to operate under Title V permit conditions. Similarly, operational impacts to climate change would not be notable on a regional, national, or global scale. 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 Aero CT plant 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 vehicle and equipment parking, materials storage, laydown, construction administration, and other 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 returned to pre-existing conditions.

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 Aero CT plant facility. The areas encompassing the proposed plant site and supporting infrastructure 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 Aero CT plant operations is not expected to significantly alter long-term productivity of wildlife, agriculture, or other natural resources.

Construction of the Aero CT plant and associated support systems 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.

3.22 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 project 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 Aero CT plant and associated infrastructure is not irreversibly committed because once the plant ceases operations and the facility is decommissioned, the land supporting the facility could be returned to other industrial or nonindustrial uses. The ROW used for the transmission line would constitute an irretrievable commitment of onsite resources, such as wildlife habitat and forest resources, for the length of time the transmission line is in place. However, upon retirement of these facilities the land would revert back to its previous condition. In the interim, compatible uses of the ROW could continue.

The transfer of borrow material, if needed, to the Project Area 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 productive status. Thus, the loss of soil 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 Aero CT plant 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

Name:	Brittany Kunkle
Education:	B.S., Environmental and Soil Science
Project Role:	TVA Project Manager, TVA NEPA Coordinator, NEPA Compliance
Experience:	3 years of professional experience in NEPA and environmental compliance
Name:	Carol Freeman, PG
Education:	M.S., Geological Sciences and B.S., Geology
Project Role:	TVA NEPA Specialist
Experience:	13 years managing and performing NEPA compliance
Name:	Emily Willard
Education:	B.S., Environmental Science
Project Role:	Project Coordination
Experience:	15 years in Environmental Compliance; Preparation of Environmental Review
Name:	Karen Boulware
Education:	M.S., Resource Planning and B.S., Geology
Project Role:	Wood Project Manager. Chapters 1 and 2; Transportation and Overall Technical Review
Experience	26 years of professional experience in NEPA.
Name:	Stephanie Miller
Education:	M.S., Biology and B.S., Marine Biology
Project Role:	Wood Deputy Project Manager. Chapters 1 and 2; Surface Waters; Wetlands; Threatened and Endangered Species; Aquatic Ecology; and Wildlife reviews
Experience	11 years of professional experience in NEPA and ecological studies

4.2 Other Contributors

TENNESSEE VALLEY AUTHORITY

Name:	Steve Cole
Education:	PhD, Anthropology; MA, Anthropology; and BA, Anthropology
Project Role:	Cultural Resources
Experience:	32 years in Archaeology and Cultural Resources Management

Name: **Chloe Sweda**
Education: B.S., Earth and Environmental Science
Project Role: Managed, Natural and Recreation Areas
Experience: 5 years of experience in Natural Resource Management

Name: **Britta Lees**
Education: M.S., Botany
Project Role: Wetland Biologist
Experience: 15 years in wetland assessment, impact analysis, and compliance

Name: **Fallon Parker Hutcheon**
Education: M.S., Environmental Studies; B.S., Biology
Project Role: Wetland Biologist
Experience: 3 years in wetland assessment, impact analysis, and compliance

Name: **Sara McLaughlin-Johnson**
Education: B.S. Wildlife & Fisheries Science
Project Role: Terrestrial Ecology (Animals), Terrestrial Threatened and Endangered Species
Experience: 9 years in terrestrial wildlife assessment, impact analysis, and NEPA compliance; 15 years of combined experience in wildlife management, conservation, and husbandry.

Name: **Craig Phillips**
Education: M.S. and B.S., Wildlife and Fisheries Science
Project Role: Aquatic Ecology and Threatened and Endangered Species
Experience: 7 years sampling and hydrologic determination for streams and wet-weather conveyances; 5 years in environmental reviews.

WOOD ENVIRONMENT AND INFRASTRUCTURE SOLUTIONS, INC.

Name: **Erin Alsop**
Education: B.S., Environmental Science
Project Role: Geology, Groundwater, Solid and Hazardous Waste, Public Health and Safety
Experience: 6 years of experience in NEPA analysis and documentation

Name: **Connie Heitz**
Education: M.P.A. Environmental and Natural Resource Management, B.S. Public Affairs
Project Role: Technical Review, Transportation
Experience: 27 years in environmental and land use planning

Name:	Chris Mausert-Mooney
Education:	B.S., Biology (M.S. in progress)
Project Role:	Vegetation
Experience:	10 years of experience in ecological and botanical investigations
Name:	Nick Meisinger
Education:	B.S., Environmental Science
Project Role:	Climate Change and Greenhouse Gases
Experience:	10 years of experience in NEPA analysis and documentation
Name:	Kim Pesenko
Education:	B.S., Civil Engineering
Project Role:	Air Quality
Experience:	28 years of professional experience in environmental compliance and air quality
Name:	Rebecca Porath
Education:	M.S. and B.S., Wildlife and Fisheries Sciences
Project Role:	Managed and Natural Areas, Vegetation, Threatened and Endangered Species; Aquatic Ecology; and Wildlife reviews; technical editing and document management
Experience:	23 years of experience in NEPA analysis and documentation, ecological studies, and preparation of technical documents
Name:	Natalie Reiss
Education:	B.A., Biology
Project Role:	Natural Areas, Parks and Recreation; Socioeconomics and Environmental Justice; Noise; and Visual Resources
Experience:	8 years of experience in NEPA analysis and documentation

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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 Johnsonville Aeroderivative CT Project
Draft Environmental Assessment

The Draft EA was released for a 30-day public comment period on January 10, 2022, 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 the Humphreys County, Tennessee area. These newspapers include The Camden Chronicle (Camden County) and The News Democrat (Waverly County).

TVA's interagency involvement included notification of the Draft EA to local, state, and federal agencies and federally recognized tribes for comments. Comments on the Draft EA were accepted through February 8, 2022, via mail and e-mail. TVA received comment submissions from the following:

- Agencies – Tennessee Department of Environment and Conservation (TDEC)
- Organizations – Southern Environmental Law Center (SELC) and Sierra Club
- Individual members of the public

Comments submitted by the Sierra Club were signed by 174 citizens, 97 of which were accompanied by an additional individual comment. Additionally, three comment submissions were made by unaffiliated members of the public.

On April 20, 2022, CEQ issued revisions to its NEPA implementing regulations. These amendments, which became effective on May 20, 2022, address, among other things, the purpose and need of a proposed action and the definition of "effects." TVA received, after the close of the comment period for the Draft EA, an additional comment letter requesting that TVA revise and recirculate the Draft EA because the Draft EA previously reviewed by the public does not comply with the changes in the CEQ regulations. As noted in the Final EA (Section 1.5), TVA's EA is consistent with the recent amendments to the CEQ regulations. TVA has considered direct, indirect, and cumulative effects of its proposed action in the EA. The EA also considered all reasonable alternatives that are technically and economically feasible and meet the purpose and need of the proposed action.

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 Johnsonville Aeroderivative CT Project Draft EA
Comments and TVA Responses**

Comment No.	Organization / Affiliation	Comment	Response
1	TDEC	TDEC supports efforts to bring additional black start generation capabilities to the TVA. The addition of these Aero CTs will increase Tennessee's energy security by providing reliable, diverse power generation that is ready to respond quickly to any load supply issues.	Comment noted.
2	TDEC	Section 3.2.2.2 of the Draft EA includes a discussion of state and federal rule applicability to the proposed project and acknowledges that there may be unlisted, additional requirements that apply. The permit application dated September 8, 2021 has been deemed complete by TDEC, which means it appears to contain all information necessary to process the application. TDEC notes that the Department may need to request additional information if any deficiencies are found during preparation of the draft permit. TDEC asks that the TVA respond promptly to any such additional information requests to ensure timely processing of the application.	Comment noted.
3	TDEC	The Draft EA discusses the possibility of a septic system associated with the switch yard/ switch house but considering the area has undergone major disturbance and is made up of a significant amount of fill, TDEC	TVA is planning to tie into the existing force main and sewer system; therefore, no septic system will be required. Section 2.2.2.2 in the Final EA has been edited to reflect this change.

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Comment No.	Organization / Affiliation	Comment	Response
		notes that permitting a conventional septic tank and field lines will likely not be possible.	
4	TDEC	Any decisions regarding the ultimate closure and disposition of Ash Pond 2 must be assessed and approved by TDEC prior to implementation. Closure of the Coal Yard will require the management of CCR that has been placed within the limits of the Coal Yard area. The CCR in the Coal Yard area is also being evaluated as part of the TDEC Commissioner's Order process. Any decisions regarding the ultimate closure and disposition of CCR material within the Coal Yard must be assessed and approved by TDEC prior to implementation.	Comment noted. The JOF coal plant has already been retired and the activities related to closure of Ash Pond 2 would occur independent of TVA's proposed action to build Aero CTs. However, TVA will coordinate with TDEC prior to any closure activities of Ash Pond 2 and the Coal Yard.
5	TDEC	Several monitoring wells currently utilized under the Commissioner's Order process are located within or adjacent to what is identified as the proposed Laydown Area. Groundwater impacts, including constituent concentrations greater than Groundwater Protection Standards, have been identified in several of these wells. The Draft EA does not acknowledge the presence of these wells, nor the importance of these wells to activities (including the possible need for corrective action) yet to be completed under the Commissioner's Order. TDEC requests that TVA recognize and note	Section 3.5.2.2 of the EA has been updated to address the presence of monitoring wells in the project areas. The permanent wells would be avoided during construction activities. Temporary wells would be closed prior to construction.

Johnsonville Aeroderivative Combustion Turbines Project EA

Comment No.	Organization / Affiliation	Comment	Response
		the need for protection of these wells from construction activities in the Final EA.	
6	TDEC	The Draft EA states that emissions from the preferred alternative and associated actions would increase local emissions within Humphreys County. Section 3.2 of the Draft EA includes some detail on these mitigation steps and outlines how the additional localized pollution will not cause exceedances of applicable ambient air quality standards. TDEC recommends that TVA consider taking additional actions to mitigate the effects of increasing emissions on Humphreys County residents.	In addition to the PSD permit application, which addresses mitigating point source emissions from the proposed CT units, TVA will retire 16 less efficient CT units at the site. This is in addition to TVA's actions during the last five years to retire the coal-fired units at Johnsonville. TVA will comply with the TDEC PSD air permit to construct, once it is issued. In its PSD application submitted to TDEC last year, TVA has proposed the use of SCRs to minimize NOx emissions from the Aero CTs and the use of catalytic oxidation systems to minimize CO emissions.
7	TDEC	TDEC also recommends that TVA implement policies during and following construction that reduce unnecessary engine idling of both equipment and vehicles moving around the construction area, in addition to efficient planning that reduces travel distances for equipment.	TVA and its contractors prioritize fuel efficiency measures, such as reduced travel distances and minimize idling times to the extent practicable both as a cost and energy efficiency measure. These measures are discussed during meetings with TVA and contractors prior to commencement of project construction.
8	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.

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9	SELC	Due to the volume, complexity, and absence of relevant information, we respectfully request that TVA extend the deadline by 30 days, with a comment deadline of March 10, 2022. A 30-day comment period extension will ensure that interested parties have a meaningful opportunity to express their concerns.	TVA normally provides a 30-day review period for EA-level analyses, even though CEQ NEPA-implementing regulations do not require that agencies offer such reviews of EAs. TVA carefully considered the points outlined in the request to extend the 30-day period and, as explained in its letter denying the request, concluded that the information identified in the letter did not warrant extending the time period for public comment on this EA.
10	SELC	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 in Humphreys County, Tennessee. 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 years and requiring extensive new infrastructure like the gas compressor, emergency generator, switchyard, and transmission upgrades TVA proposes. 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.	<p>TVA is committed to supporting the Administration's decarbonization goals and is executing a plan that will continue to dramatically cut emissions. As noted in Section 3.3.2.2.3 of the EA, implementation of the proposed action would support an overall increase in the delivery of clean/renewable energy generation which contributes to an overall decrease in regional and national GHG emissions. The EA also explains that the proposal is consistent with TVA's 2019 IRP, which TVA found would result in an overall reduction in annual GHG emissions.</p> <p>TVA is already a leader among utilities in carbon reduction today. TVA plans to achieve a 70% carbon reduction by 2030 and approximately 80% by 2035, which TVA believes can be achieved using existing technologies while maintaining reliability and affordability, as we continue to evaluate additional levers for deeper decarbonization.</p> <p>As TVA works to achieve our aspiration for net-zero carbon, TVA can make a unique contribution to President Biden's goal through TVA's innovative developments in emerging technologies including: energy storage, electric vehicle evolution, decarbonization options, connected communities, regional grid transformation, and advanced nuclear solutions. TVA is investing in research and development with peers to achieve utility scale testing and development of these new technologies, and we are working to partner with federal agencies and others to lead the nation in deployment.</p> <p>When planning for power generation, TVA must consider the mandates of the TVA Act and the Energy Policy Act, in addition to the goals identified in EO 14008. We continue to explore other ways that TVA can accelerate its emissions reductions journey, while maintaining safe, reliable, and low-</p>

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			cost power for our LPCs and the communities TVA serves, consistent with a primary objective of the TVA Act to keep rates as low as feasible. TVA's activities must also comply with the Energy Policy Act of 1992, which directs TVA to use least-cost planning principles for the TVA system. TVA remains committed to fulfilling its statutory responsibilities to the people of the Valley while also striving to meet the goals of the Administration.
11	SELC	To comply with the National Environmental Policy Act and President Biden's Executive Orders concerning the climate crisis, the Draft EA must evaluate a carbon-free alternative to the proposed gas plants. As it did for the Paradise and Colbert combustion turbines approved in 2021, TVA eschewed any consideration of clean energy technology with the vague claim that "the combination of renewable energy and storage cannot provide the same magnitude of reliable and cost-effective energy year-round" as the proposed gas plants "in combination with renewables." TVA does not present any information supporting that conclusion, and as we show in these comments, it cannot.	<p>See responses to Comment #10 (aligning to Biden EO).</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.</p> <p>TVA is balancing the pace of our clean energy transition with our obligation to provide low-cost, reliable, and resilient power. TVA's asset strategy incorporates the strategic direction from the 2019 IRP and continues to support low-cost, reliable, and cleaner energy for the customers we serve. The action alternative studied as part of this EA is one piece of the overall asset strategy, which also includes:</p> <ul style="list-style-type: none"> • Maintaining the existing low-cost, carbon-free nuclear and hydro fleets • Retiring aging coal units as they reach the end of their useful life, expected by 2035 • Adding 10,000 MW of solar by 2035 to meet customer and system needs, complemented with storage • Using natural gas to enable needed coal retirements and solar expansion as other technologies develop • Leveraging demand-side options, in partnership with local power companies • Partnering to develop new carbon-free technologies for deeper decarbonization <p>Our investments to modernize the natural gas fleet, including the addition of Aero CTs at Johnsonville, enables the retirements of older coal-fired units with higher carbon intensity, enables greater levels of renewables on</p>

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			the system, and provides reliability support as we integrate intermittent renewable generation to the system.
12	SELC	President Biden's Executive Orders make clear that a carbon-free alternative is both "reasonable" and "appropriate" for the Draft EA. Executive Order 13990 directs all executive departments and agencies "to immediately commence work to confront the climate crisis," and Executive Order 14008 makes achieving "a carbon pollution-free electricity sector no later than 2035" a national priority. The president has deployed TVA and all other federal agencies as part of a "Government-wide approach that reduces climate pollution in every sector of the economy . . . and spurs wellpaying union jobs and economic growth, especially through innovation, commercialization, and deployment of clean energy technologies and infrastructure." Executive Order 14057 further instructs federal agencies "to lead by example in order to achieve a carbon pollution-free electricity sector by 2035. . . ." In short, TVA must do its part to achieve immediate and dramatic reductions in greenhouse gas emissions.	See response to Comment #10 (alignment with Biden EO) and Comment #11 (Alternatives).
13	SELC	TVA cannot brush aside carbon-free energy as a mere general policy choice that the agency is free to ignore. Clean energy is squarely within the "ambit" of the president's	See response to Comment #10 (alignment with Biden EO) and Comment #11 (diverse asset strategy).

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		executive orders, and the president has commanded federal agencies to take immediate action. At a bare minimum, TVA must evaluate a carbon-free alternative comprised of solar, battery storage, and demand response in the Draft EA. These options are feasible: the agency knows how to develop—and indeed already operates—solar, battery storage, and demand response resources.	
14	SELC	Additionally, TVA will act in an arbitrary and illegal manner if it fails to consider a carbon-free alternative to the proposed gas plants because it has already announced it will consider these alternatives elsewhere. The agency identified a solar-plus-battery storage option as worthy of consideration in two announcements made in 2021. In May 2021, TVA announced that it would evaluate a 1,450-MW solar-plus-battery storage alternative in a draft EIS to replace generation retired at the Cumberland Fossil Plant. A month later, it made an identical announcement for a draft EIS to replace generation retired at Kingston Fossil Plant. TVA seems to want it both ways: solar-plus-battery storage is unreasonable in the Draft EA, but worthy of consideration as an alternative to new combined-cycle gas plants at Cumberland and Kingston. The agency has not offered	See response to Comment #11 (Alternatives). The two proposals referenced in this comment involve the decisions to retire coal generation at Cumberland and Kingston and construct replacement generation. By contrast, the Aero CTs at Johnsonville are needed to modernize TVA's peaking fleet, assist in the integration of renewable resources, and provide TVA with dependable year-round capacity, as recommended in the CT Modernization Study. As noted in Chapter 2 of the EA, the combination of renewable energy and storage cannot provide the same magnitude of reliable and cost-effective energy year-round as is possible with CTs in combination with renewables.

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		a rational explanation for this distinction, and we think it cannot.	
15	SELC	It has now been almost three years since the IRP, and important aspects of its analysis are outdated. The Draft EA is the right venue for TVA to undertake the analysis of carbon-free alternatives.	TVA has updated the IRP approximately every 4 to 5 years: 2011, 2015 and 2019. The 2019 IRP is a long-term plan that provides direction on how TVA can best meet future demand for power. It shapes how TVA will provide low-cost, reliable, and clean electricity; support environmental stewardship; and foster economic development in the Tennessee Valley for the next 20 years. The IRP helps enhance TVA's ability to create a more flexible power-generation system that can successfully integrate increasing amounts of renewable energy sources and distributed energy resources while ensuring reliability. The proposed additions of Aero CTs are within the range of gas additions recommended by that IRP.
16	SELC	Finally, even if carbon-free alternatives were inconsistent with the 2019 IRP—which they are not—the IRP is a broad planning document and “does not dictate a specific series of actions . . . at particular plants.” 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. TVA must now evaluate a carbon-free alternative comprised of solar, battery storage, and demand response—a clean energy portfolio—for meeting its purported capacity need.	The Purpose and Need of the Aero CTs is to enhance system flexibility, integrate increasing renewable capacity, and provide dispatchable capacity, which would lessen the burden on the remainder of the system as renewable energy resources, such as solar, are integrated. See response to Comment #11 for discussion of TVA’s diverse asset strategy and how it was developed by incorporating the strategic direction of the 2019 IRP. See also the response to Comment #14.
17	SELC	In the 2019 IRP, TVA acknowledged that battery storage provides a wider operating capacity range than aeroderivative combustion turbines, “with essentially equivalent ramp rates for a given nameplate size.” For that reason, Greenlink Analytics	See response to Comment #11 for discussion of TVA's diverse asset strategy. As explained in Appendix D of the 2019 IRP, TVA's Flexibility Study showed that both battery storage and Aero CTs contribute to system flexibility and results indicated that aeroderivative benefits may be higher in peak months (where gas assets have the ability to run for more sequential hours during high loads) and battery benefits may be higher in

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		<p>concluded that the same 550 MW nameplate capacity of battery storage . . . would be expected to add more flexibility to the system” than the proposed gas plants. The IRP analysis also shows that the value of flexibility from battery storage is greater than the value from aeroderivative combustion turbines as solar increases on the system. Battery storage can also provide a component of reliability and flexibility that the proposed gas plants simply cannot: the ability to absorb excess generation and avoid curtailment of other resources. In light of this information, TVA just gets it wrong in the Draft EA: battery storage, alone or in combination with solar or other renewable energy, can provide reliable energy and flexibility to the grid.</p>	<p>shoulder months (where there is potential for excess solar generation during periods of lower loads). Additionally, model results indicated that the flexibility benefit for both aeroderivatives and batteries increased at higher levels of solar penetration. While battery storage provides greater operational range than the proposed Aero CT plant, batteries are more expensive and limited in the duration of energy storage (typically 4 hours). Further, batteries are limited in that they do not generate power, but rather store the power generated by other sources.</p>
18	SELC	<p>Faced with a decarbonization deadline of 2035, TVA’s proposed gas plants may also have to deploy carbon capture and sequestration technology which would drive their overnight capital costs even higher to \$2,689/kW. TVA cannot rationally rule out battery storage as a reasonable alternative on the basis of these costs.</p>	<p>At this time, the combination of renewable energy and storage cannot provide the same magnitude of reliable and cost-effective energy year-round as is possible with CTs in combination with renewables.</p> <p>See discussion of alignment to the Administration’s decarbonization goals in Comment #10.</p> <p>See discussion of TVA’s diverse asset strategy in Comment #11.</p> <p>See discussion of TVA’s purpose and need in Comment #14 and in Section 1.2 of the Final EA.</p>
19	SELC	<p>Battery storage is also competitive with aeroderivative combustion turbines in EIA’s levelized cost of energy analysis. For the frame</p>	<p>See discussion of TVA’s purpose and need in Comment #14 and in Section 1.2 of the Final EA.</p> <p>While battery costs are declining, data released by the EIA in March 2022 shows that overnight capital costs for aeroderivative CTs are still lower</p>

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		<p>combustion turbines proposed at Colbert and Paradise, TVA used EIA's 2021 overnight capital costs data for the conclusion that "battery storage system costs are over 60% higher than Frame-type CTs with less than half the service life." But the agency never acknowledged the substantial costs associated with combustion turbines that are not included in an overnight capital costs comparison. Overnight costs do not include operating costs, like maintenance or, more significantly, the cost of fuel which may increase over time. They also do not include the costs of greenhouse gas emissions that contribute to climate change, a cost which TVA has refused to calculate in the EA. A levelized cost of energy analysis incorporates many of these factors to provide a more complete, apples-to-apples comparison of different technologies. Again using 2021 data from EIA, the levelized cost of energy for battery storage is within 10% of the levelized cost of energy for aeroderivative combustion turbines. EIA is set to release new data in March 2022, and we expect battery storage to pull even with, or be more cost-effective, than aeroderivative combustion turbines on a levelized cost of energy basis.</p>	<p>than that of battery energy storage systems. A concept that is sometimes used to compare asset costs is Levelized Cost of Energy (LCOE). This measure divides the total cost of an asset (i.e., construction and capital, ongoing maintenance and operating, and dispatch costs which are primarily fuel) by expected output or generation. Because dispatch costs and expected output vary widely, LCOE is not a useful metric to benchmark resource costs. A better comparison, and the standard for resource planning, is to compare \$/kW installed capital costs. These are the actual inputs to the capacity expansion model. Additionally, aeroderivative units are fully dispatchable, allowing for many hours of continuous use during periods of prolonged high loads, such as a multi-day cold winter event. They also provide efficient peaking power, feature fast ramp rates, and can operate in synchronous condensing mode when not generating to provide local voltage support and improve power quality.</p> <p>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 over the next several years. 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>TVA has added a social cost of carbon analysis in Section 3.3.2 of the Final EA for post-combustion carbon dioxide emissions.</p>

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20	SELC	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).	<p>See discussion of TVA's plans to gain operational experience with battery storage technology in Comment #19.</p> <p>The 180 MW of storage under contract has been made possible through partnerships with customers under TVA's award-winning Green Invest program. Green Invest is a proven model that offers business and industry an effective, timely, and cost-competitive solution to aggressively meet their sustainability goals. Participating customers partner with TVA and project developers to cover any costs associated with the project above TVA's marginal cost, ensuring that remaining TVA customers are not unfairly burdened. TVA continues to invest and partner in bringing this technology forward faster, and TVA plans to add battery storage as prices come down and technologies evolve.</p>
21	SELC	TVA cannot lawfully ignore energy efficiency and demand response technologies in its analysis which are important, low-cost components of a clean energy portfolio alternative. The TVA Act requires the utility to consider energy efficiency and "to treat demand and supply resources on a consistent and integrated basis." TVA knows how cost-effective these resources are. In its own sensitivity analysis in the 2019 IRP, when artificial caps are removed, the planning model picks energy efficiency and demand response instead of new gas generation. Specifically, the sensitivity analysis revealed that 1900 MW of energy efficiency and demand response displaces the need for new gas-fired combustion turbines like the plants proposed in TVA's Alternative B. The 2019 IRP also identifies demand response as a technology with the	<p>See discussion of TVA's diverse asset strategy in Comment #11. As explained previously, these alternatives would not meet the peaking capacity underlying the purpose and need for this project.</p> <p>TVA currently offers energy efficiency programs under its EnergyRight® brand, in partnership with Local Power Companies, and will continue to offer programs for the foreseeable future. In recent years, TVA has placed increased emphasis on its missional offerings, including low-income assistance through its Home Uplift program and community redevelopment through its Community Centered Growth program. TVA also has extensive experience with demand response (DR), with over 1,500 MW of DR capacity today. A large percentage of this capacity is currently contracted with industrial customers, although TVA also has DR contracts for aggregated commercial customers as well. Additionally, TVA has been piloting a program in the residential DR space, which has the potential to offer additional diversification in its DR portfolio. The 2019 IRP recommended conducting a market potential study for energy efficiency and demand response to determine the overall market depth above and beyond what is driven by evolving Department of Energy codes and standards. TVA's Energy Programs Potential Study, expected to be complete in 2022, will help inform TVA's path forward for the next decade as the energy landscape continues to evolve. The study is intended to offer a detailed look at regional opportunities for influencing electric load through various programs, such as energy efficiency, demand response, and electrification. The study will inform TVA's next IRP as we work with</p>

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		potential to provide the same reliability and flexibility as gas plants generally. Finally, TVA's CEO Jeffrey Lyash recently told Members of Congress that the utility is on track to complete its "Energy Programs Potential Study" this year assessing "regional opportunities for influencing electric load through various programs, such as energy efficiency, demand response, and electrification."	our external stakeholders who represent a broad range of interests from across the Valley at IRP Working Group meetings. Additionally, the study will inform future program design to capitalize on energy efficiency opportunities that can lower total cost while also considering the needs of those with the highest energy burden. DR programs allow TVA to offset physical capacity needs, however, they are limited in the number of calls available. TVA commits to investing more into its energy efficiency programs, specifically to those hit hard by high-energy burdens, as informed by the results of the study.
22	SELC	One factor identified in the 2019 IRP—changes in the "demand for electricity—raises significant questions about the need to build the proposed gas plants in the first place. In the purpose and need section of the Draft EA, TVA states that the "Aero CTs are needed to ensure TVA maintains a reliable peaking fleet and would enhance system flexibility by facilitating the integration of intermittent renewable resources." But it is far from clear that TVA needs this capacity at all, which would be another 550 MW of fossil-fuel 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	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. 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. 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). The North American Electric Reliability

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		were suffering grid outages. TVA also maintains a large reserve margin, one that is substantially larger than that recommended by the North American Electric Reliability Corporation to maintain reliability, and expects demand “to be flat, or even declining slightly, over the next 10 years.”	Corporation evaluates electric reliability 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.
23	SELC	In addition, demand for TVA power may decline further because customers may terminate their power supply contracts with the utility. These customers include local utilities that filed a petition with the Federal Energy Regulatory Commission for unbundled access to TVA’s transmission grid. FERC denied this petition, but the appeal period for that decision has not closed. TVA’s largest customer, Memphis Light, Gas & Water, representing 10 percent of TVA’s load, is actively considering other power supply options. TVA is of course well aware that it may serve fewer distribution utility customers in the future and accordingly may have significantly lower demand. Indeed, TVA has been so concerned about the defection of its distribution utility customers and the corresponding load loss that, in 2019, it made a significant change in its power supply contracts in an attempt to permanently lock in as much of its load as possible	The long-term partnership with local power companies aligns our interests such that there is more engagement in TVA’s 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 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 balance of the coal fleet by 2035 and has PPAs that will expire over time. If notice by customers is given, TVA would have the option to not replace a portion of that capacity.

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24	SELC	Yet another development potentially affecting demand that TVA must evaluate is the recently established Southeast Energy Exchange Market (SEEM), approved by Federal Energy Commission last year. SEEM was not part of TVA's 2019 IRP. The Draft EA must analyze whether SEEM could provide an alternative to building new generation at Johnsonville.	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.
25	SELC	Finally, TVA's proposal for new aeroderivative combustion turbines at Johnsonville is out-of-sync with its plans for new solar generation. TVA appears to be fortifying its system for new solar generation that the agency has not yet proposed, and, if and when it does propose new solar, TVA will pair the new solar with new battery storage. The Draft EA says this specifically: TVA plans to add "10,000 megawatts (MW) of solar by 2035 to meet customer demands and system needs, complemented with storage." In other words, TVA's claimed need for the proposed gas plants may be supplanted by its own plans for new solar generation.	See discussion of TVA's diverse asset strategy in Comment #11. As reported in TVA's 2021 Sustainability Report, TVA expects to add about 10,000 MW of solar by 2035, with over 2,800 MW already committed by 2024, pending environmental review. With the addition of battery storage, TVA's need for flexible gas increases. Battery storage additions will be beneficial in balancing intra-hour variability of renewable energy resources, as well as making the system more efficient overall through energy arbitrage (i.e., storing excess power when the system cost is cheaper and discharging this power when it is more expensive). However, battery storage is limited in duration and more expensive than gas additions at this time. The TVA system benefits from having a diverse portfolio of generating assets that can reliably meet peak loads year-round at the lowest cost. Additionally, not all of TVA's solar projects will include battery storage, as this decision is dependent on the price and availability at the time the decision is made.
26	SELC	Rather than rely on the illegal, short-lived regulations from 2020, TVA must apply National Environmental Policy Act (NEPA) and CEQ's implementing regulations that have served agencies, courts, and the public since 1978.	When conducting environmental reviews under NEPA, TVA and other federal agencies must comply with the current CEQ NEPA-implementing regulations. In the EA, TVA applied long-standing NEPA principles and generally used the same procedures it has in previous NEPA analyses. For instance, TVA's analysis of the environmental effects identified the direct, indirect and cumulative effects of the alternatives, including greenhouse gas emission and climate change effects.

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			In preparing this EA, TVA has applied its own regulations as well as CEQ's 2020 regulations. Further, the EA is consistent with CEQ's recently finalized rule (87 Fed. Reg. 23453 (April 20, 2022) amending certain provisions of its 2020 regulations as described in Section 1.5 of the EA.
27	SELC	The proposal to build new gas plants at the Johnsonville Reservation is inextricably linked to three TVA actions that predate the 2020 Regulations: the 2019 Integrated Resources Plan (2019 IRP), the Combustion Turbine Modernization Study, and the Paradise & Colbert Combustion Turbine Environmental Assessment.	These other actions are not inextricably linked to the proposed Aero CTs. The 2019 IRP was a broad reaching study to determine how to best meet future electricity demand over the next 20 years. The CT Modernization Study was a separate "study" analyzing only a segment of TVA's generation portfolio, specifically, TVA's aging CT fleet. The PCT/CCT project replaced capacity from retirements at Allen and Johnsonville. A portion of the PCT/CCT project shares the same reservation location (Johnsonville) as the Aero CT project. The retirement of JCT units 1-16 is considered a reasonably foreseeable future action and the associated impacts in combination with the proposed action are addressed in the Aero CT EA.
28	SELC	TVA has failed to analyze and disclose the true impacts of its gas buildout by improperly segmenting its NEPA review of closely related gas proposals at Johnsonville, Paradise, and Colbert. In last year's Paradise and Colbert Combustion Turbine Environmental Assessment, TVA reviewed a proposal to retire Johnsonville CT Units 1-16 and replace them with new CTs at sites in Paradise, Kentucky and Colbert, Alabama. Here, TVA proposes new CTs at Johnsonville. Nowhere has TVA considered and disclosed the combined effects of the two proposals, which jointly result in 2,000 megawatts of new fossil fuel-fired power plants and significant investment in new supporting infrastructure.	See response to Comment #27.

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29	SELC	Retiring old CT units at Johnsonville and building new CT units at Johnsonville, Paradise, and Colbert are closely connected actions. They are interdependent parts of a larger action—the Combustion Turbine Modernization program—and they expressly depend on that program for their justification. Further, the Johnsonville CT proposal could not or would not proceed until Johnsonville CT units 1–16 retire. Because these actions are connected, TVA must evaluate them together to “address the true scope and impact of the activities that should be under consideration.”	There is no CT Modernization program, see response to Comment #27 for a discussion of the CT Modernization Study.
30	SELC	TVA must capture the full cost of its proposal by applying the Social Cost of Greenhouse Gases. TVA ignored upstream methane emissions, as well as the significance of adding decades of greenhouse gas emissions in light of national and international decarbonization efforts. Finally, TVA must address the unresolved conflicts between its proposal and federal policy on climate change and environmental justice embodied in President Biden’s executive orders.	<p>TVA has added a social cost of carbon analysis in Section 3.3.2 of the Final EA for post-combustion carbon dioxide emissions. Other greenhouse gases (methane and nitrous oxide) are present in much smaller fractions in the post-combustion emissions. The SCR emissions controls will greatly reduce the amount of nitrous oxide emissions from the proposed units. See discussion of alignment to the Administration’s decarbonization goals in Comment #10.</p> <p>This project is utilizing existing natural gas pipeline infrastructure with existing TVA service agreements and does not affect the maximum capacity of that infrastructure. Because no new pipeline infrastructure will be built and the maximum capacity of the existing line would not be affected, and due to the retirement of some older combustion turbine units, the upstream emissions are unlikely to be affected.</p>
31	SELC	TVA must accurately quantify and consider the greenhouse gas emissions associated with the proposed combustion turbine gas units. Associated emissions must	TVA reviewed the Climate Change and greenhouse gas (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

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		account for burning gas and leaking methane, whether onsite or upstream. TVA should quantify those impacts using the Social Cost of Carbon, Methane, and Nitrous Oxide.	<p>regional scale. TVA conducted a proxy analysis that analyzed GHG emissions within the context of local, national, and global projections. Additionally, TVA has added a social cost of carbon analysis in Section 3.3.2 of the Final EA for post-combustion carbon dioxide emissions. Other greenhouse gases (methane and nitrous oxide) are present in much smaller fractions in the post-combustion emissions. The selective catalytic reduction (SCR) emissions controls will greatly reduce the amount of nitrous oxide emissions from the proposed units.</p> <p>This project is utilizing existing natural gas pipeline infrastructure with existing TVA service agreements and does not affect maximum capacity of that infrastructure. Since no new pipeline infrastructure will be built and the maximum capacity of the existing line would not be affected, the upstream emissions are unlikely to be affected, and any effort to predict those emissions would be speculative and meaningless.</p> <p>There are numerous ongoing industry and government efforts to reduce methane leakage throughout the natural gas supply chain. Total methane emissions from natural gas systems have declined 16 percent from 1990 to 2019, largely due to new control technologies, investments in lower-emitting equipment and infrastructure, and better industry operating and maintenance practices, even as gross natural gas withdrawals have climbed 90 percent. TVA recently entered a two-year pilot contract to purchase responsibly sourced gas, allowing us to partner to explore new technologies to support further methane emissions reductions.</p>
32	SELC	Not only will the Social Costs of Greenhouse Gases convey the harms of new gas plants, but they allow TVA to incorporate the social benefits of reducing greenhouse gas emissions for evaluating carbon-free alternatives.	See responses to Comments #30 and #31.
33	SELC	Despite TVA's contentions, the Interagency Working Group on the Social Cost of Greenhouse Gases has found a broad consensus among economists that use of a	See Comment #30 for a discussion on the social cost of carbon and its inclusion in the Final EA.

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		consumption-use discount rate of 3% or lower is appropriate for evaluating climate impacts. TVA cites no evidence to the contrary and ignores the Interagency Working Group's finding.	The Final EA includes an analysis of the social cost of carbon using two different discount rates to provide a full range of potential social cost of carbon estimates.
34	SELC	TVA's objection that these tools do not represent "actual environmental impacts" misrepresents TVA's NEPA obligations and the nature of climate change. As the Council on Environmental Quality has acknowledged, "[c]limate change is a particularly complex challenge given its global nature and the inherent interrelationships among its sources, causation, mechanisms of action, and impacts." NEPA does not allow agencies to give up when facing uncertainty. Agencies must analyze and disclose "reasonably foreseeable" environmental effects. When information is incomplete or unavailable, agencies must evaluate "such impacts based upon theoretical approaches or research methods generally accepted in the scientific community." The Social Costs of Carbon, Methane, and Nitrous Oxide provide TVA with generally accepted approaches to fulfill their NEPA obligations and President Biden's order to "capture the full costs of greenhouse gas emissions as accurately as possible, including by taking global damages into account."	See Comment #30 for a discussion on the social cost of carbon and its inclusion in the Final EA.

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35	SELC	The fact that there is no numeric significance threshold for climate costs in NEPA review is true of every environmental effect. Significance is a multi-factor determination, and there is no magic number for any kind of impact, whether that's acres of forest lost, gallons of wastewater discharged, or metric tons of methane emitted. As with local water, land, and air impacts, it remains both useful and essential to estimate the climate impacts of building new fossil fuel plants.	Comment noted.
36	SELC	TVA objects that the Social Cost of Carbon does not account for "system-wide" emissions reductions. TVA's speculative assurance that it will someday add renewables has no bearing on whether this gas plant will emit greenhouse gas pollution. NEPA requires TVA to analyze the impacts of this proposal. TVA is not "excused from making emissions estimates just because the emissions in question might be partially offset by reductions elsewhere.	See Comment #30 for a discussion on the social cost of carbon and its inclusion in the Final EA.
37	SELC	By ignoring upstream methane emissions, lifecycle greenhouse gas emissions, and a rapidly decarbonizing economy, TVA fails to address full climate impacts of its proposal to build new fossil fuel infrastructure.	See Comment Responses #30 and #31 for a discussion on the social cost of carbon and its inclusion in the Final EA. There are numerous ongoing industry and government efforts to further reduce methane leakage throughout the natural gas supply chain. In fact, total methane emissions from natural gas systems have declined 16 percent from 1990 to 2019, largely due to new control technologies, investments in lower-emitting equipment and infrastructure, and better industry practices, even as gross natural gas withdrawals have climbed 90 percent. TVA has and will continue to partner with natural gas transporters

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			and suppliers who are seeking to reduce methane emissions, including through voluntary third-party certification of responsibly sourced gas.
38	SELC	TVA fails to explain why those percentages are insignificant. If building a new fossil fuel plant in 2024 does not significantly worsen the climate crisis, what does? TVA must “explain the benchmark for its determination of insignificance in relation to [the] environmental danger” of climate change.	While TVA recognizes that global atmospheric GHG emission concentrations are significantly affecting the earth's climate, TVA must consider only the extent to which the alternatives may contribute to climate change through GHG emissions. To disclose and consider these effects, TVA applied the most appropriate method for describing the potential impacts of the action's GHG emissions by estimating the potential emissions of the alternatives. Consistent with CEQ guidance on analyzing GHG emissions, TVA used the projected GHG emissions associated with proposed actions as a proxy for assessing proposed actions' potential effects on climate change in NEPA analysis. The emissions estimates, with the projected changes (by percentage) in emissions allows TVA to compare effects among the alternatives. In addition, TVA qualitatively describes the activities associated with the proposed action which contribute to GHG emissions or the sequestration of carbon. The EA also appropriately references TVA's analysis of the 2019 IRP and the findings of the associated EIS. In Section 2.3 of the EA, TVA states that, “Operational emissions would be minor relative to regional and national GHG levels and would not impact climate change. Indirect effects include enabling an overall increase in delivery of clean/renewable energy generation which contributes to an overall decrease in regional and national GHG emissions.” The EA also explains that the proposal is consistent with TVA's 2019 IRP, which TVA found would result in an overall reduction in annual GHG emissions. The regional and cumulative effects of its proposal on GHG emissions (combined with other TVA generation decisions) were important factors in determining the degree of effects of whether those effects are significant.
39	SELC	Thus, TVA assumes greenhouse gas emissions will remain stable during the useful life of the plant. TVA has run some of its current combustion turbine plants for more than forty years, yet TVA fails to discuss the total greenhouse gas emissions over the lifetime of the new gas plant. Paris	See response to Comment #38. Please see Section 3.3.2.2.3 for projected emissions.

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		Agreement signatories, including the United States, have committed to slowing global warming to well under 2°C above pre-industrial temperatures, requiring immediate, aggressive cuts to greenhouse gas emissions. The President has set national goals to decarbonize the economy by 2050 and the electric grid by 2035. By going online in 2024, the Johnsonville gas plant will account for a drastically higher percentage of state, national, and global greenhouse gas emissions over the decades to come. TVA must analyze these emissions in light of the national and international decarbonization efforts.	
40	SELC	TVA must address the conflict between its proposal to build new gas plants and federal decarbonization policies.	See discussion of alignment to the Administration's decarbonization goals in Comment #10 and the response to Comments 11 and 25. As noted therein, in addition to federal decarbonization policies, TVA must consider other federal directives, including the Energy Policy Act of 1992 and the TVA Act, when planning for generation.
41	SELC	TVA's environmental justice analysis in the Draft EA is flawed because it never grapples with the impacts of the proposed gas plants on the specific environmental justice communities living near the Johnsonville site.	Potential impacts to the census block group identified as an environmental justice community in the vicinity of the Johnsonville Reservation are described in Section 3.18.2.2.3. As noted in this section, the closest residences within this community are located approximately 3 miles or more from the proposed Aero CT plant project area, and thus would not be directly affected by visual impacts, noise, traffic, or fugitive dust from onsite activities. This community would experience minor impacts to air quality associated with operation of the Aero CT plant, as would other, non-environmental justice communities within the study area. Air emissions associated with the operation of the plant would be in compliance with PSD requirements, which ensures there is no significant impact to or deterioration of air quality due to the proposed project. Any

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			insignificant minor effect would be experienced equally by environmental justice and non-environmental justice communities in the study area.
42	SELC	TVA concludes that compliance with the requirements of a PSD permit “ensures no significant impact to or deterioration of air quality” without consideration of the effects on the environmental justice community itself, the approach squarely rejected by the Fourth Circuit in Friends of Buckingham.	The approach for assessment of impacts on environmental justice communities is consistent with the approach advocated by the Fourth Circuit in Friends of Buckingham. TVA acknowledges that the identified environmental justice community would experience an increase in air emissions associated with operation of the Aero CT plant. However, impacts to members of the community would be minor, as emissions would be in compliance with PSD/Title V requirements, which ensure that no significant deterioration of air quality or change of NAAQS attainment status would occur as a result of the proposed project. Humphreys County, where the Johnsonville Reservation is located, and adjacent Benton County, where the environmental justice community is located, are currently in attainment with NAAQS ambient air quality standards, which are established to be protective of human health, including sensitive populations such as children, the elderly, and those with compromised respiratory function. Additionally, any such minor impacts would not be disproportionate to environmental justice communities as they would also be experienced by other non-environmental justice communities within the study area.
43	SELC	TVA fails to evaluate whether there will be a disproportionate effect on this environmental justice community at all, instead assuming that because wealthier communities in the study area will also experience the same pollution, the air pollution effects of the gas plant will not be disproportionate for any community. TVA claims without analysis that “while operation of the Aero CT plant would result in localized emissions that would be dispersed throughout the study area, the impact of the those emissions would not be disproportionate on any of the	TVA's analysis, documented in Section 3.18.2.2.3, demonstrates that environmental justice communities would not bear a disproportionate share of negative environmental consequences resulting from the proposed action. TVA's methodology focuses on analysis of impacts to those communities most likely to be affected by a proposed action, referred to as the study area, which in this case was determined to include census block groups within a 5-mile radius of the project area. Impacts to air quality would be borne primarily by the population within the study area, of which only 12 percent belong to a minority and 39 percent are considered low-income. Localized emissions would generally be dispersed throughout the study area, and thus the impact of those emissions would not be disproportionate on any of the communities in the study area, including the one census block group identified as a low-income population.

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		<p>communities in the study area. . . .” But other communities in the study area are the wrong comparison point. TVA should have compared the likely effects on the environmental justice community to the air pollution in nearby communities outside of the study area to determine whether this affected community located close to the proposed gas plant will experience a pollution burden greater than communities farther away. If left to stand as a precedent, the reasoning here would ensure that no TVA facility would ever have a disproportionate effect on communities of color or low-wealth communities as long as the agency’s study areas include non-environmental justice populations. This approach renders the agency’s environmental justice analysis meaningless.</p>	
44	SELC	<p>TVA fails to consider the disproportionate adverse effects that this environmental justice community has already endured for decades from TVA’s Johnsonville facilities and other industrial facilities nearby, including the Dupont and OxyChem facilities next door to Johnsonville. TVA also fails to consider the potential cumulative impacts of increased flooding and other severe weather experienced in this community and the excess energy burden it already carries. As a result, this community</p>	<p>Past operation of TVA’s Johnsonville facilities and other nearby industrial facilities are considered in establishing the base condition documented in the affected environment. Additionally, as noted in Table 3-1, the continued operation of the nearby industrial facilities are considered in the cumulative impacts analysis.</p> <p>Impacts of the effects of climate change in the TVA region are described in Section 3.3.1 of the EA which includes results from the U.S. Global Change Research Program’s Fourth National Climate Assessment report, including observations of environmental impacts attributed to climate change in the Southeast Region of the U.S. In addition, Section 8.2.8 (Variation in Climate) of TVA’s 2019 IRP presents an evaluation of the impact to TVA generating resources as a result of an increase in the average temperature in the Tennessee Valley of 3 degrees Fahrenheit</p>

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		may suffer disproportionately high and adverse impacts due to its unique history and characteristics, such as preexisting health conditions that may amplify the impacts of additional pollution.	coupled with changes in seasonal rainfall. The results of the analysis for this sensitivity were considered in the development of IRP recommendations which affect all users in the Tennessee Valley.
45	SELC	TVA failed to properly follow its updated 2020 NEPA regulations when analyzing the effects its construction of Aero CTs at the Johnsonville facility would have on floodplains and wetlands. TVA's incomplete evaluation and analysis must therefore be supplemented or redone.	<p>The analysis in the EA is consistent with EOs 11988 and 11990 and complies with the 2020 NEPA regulations. While EO 13690 (Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input), was reinstated in May 2021, implementation of EO 13690 is still in development at the national level. TVA is working with other federal agencies to develop consistent implementing plans for these EO requirements.</p> <p>Section 3.7 of the EA has been revised with additional data and analyses regarding impacts to wetlands. Based on the environmental component of the siting process, TVA determined that there would be no practicable alternative that would allow complete avoidance of wetlands. Unavoidable direct impacts to wetlands would be mitigated as required by both state and federal agencies in accordance with the Tennessee Water Quality Control Act and Section 404 of the CWA. Therefore, the proposed action would be consistent with EO 11990.</p>
46	SELC	Once TVA determined, based on badly outdated maps, that the project would occur outside of the 100-year floodplain, the agency used that finding as the basis for its determination that the project would have "no significant impact on floodplains and their natural and beneficial values." But TVA regulations make clear that this conclusion does not automatically follow from the first finding; rather, it is an independent determination that must be made in addition to	<p>The determination that the proposed project would be located outside floodplains was made not only using the effective Flood Insurance Rate Map (FIRM) but also using the flood elevations on Kentucky Reservoir on which the maps are based, as well as contour maps of the proposed project site.</p> <p>Text has been added to Section 1.5 of the Final EA to clarify the analysis conducted regarding the project's potential impacts to floodplains.</p>

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		establishing the project's location relative to floodplains. TVA therefore failed to adequately analyze whether, despite being located outside of a floodplain, the project would nevertheless have an identifiable impact on a floodplain or wetland or otherwise support development in such areas.	
47	SELC	TVA also erred by using the wrong standard for evaluating potential impacts. In its EA, TVA states that further analysis for floodplain effects is inappropriate because the proposed actions would have no "significant" impacts on floodplains. However, TVA regulations specify that the agency must determine whether a proposed action has any "identifiable" impacts on floodplains—a more nuanced inquiry. And given the proposed project's location, TVA may well find that the project does have not only identifiable but significant impacts on floodplains.	The proposed project would be located outside 100- and 500-year floodplains and at least 5 feet above the 100- and 500-year flood elevations. TVA has determined that there would be no impacts to floodplains and additional language to address this has been added to Section 1.5 of the Final EA.
48	SELC	That TVA undertake a searching inquiry of its proposed action's effect on floodplains is all the more necessary given the outdated status of Humphreys County's current FEMA flood maps and TVA's public commitment to incorporate climate adaptation and resiliency into its operations. As an initial matter, FEMA's floodplain maps for Humphreys County are old.	The Aero CT project would be located on ground that today is five feet or more above the 500-year flood elevation, which aligns with climate adaptation and resiliency from the standpoint of freeboard. Although the FIRMs are several years old, the age of FEMA maps is outside of TVA's purview. These maps are the current, effective (official) FIRMs. Regardless of the age of the maps, the 100- and 500-year flood elevations that define the boundary of the 500-year floodplain would still be 375.0 feet, as computed by TVA most recently in 1994.

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49	SELC	TVA should therefore be incorporating its current climate data and modeling assumptions into its understanding of the current floodplain at the Johnsonville site and analyzing the effects its proposed action could have on nearby floodplains based on this most up-to-date information.	See response to Comment #48. The EA contains the most current data available at this time.
50	SELC	This action item, referred to as “Flood Hazards and Water Reliability,” aims to “examin[e] potential flooding events and water reliability risks to support TVA’s mission and carry out its responsibilities in managing the Tennessee River System.” To do so, TVA plans to utilize “flood event modeling process[es]” to “address the resiliency risk of increased flooding predicted in some climate models.” Again, these inquiries and modelling should be actively incorporated by TVA staff into all development decisions the agency undertakes along its waterways and floodplains. In other words, TVA should not rely on old, outdated maps to skirt a searching inquiry of its proposed action’s potential effects on floodplains if it has more up-to-date information readily available to incorporate into a more meaningful review.	See response to Comments #48 and #49.
51	SELC	TVA must also analyze whether its proposed action would directly or	See response to Comments #46 and #47.

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		indirectly support floodplain development.	
52	SELC	This analysis is insufficient under Executive Order 11990 and TVA regulations implementing NEPA, which both demand that an agency identify whether there are any practicable alternatives for proposed projects construction activities occurring in wetlands.	Section 3.7 of the EA has been revised with additional data and analyses. TVA has followed its guidance regarding the no practicable alternative. During the siting process, TVA's transmission team reviewed wetlands information while determining how the future transmission line would be routed. The team weighed a number of factors into choosing a preferred route and multiple routes were considered for the line. Due to the proximity of the retention pond and the other lines in the area and considering line outage constraints and clearance requirements, there was no practical alternative that would eliminate all impacts. During that process, the siting team was able to avoid placing transmission structures directly in wetlands and reduced wetlands to be spanned as much as practicable. After avoidance and minimization measures had been considered, the preferred route was analyzed in this EA. Based on the environmental component of the siting process, along with the analysis and proposed mitigation measures, TVA determined that there would be no practicable alternative that would allow complete avoidance of wetlands.
53	SELC	TVA is silent on whether any practicable alternatives exist to avoid both the temporary construction impacts as well as the permanent maintenance impacts of building and maintaining this right of way through onsite hardwood wetlands. TVA must therefore supplement its analysis.	See response to Comment #52.
54	SELC	TVA has not addressed the cumulative impacts of its gas buildout at Johnsonville and across its service territory.	Section 3.1.2 of the EA addresses the Reasonably Foreseeable Future Trends and Planned Actions at and in the immediate vicinity of the Johnsonville Reservation, which could potentially contribute to cumulative impacts in association with this project. Cumulative impacts with regard to reasonably foreseeable future trends and planned actions are addressed at the end of relevant resource areas throughout Chapter 3 of the EA. Projects outside of the vicinity described for the cumulative impact analysis are beyond the scope of this analysis.

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55	SELC	TVA has not looked at the effects of adding decades of new greenhouse gas emissions through this massive, contemporaneous gas buildout.	See response to Comment #54.
56	SELC	TVA has also ignored the cumulative impacts locally. For nearly seventy years, TVA operated a coal plant on the Johnsonville Reservation. TVA's coal ash is submerged in groundwater, which has indicated levels of toxic pollution that exceed safe drinking water standards. Local pollution imposes additional, cumulative harms on surrounding counties that face some of the highest energy burdens—that is, cost of energy as a percentage of income—in the TVA region. Neighboring Benton County is home to a low income environmental justice community that has endured generations of exposure to TVA pollution. TVA proposes to permanently fill wetlands and build infrastructure near a floodplain in a region where development and climate change have led to increasingly common and severe flooding. As TVA admits, its proposal “would likely adversely affect” three endangered species of bats, but TVA does not disclose the cumulative impacts of further habitat loss on these species. TVA vaguely mentions an imminent “lateral divestiture” project without describing the project or its impacts. TVA notes that the	<p>See response to Comment #54 for discussion of cumulative effects analysis, Comment #46 for floodplain impacts, and Comment #53 for wetland impacts. As described in Section 3.1.2 of the EA, TVA would conduct a separate environmental review to address closure of the ash impoundment. That evaluation will address all relevant resources, including groundwater and environmental justice, and will include an evaluation of cumulative impacts. TVA has conducted an additional wetland survey and updated Section 3.7 of the EA. The Aero CT project would only affect 0.05 acres of wetlands, which affects less than 0.01% of wetlands within 5 miles of the project area. These effects would be mitigated as described in Section 3.7.2.2.</p> <p>As described in Section 3.11.2.2, the Proposed Action in combination with the other reasonably foreseeable future actions would likely adversely affect the Indiana bat, northern long-eared bat, and gray bat, though with the use of BMPs and identified conservation measures, impacts would not be significant and would not affect any of the other animal or plant species.</p> <p>The lateral divestiture project is a reasonably foreseeable future project, but additional details beyond what is described in the Draft EA are not available at this time.</p> <p>Only JCT Units 1-16 are retiring, and the existing JCT units 17-19 will remain in-service. Unit 20 is the co-generation unit and will remain in-service for the foreseeable future. As described in Section 3.1.2, on-going operations of adjacent industrial facilities, including emissions from local vehicles and related impacts to air quality, including GHG emissions, are considered part of the existing environmental setting (and therefore is part of the affected environment analysis) and are not expected to increase in the foreseeable future.</p>

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		Johnsonville Reservation is surrounded by other industrial sites, yet TVA ignores past, present, and future impacts from other polluters in the area. TVA also has not explained whether or how the proposed CTs relate to the utility's decision in 2015 to continue operating the now-retiring CTs in order to support cogeneration for a nearby "strategic customer." To the extent that TVA plans to use the proposed CTs for the purpose of continuing to supply power to that customer specifically, TVA must disclose that fact as part of the proposed action to be studied as part of its proposal, and recirculate an environmental document that fully discloses the purpose, need, alternatives, and impacts of this project.	
57	SELC	Because building new gas-fired power plants is a "major federal action[] significantly affecting the quality of the human environment," TVA must prepare an environmental impact statement (EIS).	In TVA's NEPA implementing regulations, 18 CFR 1318.400(a)(2), an EIS is required for construction and operation of new major power generating facilities at sites not previously used for industrial purposes. The Aero CT project is on an existing industrial site. Therefore, an EIS is not required. Additionally, 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. This confirms TVA's conclusion that an EIS is not necessary.
58	SELC	the decades of pollution and the ongoing health risks of coal ash	See responses to Comments #54 and #56.

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		impoundments at Johnsonville create “cumulatively significant impacts” for the communities in Humphreys and Benton Counties. Public health, biodiversity, and economic well-being are also impacted by the “cumulatively significant impacts” of TVA’s decision to build a new fossil-fuel plant, thereby emitting decades’ worth of greenhouse gases and accelerating climate change.	
59	SELC	because burning fossil fuels worsens climate change and threatens local air quality for overburdened communities, the new gas plants’ impacts are also “highly controversial.”	See responses to Comment #57. In the context of NEPA, controversy relating to the impacts of an action occurs when there is scientifically supported commentary that casts substantial doubt on the methodology and data used in assessing impacts. The commenter does not specify how the proposed plant’s impacts are scientifically controversial.
60	SELC	TVA’s proposal to build new gas plants is likely to “establish a precedent for future actions,” 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’s issued in these cases, thereby allowing the FONSI’s to serve as precedent for future [actions].	See response to Comment #57. TVA carefully considers the appropriate NEPA approach for each project based on specific project characteristics. Therefore, the fact that TVA has concluded that an EA and FONSI are appropriate for this action has no bearing on TVA’s conclusion as to future actions.
61	SELC	TVA’s decision to build new gas plants at Johnsonville imposes an unjust burden on the environmental justice community in Benton County, and TVA does not so much as	See response to Comment #64. This NEPA analysis is consistent with EO 14008. TVA has assessed impacts on environmental justice communities in Section 3.18 of the EA.

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		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.	
62	JoAnn McIntosh	The 550 MW generated by the proposed ten Aeroderivative CTs at Johnsonville will be a commitment to more gas on the grid, thereby increasing carbon emissions when, according to TVA's Draft EA, "TVA has a plan for 70 percent carbon reductions by 2030, a path to approximately 80 percent carbon reductions by 2035 and ASPIRES TO [my emphasis] net-zero carbon emissions by 2050." These decarbonization goals cannot be achieved if gas is chosen over renewable options.	See discussion of alignment to the Administration's decarbonization goals in Comment #10. See discussion of TVA's diverse asset strategy and how the proposed Aero CTs at Johnsonville fit in Comment #11.
63	JoAnn McIntosh	TVA maintains that peaker plants such as the proposed Aero CTs are necessary in order to integrate their planned 10,000 MW of solar by 2035. However, the solar plus storage technology exists today that can address the variability of solar generation, thus making new gas	See discussion of TVA's diverse asset strategy in Comment #11. See discussion of gas and storage costs and portfolio fit in Comment #19.

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		plants a poor financial investment as well as running counter to decarbonization goals.	
64	JoAnn McIntosh	Extreme weather events that impact the grid demonstrate that climate change and the need for decarbonization must be prioritized now. Instead of making aspirational goals, TVA needs to commit to full decarbonization, and should support and invest in forward-looking technologies and projects that achieve that commitment sooner rather than later.	<p>TVA has a plan for 70 percent carbon reductions by 2030, a path to approximately 80 percent carbon reductions by 2035 and aspires to have net-zero carbon emissions by 2050. This decarbonization trajectory is consistent with the imperatives of maintaining reliability and resiliency of the power grid and of generating power at the lowest system cost.</p> <p>See discussion of alignment to the Administration's decarbonization goals in Comment #10.</p> <p>See discussion of TVA's diverse asset strategy and how the proposed Aero CTs at Johnsonville fit in Comment #11.</p>
65	Karen Wieckert	I am thrilled, to be honest, that TVA is replacing old coal plants -- the air pollution, the ash concern, the mining are all negatively effecting communities of people and other creatures/plants.	Comment noted.
66	Karen Wieckert	However, the future should also include reducing reliance on energy sources that negatively effect people/critters/plants. The pipeline plus the use of gas does help somewhat in replacing coal, but why not take the opportunity to truly change the mix and consider more renewable sources.	<p>TVA expects to add about 10,000 MW of solar by 2035, with over 2,300 MW already committed. The gas projects help the integration of larger quantities of solar into the grid. TVA is also evaluating a variety of other generation projects at other locations, such as small modular reactors, which are or will be addressed in separate NEPA evaluations. Siting this project adjacent to an existing TVA CT facility results in greater efficiencies through integration with existing transmission, pipeline, and other infrastructure, thus, resulting in lower environmental impacts than what would be anticipated for a newly developed site.</p> <p>See discussion of alignment to the Administration's decarbonization goals in Comment #10.</p> <p>See discussion of TVA's diverse asset strategy and how the proposed Aero CTs at Johnsonville fit in Comment #11.</p>

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67	Karen Wieckert	Also, it might be a good opportunity to consider distributing where the power is created, rather than all in one plant.	See response to Comment #66. The siting of this project at an existing TVA brownfield facility results in lower environmental impacts as opposed to a greenfield site and greater efficiencies through integration with existing transmission and other infrastructure.
68	Joseph R Schiller	TVA continues to game the NEPA by proposing pseudo-alternatives that are merely minor variations of the technology alternative it prefers. In this case the TVA had the audacity to not even offer pseudo alternatives, instead offering only a “no action alternative,” (which is mandatory) and the preferred “Aeroderivative CT alternative.” This is a clear violation of NEPA given that there are several obvious real alternative actions possible.	Chapter 2 provides an explanation of TVA’s alternative development process and a summary of the criteria used to develop TVA’s preferred alternative can be found in Table 2-1. Various generation types and locations were previously considered but dismissed from further consideration due to various reasons including their inability to meet the project purpose and need.
69	Joseph R Schiller	For example, the TVA could offer a solar combined with storage alternative, a wind power and storage alternative, an energy efficiency/conservation/load management alternative, and various combinations of these as well as a combination of aeroderivative CT and solar plus storage. Given that the TVA’s rationale for installing Aeroderivative CTs is to support additional renewables, then why not include a “renewables combined with the aeroderivative CT” as an action alternative to validate this contention!	See responses to Comments #66 and #68. See discussion of TVA’s diverse asset strategy and the proposed Johnsonville Aero CTs fit in Comment #11.
70	Joseph R Schiller	Unless the TVA is prepared to offer real alternatives, the no action alternative is the best choice because	See responses to Comments #66, #68 and #69.

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		no real analysis of viable technologies is being performed.	
71	Joseph R Schiller	When TVA conducted its CT modernization Study it concluded that adding this aeroderivative turbine to its fleet was a “no regrets” option. Why didn't TVA install this “no regrets” option at Colbert and Paradise? Regardless, in a rapidly accelerating climate crisis the only “no regrets” option is to immediately install solar plus storage along with other renewable generation.	See discussion of TVA's diverse asset strategy and the proposed Johnsonville Aero CTs fit in Comment #11. See discussion of the difference between the Paradise/Colbert projects and Johnsonville in Comment #14.
72	Joseph R Schiller	TVA needs to install renewables to justify installing other technologies it claims are needed to support them.....TVA needs to rapidly and consistently install renewables to justify installing other technologies it claims are needed to support renewable sources.....The TVA currently has approximately 12000 MW (12GW) of gas turbine generation available in its power portfolio. The bulk of this gas generation is combustion turbine (CT) that is well suited to supporting variable renewable energy generation. Now is the time to install significantly more solar generation to utilize this solar supporting resource.	See responses to Comments #66 and #68. See discussion of TVA's diverse asset strategy and how the proposed Johnsonville Aero CTs fit in Comment #11.
73	Joseph R Schiller	Until, and unless, the TVA demonstrates reliability challenges in pursuing this solar build out, it should voluntarily impose a moratorium on	See responses to Comments #11 and #15. Adding gas generating options helps accelerate the phaseout of TVA's coal generation and integrate larger amounts of solar on the grid.

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		installing any additional gas turbines until it completes its next IRP. It is imprudent for the TVA to continue to invest heavily in gas technology assets that many experts in energy economics believe are at risk of becoming stranded until it performs a comprehensive analysis of the current best technology options available for meeting its capacity and reliability goals.	
74	Joseph R Schiller	The 2300 MW of solar in the TVA's current generation portfolio is not enough to justify concern about installing additional supporting technologies such as CT. TVA is below the average in both total solar capacity installed and installed solar watts per customer, and is dropping in its rankings compared to its peer major southeastern utilities. In fact, at least two of those utilities have already installed as much solar as TVA plans to install by 2035.....Further, the TVA has more hydro resources than all its peer utilities in the southeast and hydro turbines can support solar as effectively as aeroderivative CTs	See responses to Comments #11, #66 and #68. TVA's hydroelectric system serves several missions: flood control, environmental stewardship, navigation, energy production, water supply, and recreation. TVA has some intra-day flexibility from the hydroelectric fleet, but there are times when even hydroelectric resources can be constrained in a manner that reduces flexibility. For example, abnormally dry or wet conditions have impact on generation flexibility or when other demands on the system such as minimum flow or special releases are needed to satisfy water quality demands or other downstream needs. Releases from the hydroelectric facilities are highly dependent on rainfall and runoff forecasts which introduces inherent unpredictability as weather and rainfall forecasts shift.
75	Joseph R Schiller	It must also be pointed out that most, if not all the solar TVA plans to install through 2035 will likely include four-hour lithium ion or other battery storage (Solar+storage to add most new battery storage capacity in the U.S. over next three years	See responses to Comments #66 and #68. See discussion of TVA's diverse asset strategy and the proposed Johnsonville Aero CTs fit in Comment #11. See discussion of the role of storage additions in Comment #25.

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		(renewableenergyworld.com) and this will provide the bulk of required support for future solar installations (Storage Futures Study: Grid Operational Impacts of Widespread Storage Deployment (nrel.gov)). The residents of the TVA service area strongly support installation of more solar generation. Thus, the TVA's continuing attempts to justify further fossil fuel plant construction based on "its need to support solar" must be seen as a cynical and deceptive ploy to recruit public support for its acquisition of a resource it does not need that will contribute to, not help mitigate, the climate crisis.	
76	Joseph R Schiller	In summary, the TVA has not made a good faith analysis of the best technology solutions for replacing its old combustion turbines at the Johnsonville plant and the meager amount of solar TVA has installed does not justify installing the aeroderivative CTs to support it. Even if the TVA did need to support its solar installations with other generation technologies, the existing TVA hydro turbines are a more than sufficient technology to support all the solar it plans to install by 2035.	See responses to Comments #11 and #74.
77	Amy Kelly	I am writing to ask you to replace all fossil fuel generation with clean, renewable energy. TVA is currently deciding to invest in gas at three additional locations making new gas	See responses to Comments #64, #66, and #68.

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		builds almost 5,000 MW of TVA's generation.	
78	Amy Kelly	TVA is trading one fossil fuel for another and investing ratepayer dollars to modernize existing gas turbines that will not be economical in the coming years due to climate change. We will be the ones paying for these decisions.	See discussion of TVA's diverse asset strategy in Comment #11.
79	Amy Kelly	TVA is not considering the environmental impacts of climate change in their environmental reviews and is thwarting its mandate under the TVA Act to be an environmental steward.	Section 3.3 of the Draft EA discusses the impacts of climate change and greenhouse gas emissions.
80	Amy Kelly	TVA can be a public utility that responds to the urgent demands of the day by readily supplying clean energy to businesses that are requesting it by making renewables more than 3% of its energy mix.	See responses to Comments #66 and #68. Renewables are expected to be a sizable portion of TVA's energy mix as it adds more than 10,000 MW of solar capacity by 2035.
81	Amy Kelly	TVA needs to do a full EIS on all projects that involve fossil fuels and fully consider renewable energy as an alternative in those studies by taking bids and communicating with solar and wind suppliers as often as it does gas suppliers.	TVA has determined an environmental assessment is an appropriate level of review for this proposal to build aeroderivative CTs to meet peaking needs. See responses to Comments #64 and #66.
82	Lynn Oliver	Also need TVA funded pilot program for solar panels for Tennessee home owners in multiple geographic areas to make people aware of alternatives to electric sources. Mother Earth	To support homeowners and businesses around the Valley, TVA developed "TVA Green" a suite of solutions to meet renewable energy needs for a broad range of customers. Green Connect, and Green Switch are programs for homeowners. The Green Connect Program, part of TVA Green, is designed to help homeowners who are ready to commit to a solar generation system (with

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		seems to be fighting back with weather extremes.	<p>or without battery storage) connect with quality installers. Customers also have access to objective information and a network of quality installers, as well as receiving installation verifications to ensure their systems are installed to TVA Green Connect Program standards.</p> <p>Green Switch provides the easiest solution for customers to power their homes or businesses through 100% solar energy. For as low as \$2 per month, customers can match some or all their current electricity use with solar located in the Valley.</p> <p>TVA also just developed a Virtual Solar Education Tool, a one-stop, simple tool that helps homeowners considering onsite solar to learn about solar energy options, cost, and programs at their own pace and convenience.</p> <p>More information on all TVA Green solutions can be found at www.TVAGreen.com.</p>
83	Rebecca Cummings	Thank you for your plans to shut down your coal facilities. This is an important step toward reducing our impact on the climate as well as reducing air pollution and environmental risks from slag. Thank you. As you consider their replacements, please consider: 1) Energy-efficiency grants to encourage less energy consumption in buildings and transportation. 2) Renewables and battery storage. For the sake of our children and their children, we need to reduce our impact on the climate. 3) Encourage rooftop solar and in-home batteries through rebates and energy buy-back incentives. That way you can achieve greater renewable production without the up front land costs and without on-going maintenance costs. 4)	Regarding renewables and battery shortage, see responses to Comments #66 and #68. Energy-efficiency grants, rooftop solar and in-home batteries, and lobbying of other utility companies are outside the scope of this Environmental Assessment.

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		Lobby local utility companies to reduce their monthly connection fees. This will encourage more rooftop solar and greater energy conservation. The last thing you want is for more and more people to disconnect from the grid.	
84	Cassandra Gronendyke	It is imperative that we protect our planet for future generations to enjoy by converting our electric grid to clean, renewable energy.	Comment noted.
85	Kelly O'Brien	We need clean energy for our state and planet. Our government agencies keep putting off the urgency of the damage to the planet. Excuses are long, what will you do when there is no more time? Slowly our systems are destroying our world. If anyone survives in the future after our failures, they will ask " Why didn't they do anything sooner when they had known for years. This will be the legacy that you leave for the future. If there is a world left.	See response to Comment #64.
86	JoAnn McIntosh	Stop the gas stopgap! Gas is NOT a transition fuel that will enable more deployment of renewables -- it is a carbon-producing fossil fuel that will slow the necessary decarbonization of the grid.	See response to Comments #64, #66, and #68.
87	Kevin Hoban	Do the right thing!	Comment noted.
88	Crys Zinkiewicz	Choose the future. Make it better for all!	Comment noted.

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89	John Lund	I have an extended and growing family in TN... I wish this state to be as clean and environmentally friendly as possible.	Comment noted.
90	Rhonda Tinsley	I am very interested in moving to renewable energy sources and would gladly work with my electric power coop to share costs of converting my home to solar power to share in producing as well as consuming power.	Comment noted.
91	Cynthia Mcwilliams	Please consider that we see the effects of our climate crisis on a weekly basis, massive tornados, out-of-control wildfires, excessive heat in what should be cold areas and cold months, temperatures that rise and then fall 30 degrees in one day, excessive rainfall and then none. Our usual November days used to be cold (30 to 40 degrees) and wet. Now we have summer days, bright and sunny often close to 80 degrees. It's time for us to make the shift to solar and wind energy even though I realize that there are powerful and influential people who want to continue using (and profiting from) fossil fuels. TVA should rise above the greed and power plays to provide us with sustainable power that will not harm the planet or its occupants. Please take the responsibility in moving us away from the fossil fuels that are	See response to Comments #64, #66, and #68.

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		causing the climate crisis we are witnessing.	
92	Donovan Drake	Make the right move for our grandchildren.	Comment noted.
93	Joyce Coombs	Clean up our air now!!!	Comment noted.
94	Carrie Megill	The rate payers in Tennessee want fossil fuels replaced with clean renewable energy. We want it for our children, our state, our world. We no longer have the time to take it slow. Please do not just trade one fossil fuel for another. Thank you	See response to Comments #64, #66, and #68.
95	Chris Dacus	Ask yourself this: Why are you wanting to continue to kill off your customers? The answer should be that you don't want to do that. Go please go forward immediately with renewable energy. Thanks.	See response to Comments #64, #66, and #68.
96	Cindy Whitt	Please take actions to ensure a clean energy future for all especially our grand children.	See responses to Comment #64.
97	Joseph Payne	I am an optimist and believe a majority of TVA employees know that the best and proven way forward is to retire all the active fossil fuel plants but for fear of losing their jobs or at the least not getting that next raise. I know this from experience as a former TVA hire. You are important to thier senior management only if it serves their needs, that being lining the pockets of major fossile fuel producers which in turn satisfies	Comment noted.

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		lobbyists lining the pockets of politicians. Somewhere along this chain of selfish thoughtless money grubbing an organized group of individuals will emerge to bring this to a halt. Maybe in time to reverse enough of the damage done by these selfish, thoughtless but very wealthy individuals.	
98	Jane Herron	Gas is also a fossil fuel and should not be considered as a replacement for coal. It is past time to be moving to clean renewable energy. Our children and grandchildren are depending on you to make forward-looking, intelligent decisions.	See response to Comments #64, #66, and #68. The proposed gas project is not a replacement for the coal units at Johnsonville that were retired in 2017.
99	Geneva Andrews	I certainly don't want pipelines running through MY property and they shouldn't run through anyone's.	No new pipelines are associated with the Proposed Action.
100	Jeff Sims	The future of the planet and humanity depends on the action we take NOW.	Comment noted.
101	Jeff Simms	The future of the planet and humanity depends on the action we take NOW.	Comment noted.
102	Rachel Murray	Climate change is real and it's a threat to the future of the entire planet. TVA has a responsibility to do everything possible to avoid contributing to the destruction of our environment. Please do the right thing.	See response to Comment #64.
103	Steve Riches	Clean Energy Now	See response to Comment #64.
104	Dana Moran	The best way to take care of the health of our communities is to take	See response to Comment #64.

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		care of the health of our environment. We should be doing everything possible to create clean, sustainable energy and jobs!	
105	Heather Finotti	This is such a perfect opportunity to make a decision that will be healthier for our plant and people for a long time to come. Please help us all move forward, choose renewable energy like solar!	See response to Comment #64.
106	Jennifer Miller	I installed solar panels on my roof last year. Solar is coming whether you are with us or not.	Comment noted.
107	Beverly Morris	Start setting up solar energy and wind farms to create clean energy while dismantling coal fired plants so we aren't caught without adequate energy!	See responses to Comments #64 and #66.
108	Nora Robertson	I'M WORRIED ABOUT OUR FUTURE. WE NEED CLEAN ENERGY NOW. WE CANNOT WAIT ANY LONGER FOR RENEWABLE ENERGY! REPLACING COAL WITH GAS IS NOT A REAL SOLUTION FOR OUR WARMING PLANET.	See responses to Comments #64 and #66.
109	Donald Keyser	I want clean energy, as in solar or wind	See responses to Comments #64 and #66.
110	David Gresham	Gas will eventually run out, solar won't. Also, we are shipping much of our natural gas to Europe now.	Comment noted.
111	Mindy Staggs	As a Tennessean, I support solar renewable energy.	Comment noted.

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112	Richard Gilbert	Please move into the future. Burning fossil fuels speeds up our destruction.	See response to Comment #64.
113	Laurie Levknecht	Now is the time to act! Commit to clean energy!	See responses to Comments #64 and #66.
114	Suzanne Rogers	Spending money on anything other than clean energy makes no sense at all. Please wake up and do the right thing! It's time to commit to renewable energy.	See responses to Comments #64 and #66.
115	Sonja Hunter	We need to make the switch away from dirty energy sources and go all in on clean energy for cleaner air, cleaner water and healthier Tennesseans!	See responses to Comments #64 and #66.
116	Charles Rogers	It is well past time to accelerate the transition to clean and renewable energy sources and away from fossil fuels.	See responses to Comments #64 and #66.
117	Russell Kennedy	Save yourself and us money and go renewable with wind and solar with battery back up.	See responses to Comments #64 and #66.
118	Sandra Kee	We don't need to end up like Texas and be out of power. Coal and Gas is the way to go only!! If solar freezes then what do you have, nothing. Definitely not windmills that also freezes.	Comment noted.
119	Kurt Emmanuele	Let's get ahead of the curve and switch to clean energy since we ultimately have to do it anyway.	See responses to Comments #64 and #66.
120	Judith Flegel	It is excellent and necessary to end coal plants. Replace energy	See responses to Comments #64 and #66.

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		production with clean renewable energy, not fossil fuels. Our environment is on the brink. Protect it and research how to continue to improve negative environmental impact. Thank you.	
121	Kara Dulac	In order to slow down climate change, we must make a decisive shift from energies that are destroying our planet to renewable energy which is not based on fossil fuels. Please do what's right for our environment, our citizenry, and our planet and choose renewable energy over fossil fuels.	See responses to Comments #64 and #66.
122	Bill Askew	TVA should lead the country in the use of renewable energy to replace fossil fuels. We need solar and wind now to power the Valley's homes and industry, not one day later. Please consider the climate when the decisions are made that affect all our futures.	See responses to Comments #64 and #66.
123	Jim Steitz	While the closure of coal-fired plants is correct, it must be replaced with solar and wind energy, because the timetable of our climate crisis will not accommodate the more gradual emissions reductions embodied in your current trajectory, and in the proposal for gas-fired generation as replacements. Latest data on methane leakage in the natural gas industry also indicates that gas-fired generation carries a greater climate impact, nearer to that of coal-fired power, than previously supposed.	See responses to Comments #64, #66, and #68.

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		TVA has a solemn responsibility to curtail its carbon emissions as rapidly as technologically possible. Every pound of carbon burned in a TVA-managed generator is a blow struck against the prospects for human flourishing in the century to come. TVA must choose electricity sources that are proportionally concordant with the most recent conclusion of climatologists, that carbon emissions must decline radically by 2030, not gradually, later, or deferentially to current complacent TVA plans.	
124	Rodney Lynch	It is very important that Tennessee remains competitive and beautiful for tourists. No one likes oil. Solar is the future	See responses to Comments #64 and #66.
125	Wendy Holmgren	We cannot ignore the warning signs endured by my family and others. My rural home was pounded by unprecedented flooding, snowfalls and ice storms. We have been stranded in Lewis County for a week for some of these events. My married children have huddled in storm shelters in Bowling Green, KY during the city's devastating tornadoes. My son and wife have fled New Orleans to escape hurricanes twice and their residence damaged. My husband and I sought shelter as an E-1 tornado tore across our path on the Natchez Trace Parkway. These events occurred only in the past TWO YEARS! I am a scientist and educator	See responses to Comments #64 and #66.

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		and taught and discussed the science of climate change for the past 20 years. It angers me that warning signs have been ignored for far too long. The economic impact increases each year industry and governments fail in their stewardship to take action. The negative impacts grow larger and harder to reverse. Please take corrective actions for my/your grandchildren's futures.	
126	Joanne Golden	Please let's move into the future of clean energy for all.	See responses to Comments #64 and #66.
127	Margaret Cowan	As a grandmother of four, I am extremely concerned about the failure of the United States to address climate change aggressively. We have a responsibility to future generations to do our best to alter our energy consumption to make sure our children and grandchildren have a livable world in which to flourish. I am urging TVA to provide leadership by rapidly moving away from fossil fuels to sustainable sources of energy.	See responses to Comments #64 and #66.
128	Tamara Welsh	We need to build a sustainable future!	Comment noted.
129	John Brewster	This is an historic opportunity to help build a better future for my grandchildren. Renewable energy is obviously the right choice. The fossil fuel industry brings us a future that moves us toward more problems, more pollution as less hope. Clean energy is clearly the most powerful	See responses to Comments #64 and #66.

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		choice. Please take this step toward a brighter future. Thanks	
130	Sarah Rowe	Please begin moving on from polluting, obsolete fossil fuels to the clean solar and wind energies (taking wildlife welfare into account) of the future!	See responses to Comments #64 and #66.
131	Cindy Holt	It is far past time that TVA looks to the future with renewable energy sources and gives up the illusion that natural gas is a healthy alternative to coal.	See responses to Comments #64 and #66.
132	Charles & Dinah Crow	I am very concerned about the impact of new natural gas pipeline construction on the streams that must be crossed in the right of way. Crossing the streams can only degrade the fauna and flora downstream by creating large amounts of sediment that will impact the water quality.	See response to Comment #99.
133	Kathy Flaherty	* TVA needs to do a full EIS on all projects that involve fossil fuels and fully consider renewable energy as an alternative in those studies by taking bids and communicating with solar and wind suppliers as often as it does gas suppliers. I agree with this message, we need to think of the future.	See responses to Comments# 64, #66, and #68.
134	R.T. Williams	When is a courageous stand and common sense more in play than right now? Sometime real soon we must join with one another to make a statement for our future. Those	Comment noted.

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		amongst us, whom we have chosen and possess the power, have the opportunity. Use it.	
135	K Melton	Fossil fuels must be replaced. We are in the midst of a devastating climactic time that isn't reversible! Solar, clean energy sources that don't enable more climactic distress are the wise choices. Trading fossil fuel for fossil fuel isn't an intelligent, informed choice-isn't pro environment or pro humanity but would stand as a nonsensical choice to further climate change.	See responses to Comments #64, #66, and #68.
136	Julia Hulsey	I never have been able to have children. But, the healthy condition of our Earth "nest" is very important for our future leaders. Plastic *must* go, along with all fossil fuels!! **Please** consider the environmental impacts of climate change and choose renewable clean energy!	See responses to Comments #64 and #66.
137	Anna Tursich	Any successful economic endeavor is forward-thinking. Right now, solar is the obvious choice over fossil fuels, but it is not the end-game. New technologies are evolving which integrate solar and other processes for improved efficiencies and reduction of negative environmental impact. TVA was initially developed to plan for the future. Now we must learn from past successes and mistakes, and look forward to providing the best and safest energy production for future generation of Americans and	See responses to Comments #64 and #66. TVA's Integrated Resources Plan (IRP), revised in 2019, sets out TVA's 20-year energy portfolio for meeting the Tennessee Valley's energy demand in a manner that maintains the reliability and resiliency of the grid and achieves these goals at the lowest system cost. The proposed action at Johnsonville is consistent with TVA's 2019 IRP.

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		the world. TVA should be a leader in the industry. The influence of super wealthy individual whose only interest is in protecting their wealth has no place in the public policy of the TVA. The current practice of reducing the payback for energy provided by individual home solar projects is the kind of thing that makes your customers disrespect and distrust the TVA leadership. How will you answer to your great grand children when they ask what did you do to make the world a better place?	
138	Ede Pyle	Having grown up in the oil patch, I have seen the damage and disruption flowing from development and production of hydrocarbons. I urge TVA to embrace solar as our next source of energy.	See responses to Comments #64 and #66.
139	Lucinda Chaffin	Please replace all fossil fuel generation with clean, renewable energy.	See responses to Comments #64 and #66.
140	Evelyn Leo	We worry about what this will do to job availability but if you're looking to replace dirty energy with clean and renewable there are plenty of jobs in those fields. Granted people need to be trained but that makes more jobs. Let's just do it	Comment noted.
141	Sharon Barnett	This is a no-brainer for our children's future...no more investment in fossil fuels...renewable energy ONLY!!! No nuclear...because we have no way of containing the waste safely (i.e. until it	See responses to Comments #64 and #66.

Johnsonville Aeroderivative Combustion Turbines Project EA

Comment No.	Organization / Affiliation	Comment	Response
		is no longer a danger). We need to make solar energy a priority with affordable solar for every household.	
142	Morgan Smith	If we're not moving forward we're falling behind.	Comment noted.
143	Beverly Wilcox	For our children's sake!	Comment noted.
144	John Minnehan	Natural gas is not renewable, requires and relies on extracting fossil fuel energy, and increases CO2 emissions. It's time for Tennessee to implement and get on board with renewable energy. Renewable energy in the form of solar and wind energy is the way of the future, Tennessee will benefit economically, environmentally, and technologically.	See responses to Comments #64 and #66.
145	Karen Sorensen	TVA should be a leader in clean energy! Make TN proud!	Comment noted.
146	Vance Sterling	How about the CEO of TVA take a cut in his income and let the common people a break on their bills!!	Comment noted.
147	Cherie Martinez	It's about time!!	Comment noted.
148	Luther Ludwig	It's past time to get serious about replacing climate heating carbon fuels. Let's get with solar, I mean really!	See responses to Comments #64 and #66.
149	Jeannine Horton	Let's move Tennessee forward away from Earth, forest and life killing fossil fuel energy sources!!! Chose renewables over gas!!! Protect our greatest resources, our air, water, forests, land, Earth!!!! This rapid	See responses to Comments #64, #66, and #68.

Appendix A – Public and Agency Comments and TVA's Responses to Comments

Comment No.	Organization / Affiliation	Comment	Response
		Climate change is real and human caused!!! Do something "great"!! Move away from oil and gas and into the future NOW! This matters to me and my family because we live here on Earth, it's our home! We have young members in our family who deserve a better cleaner future!!!	
150	Kathleen Mahoney-Norris	My husband grew up in Knoxville and his father was an engineer with the TVA who worked on Norris Dam. He always talked about how spectacular this area was in its natural beauty. After my husband passed away I moved here to live in this beautiful area and appreciate all its resources. We need to take care of the beauty and healthy environment here for ourselves and our children and grandchildren, and thus need to plan strategically to move away from fossil fuels.	See response to Comment #64.
151	Timothy Kent	Don't trade one carbon releasing energy for another! If you care about the future for our young people and the earth, go with wind and solar energy!	See responses to Comments #64 and #66.
152	Sadie McElrath	Hello, My husband and I just bought our first electric car and we would like it to run on solar power. I'm so glad TVA is transitioning away from coal, but please replace it with a robust solar power system. It will make us more confident in TVA and more happy to be a customer. Thank you.	See responses to Comments #64 and #66.

Johnsonville Aeroderivative Combustion Turbines Project EA

Comment No.	Organization / Affiliation	Comment	Response
153	Paul Slentz	As a person of faith, I believe strongly that care for God's good creation is one of the most pressing demands of our time. Climate change is a current reality that is already affecting millions of people, with the greatest harm happening to the poor, in the United States and throughout the world. This is a crisis that demands the urgent reduction of greenhouse gas emissions. I urge TVA to shut down its remaining coal plants quickly and transition immediately to non-carbon fuel sources, especially solar and wind. Humankind and all the creatures we share this planet with are under dire threat now and action needs to be taken now. Thank you for your consideration of this concern that I share with so many others. Rev. Paul Slentz, Nashville	See responses to Comments #64, #66, and #68.
154	Isabel Fleming	Please read!!	Comment noted.
155	Keb Wolfe	Renewable energy is what people want. You need to begin switching to it. PLEASE!!	See responses to Comment #66.
156	Jennifer Stainer	Please no more molestation of our planet. Choose SOLAR and WIND as our energy sources.	See responses to Comments #64 and #66.
157	Sandra Kilgore	For the sake of our children, clean water, clean air and the future of our planet please choose renewable energy over gas!	See responses to Comments #64 and #66.
158	Dan Firth	TVA has not demonstrated that the new gas plants are necessary to	See responses to Comments #10 and #11.

Appendix A – Public and Agency Comments and TVA's Responses to Comments

Comment No.	Organization / Affiliation	Comment	Response
		support renewables. TVA has offered no analysis options where storage is included. TVA must consider that carbon capture will need to be added to maintain viability of any gas assets in just a few years in order to have any chance of net-zero emissions and should include the cost of CC in all analyses of options. TVA needs to lead by building out renewable energy assets and lead us into a renewable energy future.	
159	Linda & Joel Morris	I am adamantly opposed to modernizing of gas turbines. Climate change demands that TVA must concentrate on renewable energy and increasing them as a percentage of their energy mix. A full EIS must be done on all projects involving fossil fuels including alternative solar and wind.	See responses to Comments #64, #66, and #81.
160	Sharon Hart	Time is now to move into the future of energy. That means facing up to the degradation of our planet and saying NO! That means YES to renewables. That means YES--health for all.	See responses to Comments #64 and #66.
161	Kent Minault	Gas is not clean energy. The leakage from the gas infrastructure around the country is a climate disaster already. Let's not build out more.	See response to Comment #37.
162	Lea Alexander	My 18 yr old daughter feels hopeless about climate change & says others in her generation feel the same. Why? Because they believe you will fail to do the right thing for the planet. As an	See responses to Comments #64 and #66.

Comment No.	Organization / Affiliation	Comment	Response
		11 yr old for a 4H speech, she tackled the evils of fracking, but you seem unaware. Jeff, when you said our transition to clean energy was a marathon rather than a sprint, you spoke from a position of privilege, damnable ignorance of science, & feckless leadership. If we are to save the lands of indigenous peoples in Alaska from rising sea levels, we must sprint. If we are to continue to live above ground, we must sprint. How spiritually evolved are we if we accept human-caused extinction of species? Jeff and board members, we need you to show leadership for the urgent mission of creating clean energy. If you are not up to the challenge of meeting the administration's goals, please resign. Let's put that \$10M+ salary toward clean energy and battery storage! Is hope for TVA's leaders naive?	
163	Katherine Nelson	Gas the wrong choice for Tennessee. Wind and solar make more sense for the future of clean energy in Tennessee.	See responses to Comments #64 and #66.
164	Carol Michler Detmer	Please consider the environmental impact over time. Renewables are far more practical in many ways, especially their minimal impact on the environment. Gas may be cleaner than coal when it burns, but consider the impact of the pipelines, of extracting it from the ground, etc. Those are very consequential aspects	See responses to Comments #64 and #66.

Appendix A – Public and Agency Comments and TVA's Responses to Comments

Comment No.	Organization / Affiliation	Comment	Response
		of gas, and not kind to the environment over time.	
165	Tom Gatti	I'll never understand why TVA, which is basically a government funded utility lags so far behind when it comes to sustainability We don't need gas from fracking or the god awful tar sands of Canada. We need renewables if this planet and its inhabitants are going to stand a chance of surviving. So get your head out of the sand and let's set the example for investing in renewable energy sources	TVA's activities are funded through revenues from sale of electricity at the wholesale level; it does not receive any federal funding. See responses to Comments #64 and #66.
166	Max Ervin	We applaud your decision to stop using coal for energy production and urge you to make this transition as quickly as possible. However, to consider replacing coal with another fossil fuel is unthinkable. It is imperative that you only pursue renewable energy sources now and in the future!	See responses to Comments #64 and #66.
167	Chriseni Pulse	I want my children to grow up in a safe environment. This choice will not only impact us now, but in the future to come. Please reconsider and choose renewable energy!	See responses to Comments #64 and #66.
168	David Bordenkircher	Gas [proces will go up in the near future. This needs to be repeated.	Comment noted.
169	Michael Pardee	I am a long time rate paying TVA customer via KUB. It is immensely important that TVA migrate to	See responses to Comments #64 and #66.

Johnsonville Aeroderivative Combustion Turbines Project EA

Comment No.	Organization / Affiliation	Comment	Response
		renewable energy sources as rapidly as possible.	
170	Dana Lacy	We are seeing the effects of climate change unfold in real time: increased heat, flooding, tornadoes, fires... etc. We really can't afford not to act. It is time to be bold and stand up for change. Others will follow!	Comment noted.
171	John Taylor	Please consider favoring solar panels with battery storage over natural gas, yet another fossil fuel beset by methane release, inherent danger of pipeline placement and inability to meet the net-zero pollution goal by 2050. Yes, the CO2 emissions are better than coal but the overall impact of increasing LNG use and infrastructure will make it impossible for us to meet the yearly emission reduction goal in order to be emission-free by 2050.	See responses to Comments #64, #66, and #68.
172	Gisella Patharkar	Climate change is the greatest threat and it is high time for real action. Because of climate change large coastal areas and islands may become inundated and cause huge population migrations. We need to act now. It is high time.	See responses to Comments #64 and #66.
173	Bonnie Drake	I love the beauty of Tennessee and I am afraid that we are damaging what makes our state so attractive. With the rapid influx of new residents to our state I feel we need to look at wind and solar in place of fossil fuels.	See responses to Comments #64 and #66.

Appendix A – Public and Agency Comments and TVA's Responses to Comments

Comment No.	Organization / Affiliation	Comment	Response
174	Ellen Getter	Just because you're transitioning away from coal plants, you still use natural gas as an energy source. We need renewable energy now! Don't wait	See responses to Comments #64 and #66.
175	JoAnn McIntosh	The United States has set a goal to reach 100 percent carbon pollution-free electricity by 2035, but TVA is planning a gas buildout that will make that impossible. Gas is NOT a transition fuel! The technology exists today for a reliable, decarbonized grid -- please expedite deployment.	See responses to Comments #64, #66, and #68.
176	Marilyn Finley	Tennessee is falling behind in the adoption of renewable energy. This kind of action by TVA keeps us further behind.	See responses to Comments #66 and #68.
177	Justin Pearson	These projects are detrimental to the health of our vibrant communities, our waterways, and our future. You are perpetuating environmental degradation and harm by propagating projects that you know will continue to destroy our planet and harm the most vulnerable. Please stop this unjust project!!!	See responses to Comments #64, #66, and #68.
178	Dawn Wetzel	Clean energy is very important for our future.	Comment noted.



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

DAVID W. SALYERS, P.E.
COMMISSIONER

BILL LEE
GOVERNOR

February 8, 2022

Via Electronic Mail to brkunkle@tva.gov

Brittany Kunkle
Tennessee Valley Authority
400 W. Summit Hill Drive, WT11B-K
Knoxville, TN 37902.

Dear Ms. Kunkle:

The Tennessee Department of Environment and Conservation (TDEC) appreciates the opportunity to provide comments on the draft *Tennessee Valley Authority (TVA) Johnsonville Aeroderivative Combustion Turbines Project Environmental Assessment* (Draft EA), which evaluates the potential environmental effects associated with the construction and operation of ten natural gas-fired aeroderivative combustion turbines (Aero CTs) at the Johnsonville Reservation in Humphreys County, Tennessee. TVA's Johnsonville Reservation currently houses 20 simple-cycle CT units within the Johnsonville Combustion Turbine (JCT) plant. The existing JCT Units 1-16 will be retired with their combined generation being replaced at TVA's Paradise and Colbert facilities as evaluated in the Paradise and Colbert Combustion Turbine Plants EA. The proposed action is the addition of 10 natural gas-fired Aero CTs to generate approximately 550 MW for commercial operation at the existing TVA Johnsonville Reservation no later than December 31, 2024. The Aero CTs are needed to ensure TVA maintains a reliable peaking fleet and would enhance system flexibility by facilitating the integration of intermittent renewable resources. TVA has developed two alternatives for implementing this proposed action, both of which are considered within the draft EA:

- Alternative A – No Action Alternative: Under the No Action Alternative TVA would not construct 10 natural gas-fired Aero CTs generating approximately 550 MW and associated support systems to support this generation at the Johnsonville Reservation. This alternative does not meet the purpose and need of TVA's proposed action and serves as a baseline for comparison to Alternative B.
- Alternative B – Construction of Johnsonville Aero CTs and Support System: Under Alternative B, TVA would construct 10 natural gas-fired Aero CTs generating approximately 550 MW and associated support systems at the Johnsonville Reservation. The overall Johnsonville Aero CT project area consists of approximately 245 acres of mostly heavily disturbed land located completely within the Johnsonville Reservation (Figure 2-1 in the Draft EA). Project activities would not affect the entirety of this project area; however, final locations for laydown yards, parking, construction trailers, etc. are dependent upon final design. Estimated locations for these features have been included in Figure 2-1 in the Draft EA. Construction of the Aero CTs and associated structures would begin in late 2022 and take approximately 2 years.

TDEC is the environmental and natural resource regulatory agency in Tennessee with delegated responsibility from the U.S. Environmental Protection Agency (EPA) to regulate sources of air pollution; solid and hazardous waste; radiological health issues; underground storage tanks; and water resources. TDEC's comments are made in the context of proposed Alternative B. TDEC has reviewed the Draft EA and has the following comments regarding the proposed action:

General

TDEC supports efforts to bring additional black start generation capabilities to the TVA. The addition of these Aero CTs will increase Tennessee's energy security by providing reliable, diverse power generation that is ready to respond quickly to any load supply issues.

Air Pollution Control

TDEC appreciates TVA's proposed measures to mitigate air quality impacts from fugitive dust, open burning, and emissions from motor vehicles. The Draft EA also mentions future impacts from the demolition of buildings and structures located on the site, which will be addressed separately. The EPA and TDEC's Division of Air Pollution Control (DAPC) enforce federal and state regulations regarding asbestos renovation and demolition activity. These regulations apply to any building or structure known to contain asbestos or to any buildings proposed to be renovated or demolished.

Section 3.2.2.2 of the Draft EA includes a discussion of state and federal rule applicability to the proposed project and acknowledges that there may be unlisted, additional requirements that apply. The permit application dated September 8, 2021 has been deemed complete by TDEC, which means it appears to contain all information necessary to process the application¹. TDEC notes that the Department may need to request additional information if any deficiencies are found during preparation of the draft permit. TDEC asks that the TVA respond promptly to any such additional information requests to ensure timely processing of the application.

Water Resources

The overall project site is 245 acres in size, with a permanent occupation of 15 acres with 36 acres expected for vehicle and equipment parking, materials, laydown and construction. As the area disturbed will be more than 50 acres in size, including staging areas, the project will require an individual construction stormwater permit (CGP)² and a project specific Surface Water Pollution Prevention Plan. As noted in the submittal, the existing Tennessee Multi-Sector Permit (TMSP) will need to be modified. Proposed alterations to wetlands and other water resources identified in the project area itself do not appear to require an Aquatic Resource Alteration Permit (ARAP)³, but any final decision regarding ARAP necessity will be contingent upon the results from the upcoming new wetland delineation survey mentioned in the Draft EA.

The proposed barrow area south of the project site contains a perennial stream, as identified in a hydrologic determination and through areas indicating hydric soils. An ARAP permit may be required for activities in those areas, depending on what portion of the barrow area is used. The Draft EA discusses the possibility of a septic system associated with the switch yard/ switch house but considering the area has undergone major disturbance and is made up of a significant amount of fill, TDEC notes that permitting a conventional septic tank and field lines will likely not be possible.

Solid Waste

TDEC has the following comments regarding elements in the Draft EA pertaining to Coal Combustion Residuals (CCR) management:

Table 3-1 in the Draft EA contains a summary of reasonably foreseeable future trends and planned actions in the vicinity of the Johnsonville Aero CT Plant project area, including the closure of Ash Pond 2, the Coal Yard, and the Coal Yard Runoff Pond at Johnsonville Fossil Plant. Closure of Ash Pond 2 is being evaluated as part of the

¹ See https://dataviewers.tdec.tn.gov/pls/enf_reports/f?p=19031:34051::::34051:P34051_PERMIT_ID:92983

² See <https://www.tn.gov/environment/permit-permits/water-permits1/npdes-permits1/npdes-stormwater-permitting-program/npdes-stormwater-construction-permit.html>

³ See <https://www.tn.gov/environment/permit-permits/water-permits1/aquatic-resource-alteration-permit--arap-.html>

TDEC Commissioner's Order process. Any decisions regarding the ultimate closure and disposition of Ash Pond 2 must be assessed and approved by TDEC prior to implementation. Closure of the Coal Yard will require the management of CCR that has been placed within the limits of the Coal Yard area. The CCR in the Coal Yard area is also being evaluated as part of the TDEC Commissioner's Order process. Any decisions regarding the ultimate closure and disposition of CCR material within the Coal Yard must be assessed and approved by TDEC prior to implementation.

Several monitoring wells currently utilized under the Commissioner's Order process are located within or adjacent to what is identified as the proposed Laydown Area. Groundwater impacts, including constituent concentrations greater than Groundwater Protection Standards, have been identified in several of these wells. The Draft EA does not acknowledge the presence of these wells, nor the importance of these wells to activities (including the possible need for corrective action) yet to be completed under the Commissioner's Order. TDEC requests that TVA recognize and note the need for protection of these wells from construction activities in the Final EA.

Energy

TDEC recognizes the relatively low long-term impact on regional, national, or global greenhouse gas (GHG) emissions that the construction of these Aero CTs will have. TDEC also recognizes that construction of the Aero CTs facilitate a reduction in GHG emissions by supplementing both peak load demand and renewable sources of power generation. The Draft EA states that emissions from the preferred alternative and associated actions would increase local emissions within Humphreys County. Section 3.2 of the Draft EA includes some detail on these mitigation steps and outlines how the additional localized pollution will not cause exceedances of applicable ambient air quality standards. TDEC recommends that TVA consider taking additional actions to mitigate the effects of increasing emissions on Humphreys County residents.

TDEC also recommends that TVA implement policies during and following construction that reduce unnecessary engine idling⁴ of both equipment and vehicles moving around the construction area, in addition to efficient planning that reduces travel distances for equipment. Such management strategies to minimize vehicle and equipment idling and travel distances will reduce harmful emissions from gasoline and diesel burning engines, improve local air quality, and reduce noise pollution.

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 alternative, nor should they be interpreted as an indication regarding future permitting decisions by TDEC. Please contact me should you have any questions regarding these comments.

Sincerely,



Bryan Davidson | Policy Analyst
Office of Policy and Sustainable Practices, TDEC
William R. Snodgrass Tennessee Tower
312 Rosa L Parks Ave, 2nd Floor
Nashville, TN 37243
Email: Bryan.Davidson@tn.gov
Phone: 615-741-9178

⁴ "idling" refers to the running of an engine when the equipment or vehicle is not at that time being used for its intended purpose.

January 20, 2022

VIA email to brkunkle@tva.gov

Brittany Kunkle
NEPA Compliance
Tennessee Valley Authority
400 W Summit Hill Drive, WT 11B
Knoxville, TN 37902
Phone: 865-632-6470

**Re: Request for Comment Period Extension for Johnsonville Aero derivative
Combustion Turbines Project Draft Environmental Assessment**

Dear Ms. Kunkle,

By notice given on January 10, 2022, the Tennessee Valley Authority posted a draft environmental assessment to construct and operate 10 new, gas-fired combustion turbines (“CTs”), along with related infrastructure, at the Johnsonville Reservation.¹ The current deadline for filing comments on the draft environmental assessment (“Draft EA”) is February 8, 2022.

On behalf of the Sierra Club, Southern Alliance for Clean Energy, and Center for Biological Diversity, the Southern Environmental Law Center respectfully requests that TVA extend the comment deadline. The following challenges have undermined the public’s opportunity to review and comment on the Draft EA within the initial 30-day period:

- The Draft EA incorporates by reference hundreds of pages of additional environmental analysis from other documents. For example, Section 1.4 alone incorporates by reference six publications, each exceeding 100 pages.
- The Draft EA relies on extensive analysis not included within the EA. For example, TVA relies on greenhouse gas analysis from a separate Clean Air Act permit application² not included or disclosed to the public and references review of a “lateral divestiture project” that TVA has not yet conducted or provided to the public.³
- The Draft EA is closely related to yet hardly discusses TVA’s recent decision to retire other Johnsonville CTs and replace them with CTs in Paradise, Kentucky and Colbert, Alabama.⁴ That failure leaves the public to connect the dots by reviewing two separate

¹ <https://www.tva.com/environment/environmental-stewardship/environmental-reviews/nea-detail/johnsonville-aeroderivative-combustion-turbine-project>.

² Section 3.3.2.2.3 (relying on analysis from a 2021 Prevention of Significant Deterioration permit application).

³ Table 3-1 (“This independent action will be assessed in a separate NEPA document.”).

⁴ Section 1.2 (describing the separate NEPA review of a decision to retire sixteen CT units at Johnsonville).

environmental assessments, as well as any other records that may bear on TVA's generation decisions.

- TVA has not yet responded to a November 16, 2021 Freedom of Information Act request for records related to TVA's analysis of gas prices.⁵ The volatility of gas prices and TVA's market analysis are critical for TVA and the public to consider as TVA proposes to build new gas plants.
- The Environmental Protection Agency recently issued a series of significant coal ash proposed determinations and other actions. These actions by EPA have the potential to affect remedial decisions related to coal ash, groundwater, and operations at the Johnsonville Reservation that may have a bearing on the proposal discussed in the Draft EA, including but not limited to the evaluation of cumulative impacts.⁶

Due to the volume, complexity, and absence of relevant information, we respectfully request that TVA extend the deadline by 30 days, with a comment deadline of March 10, 2022. A 30-day comment period extension will ensure that interested parties have a meaningful opportunity to express their concerns.

We appreciate your consideration of this request.

Respectfully submitted,



Trey Bussey
Associate Attorney
Southern Environmental Law Center

Maggie Shober
Research Director
Southern Alliance for Clean Energy

Gabriela Sarri-Tobar
Energy Justice Campaigner
Center for Biological Diversity

Amy Kelly
Tennessee Representative
Sierra Club Beyond Coal Campaign

⁵ Letter from Trey Bussey, SELC, to Denise Smith, TVA, Nov. 16, 2021 (requesting any records, including underlying data and analysis, related to a presentation from TVA staff member Brian Child to the Board on fuel prices, with a particular focus on volatility in gas prices).

⁶ See EPA, "EPA Takes Key Steps to Protect Groundwater from Coal Ash Contamination," Jan. 11, 2022, available at <https://www.epa.gov/newsreleases/epa-takes-key-steps-protect-groundwater-coal-ash-contamination>; see also <https://www.epa.gov/coalash/coal-combustion-residuals-ccr-part-implementation>.

February 8, 2022

VIA EMAIL TO:

Brittany Kunkle
NEPA Specialist
400 West Summit Hill Drive, WT 11B
Knoxville, TN 37902
brkunkle@tva.gov

**Re: Comments on TVA's Draft Environmental Assessment for
the Johnsonville Aeroderivative Combustion Turbine
Project**

Dear Ms. Kunkle:

Southern Environmental Law Center, Appalachian Voices, Energy Alabama, Sierra Club, Center for Biological Diversity, and Southern Alliance for Clean Energy submit these comments on TVA's draft environmental assessment for the proposed Johnsonville aeroderivative combustion turbine plants. We have included forty-five 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-fired power plants balks at that opportunity, proposing to accelerate climate change during the narrow moment remaining to mitigate its worst effects. Rather than provide the clear-sighted analysis necessary to lead the response to the climate crisis, the Draft EA ignores and mischaracterizes the climate change impacts of the proposed gas plants, 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,

s/ Trey Bussey

Trey Bussey
Southern Environmental
Law Center
1033 Demonbreun Street
Suite 205
Nashville, TN 37203
(615) 921-9470
tbussey@selctn.org

s/ Amanda Garcia

Amanda Garcia
Southern Environmental Law
Center
1033 Demonbreun Street
Suite 205
Nashville, TN 37203
(615) 921-9470
agarcia@selctn.org

Gregory Buppert
Southern Environmental
Law Center
201 West Main Street
Suite 14
Charlottesville, VA 22902
(434) 977-4090
gbuppert@selcva.org

Bri Knisley
Appalachian Voices
589 West King Street
Boone, NC 28607
(865) 219-3225
brianna@appvoices.org

Jonathan Levenshus
Sierra Club
50 F Street NW, 8th Floor
Washington, DC 20001
(202) 590-0893
jonathan.levenshus@sierraclub.org

Daniel Tait
Energy Alabama
P.O. Box 1381,
Huntsville, AL 35807
(256) 812-1431
dtait@alcse.org

Zachary Fabish
Sierra Club
50 F Street NW, 8th Floor
Washington, DC 20001
(202) 675-7917
zachary.fabish@sierraclub.org

Maggie Shober
Southern Alliance for Clean
Energy
P.O. Box 1842,
Knoxville, TN 37901
(615) 364-5527
maggie@cleanenergy.org

Gabriela Sarri-Tobar
Center for Biological Diversity
1411 K St. NW, Suite 1300
Washington, D.C. 20005
(202) 849-8401
gsarritobar@biologicaldiversity.org

COMMENTS

I. Introduction

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, low-wealth and Black, indigenous, and other people of color are disproportionately harmed by climate change.² The Tennessee Valley and the Southeast are especially vulnerable.³ For the Valley, 2018 through 2020 were the wettest years in 131 years of record keeping, and 2020 set the single-year record with rainfall 139 percent above normal.⁴ Last year, Humphreys County, where TVA proposes to build a new gas plant, received a record-breaking 17-inches of rainfall in a single day, killing twenty people.⁵ There is broad scientific consensus that

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 (**Att. 1**).

² 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. 2**)

³ *Id.* at 743.

⁴ WBIR Staff, *TVA Calls 2020 the Wettest Year on Record for Tennessee Valley Authority*, WBIR (Jan. 5, 2021), <https://bit.ly/3tg5xo5> (**Att. 3**).

⁵ Brinley Hineman, et al., *Waverly Flooding Victims: Family and Friends Reflect on the Loved Ones Lost*, *Tennessean* (Aug. 25, 2021) <https://www.tennessean.com/in-depth/news/2021/08/25/waverly-tennessee-flooding-victims/8244501002/> (**Att. 4**).

global anthropogenic CO₂ emissions must reach net zero by around 2050 to avoid the worst impacts of climate change.⁶

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.”⁷ 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 Nation resilient in the face of this threat.”⁸ The Executive Order establishes the goals of “net-zero emissions, economy-wide, by no later than 2050”⁹ and “a carbon pollution-free electricity sector no later than 2035.”¹⁰

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.”¹¹ The order reestablishes the Interagency Working Group on the Social Cost of Greenhouse Gases and instructs agencies to “capture the full costs of greenhouse gas emissions as

⁶ Intergovernmental Panel on Climate Change, Summary for Policymakers, IPCC Special Report: Global Warming of 1.5° C, at 6 and 14 (2018), <https://www.ipcc.ch/sr15/chapter/spm/> (Att. 5).

⁷ Exec. Order No. 14008, 86 Fed. Reg. 7619, 7619 (Feb. 1, 2021).

⁸ *Id.* at 7622.

⁹ *Id.*

¹⁰ *Id.* at 7624.

¹¹ Exec. Order No. 13990, 86 Fed. Reg. 7037, 7037 (Jan. 25, 2021).

accurately as possible, including by taking global damages into account.”¹² 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.¹³

In Executive Order 14057, *Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability*, President Biden declared it the “policy of my Administration for the Federal Government to lead by example in order to achieve a carbon pollution-free electricity sector by 2035 and net-zero emissions economy-wide by no later than 2050.”¹⁴ The order requires every agency to “increase its percentage use of carbon pollution-free electricity, so that it constitutes 100 percent of facility electrical energy use on an annual basis” by 2030.¹⁵

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 in Humphreys County, Tennessee.¹⁶ 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 years¹⁷ and requiring extensive new infrastructure like the gas compressor, emergency

¹² *Id.* at 7040.

¹³ *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 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.

¹⁴ Exec. Order No. 14057, 86 Fed. Reg. 70935 (Dec. 13, 2021).

¹⁵ *Id.* at 70936.

¹⁶ TVA, Johnsonville Aeroderivative Combustion Turbine Project Draft Environmental Assessment (Jan. 2022) [hereinafter “Draft EA”].

¹⁷ 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 “Paradise & Colbert CT EA”].

generator, switchyard, and transmission upgrades TVA proposes.¹⁸ 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.

As discussed in Sections II and III, 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 steward¹⁹ for the Tennessee Valley.

II. TVA MUST EVALUATE A CARBON-FREE ALTERNATIVE TO THE PROPOSED GAS PLANTS.

To comply with the National Environmental Policy Act and President Biden’s Executive Orders concerning the climate crisis, the Draft EA must evaluate a carbon-free alternative to the proposed gas plants. As it did for the Paradise and Colbert combustion turbines approved in 2021, TVA eschewed any consideration of clean energy technology with the vague claim that “the combination of renewable energy and storage cannot provide the same magnitude of reliable and cost-effective energy year-round” as the proposed gas plants “in combination with renewables.”²⁰ TVA does not present any information supporting that conclusion, and as we show in these comments, it cannot.

A carbon-free alternative comprised of a combination of solar, battery storage, and demand response resources—a clean energy portfolio—can provide the same reliable, cost-effective energy as the proposed

¹⁸ Draft EA at 9.

¹⁹ 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).

²⁰ Draft EA at 7.

aeroderivative combustion turbines at a competitive cost without climate-warming greenhouse gas emissions. Lagging in each of these carbon-free resources,²¹ TVA has tremendous room for growth. Federal law and a presidential mandate require TVA to consider this alternative in the Draft EA.

A. NEPA and a presidential mandate require TVA to evaluate a carbon-free alternative.

The evaluation of reasonable alternatives is a bedrock requirement of NEPA.²² “[T]o the fullest extent possible[,]” federal agencies must “study, develop, and describe appropriate alternatives” for “any proposal which involves unresolved conflicts concerning alternative uses of available resources.”²³ This requirement applies not only to environmental impact

²¹ Solar and wind provide only three percent of TVA generation. TVA, TVA at a Glance, <https://www.tva.com/about-tva/tva-at-a-glance> (last visited Feb. 7, 2022). TVA’s energy efficiency savings in 2019 were less than three percent of the U.S. average in 2019. Southern Alliance for Clean Energy, *Energy Efficiency in the Southeast* (Jan. 26, 2021), <https://bit.ly/3gcFMBC> (Att. 6). TVA’s demand response programming could increase dramatically. In 2017, demand response provided peak savings of about three percent of the proposed summer peak. Price signals with enabling technology have the ability to function as automated demand response programming and provide median peak demand savings up to 35 percent. U.S. Dep’t of Energy, *Final Report on Customer Acceptance, Retention, and Response to Time-Based Rates from the Consumer Behavior Studies* at viii (Nov. 2016), <https://bit.ly/3zl6xuX> (Att. 7); see also Ahmad Faruqui, et al., *Time-Varying and Dynamic Rate Design*, Regulatory Assistance Project 31-31 (2012), <https://bit.ly/3iy3eee> (Att. 8).

²² 42 U.S.C. § 4332(E); *Save Our Cumberland Mountains v. Kempthorne*, 453 F.3d 334, 346 (6th Cir. 2006) (recognizing an agency’s obligation to consider “reasonable” alternatives).

²³ 42 U.S.C. § 4332(E); *Trinity Episcopal School Corp. v. Romney*, 523 F.2d 88, 93 (2d Cir. 1975) (“[W]here (as here) the objective of a major federal project can be achieved in one of two or more ways that will have differing impacts on the environment, the responsible agent is required to study, develop and describe each alternative for appropriate consideration.”).

statements, but also to environmental assessments.²⁴ Few environmental conflicts are more immediate than the conflict between new gas-fired power plants and the urgent need to end all greenhouse gas emissions to combat the climate crisis.

President Biden’s Executive Orders make clear that a carbon-free alternative is both “reasonable” and “appropriate” for the Draft EA. Executive Order 13990 directs all executive departments and agencies “to *immediately* commence work to confront the climate crisis,”²⁵ and Executive Order 14008 makes achieving “a carbon pollution-free electricity sector no later than 2035” a national priority.²⁶ The president has deployed TVA and all other federal agencies as part of a “Government-wide approach that reduces climate pollution in every sector of the economy . . . and spurs well-paying union jobs and economic growth, *especially through innovation, commercialization, and deployment of clean energy technologies and infrastructure.*”²⁷ Executive Order 14057 further instructs federal agencies “to lead by example in order to achieve a carbon pollution-free electricity sector by 2035. . . .”²⁸ In short, TVA must do its part to achieve immediate and dramatic reductions in greenhouse gas emissions.

TVA cannot brush aside carbon-free energy as a mere general policy choice that the agency is free to ignore.²⁹ Clean energy is squarely within the “ambit” of the president’s executive orders,³⁰ and the president has commanded federal agencies to take immediate action. At a bare minimum, TVA must evaluate a carbon-free alternative comprised of solar, battery storage, and demand response in the Draft EA. These options are feasible: the agency knows how to develop—and indeed already operates—solar, battery storage, and demand response resources.

²⁴ *Bob Marshall Alliance v. Hodel*, 852 F.2d 1223, 1228-29 (9th Cir. 1988).

²⁵ 86 Fed. Reg. at 7037 (emphasis added).

²⁶ 86 Fed. Reg. at 7624.

²⁷ *Id.* at 7622 (emphasis added).

²⁸ 86 Fed. Reg. at 70935.

²⁹ *Save Our Cumberland Mountains*, 453 F.3d at 346-47.

³⁰ *Id.* at 347.

Additionally, TVA will act in an arbitrary and illegal manner if it fails to consider a carbon-free alternative to the proposed gas plants because it has already announced it will consider these alternatives elsewhere. The agency identified a solar-plus-battery storage option as worthy of consideration in two announcements made in 2021. In May 2021, TVA announced that it would evaluate a 1,450-MW solar-plus-battery storage alternative in a draft EIS to replace generation retired at the Cumberland Fossil Plant.³¹ A month later, it made an identical announcement for a draft EIS to replace generation retired at Kingston Fossil Plant.³² TVA seems to want it both ways: solar-plus-battery storage is unreasonable in the Draft EA, but worthy of consideration as an alternative to new combined-cycle gas plants at Cumberland and Kingston. The agency has not offered a rational explanation for this distinction, and we think it cannot.

Further, TVA has committed to electrifying the transportation sector, with a goal to put 200,000 electric vehicles on the road by 2028,³³ and that figure is likely to expand exponentially from there. It is critical that TVA invest in low-cost, energy-saving resources like energy efficiency and demand response to make space for electric vehicles without increasing greenhouse gas emissions. Building gas-fired power generation would waste the carbon gains of electric transportation, trading one fossil fuel for another.

A robust analysis of carbon-free alternatives is also consistent with TVA's 2019 Integrated Resource Plan (IRP). The 2019 IRP emphasizes that the utility must have flexibility: it 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."³⁴ TVA selected *all* of the 2019 IRP results for its final recommendation "to provide flexibility

³¹ 86 Fed. Reg. 25933, 25934 (May 11, 2021) ("TVA plans to consider three action alternatives in the EIS: . . . (C) Retirement of CUF and construction and operation of Solar and Storage Facilities, primarily at alternate locations.").

³² 86 Fed. Reg. 31780, 31781 (June 14, 2021).

³³ TVA, *Electric Vehicles*, <https://www.tva.com/about-tva/tva-at-a-glance> (last visited Feb. 8, 2022).

³⁴ TVA, 2019 Integrated Resource Plan at ES-1(2019) (the "2019 IRP").

for how the future evolves.”³⁵ In other words, the 2019 IRP deferred until later analysis at the individual project stage to gauge the pace, scope, and cost of changes to the energy landscape of the Tennessee Valley and to determine the best manner and resources to address them. It has now been almost three years since the IRP, and important aspects of its analysis are outdated. The Draft EA is the right venue for TVA to undertake the analysis of carbon-free alternatives.

Finally, even if carbon-free alternatives were inconsistent with the 2019 IRP—which they are not—the IRP is a broad planning document and “does not dictate a specific series of actions . . . at particular plants.”³⁶ 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.³⁷ TVA must now evaluate a carbon-free alternative comprised of solar, battery storage, and demand response—a clean energy portfolio—for meeting its purported capacity need.

B. Battery storage is a cost-effective, dispatchable resource that provides the same—or superior—grid reliability and flexibility as the proposed gas plants.

TVA is myopic in its belief that gas is a “bridging” fuel needed to bring carbon-free energy online. The utility says that “solar requires dispatchable

³⁵ *Id.*

³⁶ *Ky. Coal Ass’n, Inc. v. Tenn. Valley Auth.*, 804 F.3d 799, 803 (6th Cir. 2015) (quoting from TVA’s 2011 IRP and holding that TVA acted reasonably when exceeding the IRP’s range of projected coal retirements).

³⁷ *Id.* While significantly increasing distributed energy resources (DER) is consistent with the 2019 IRP, TVA must revisit its analysis of such an increase. The 2019 IRP’s use of a “total resource cost” metric disproportionately inflates TVA’s costs of DER by adding third-party costs. That analysis—which uniquely penalizes carbon-free sources without accounting for their climate benefits—is inconsistent with Executive Order 13990’s requirement that agencies “accurately determine the social benefits of reducing greenhouse gas emissions when conducting cost-benefit analyses of regulatory and other actions.” 86 Fed. Reg. at 7040.

resources,”³⁸ but it only considers peaking gas generation to meet that need. Battery storage, itself a carbon-free technology, can provide the same or superior grid reliability and flexibility as the proposed aeroderivative combustion turbines allowing for the integration of solar or other renewables.

In the 2019 IRP, TVA acknowledged that battery storage provides a wider operating capacity range than aeroderivative combustion turbines, “with essentially equivalent ramp rates for a given nameplate size.”³⁹ For that reason, Greenlink Analytics concluded that “the same 550 MW nameplate capacity of battery storage . . . would be expected to add more flexibility to the system” than the proposed gas plants.⁴⁰ The IRP analysis also shows that the value of flexibility from battery storage is greater than the value from aeroderivative combustion turbines as solar increases on the system.⁴¹ Battery storage can also provide a component of reliability and flexibility that the proposed gas plants simply cannot: the ability to absorb excess generation and avoid curtailment of other resources.⁴² In light of this information, TVA just gets it wrong in the Draft EA: battery storage, alone or in combination with solar or other renewable energy, can provide reliable energy and flexibility to the grid.

Not only can battery storage provide the same or superior services as the proposed gas plants, but it can do so at the same or lower overnight capital costs. In 2021, the National Renewable Energy Lab (“NREL”) calculated the overnight capital costs for four-hour batteries at \$1,037/kW, less than the Energy Information Administration’s (“EIA’s”) reported

³⁸ Draft EA at 7.

³⁹ Matt Cox & Kenneth Sercy, Greenlink Analytics, TVA’s Draft EA for the Johnsonville Aeroderivative Combustion Turbine Project Should Consider Clean Energy Alternatives at 1 (Feb. 8, 2022) (citing 2019 IRP at D-11) (“Greenlink Report”) (**Att. 9**).

⁴⁰ *Id.*

⁴¹ Kerinia Cusick, Center for Renewables Integration, Analysis of TVA’s Johnsonville Environmental Assessment Evaluation of Alternatives at 7-9 (Feb. 2022) (summarizing analysis in the 2019 IRP at D-10 to D-13) (“Cusick Report”) (**Att. 10**).

⁴² *Id.* at 13.

\$1,175/kW for aeroderivative combustion turbines.⁴³ EIA's own 2021 figure for four-hour batteries was \$1,201/kW, only a small fraction higher than the gas plants.⁴⁴ Moreover, overnight capital costs for battery storage have also dropped precipitously, approximately 50%, since 2019, while costs for aeroderivative combustion turbines have increased approximately 40% over the same time period.⁴⁵ Faced with a decarbonization deadline of 2035, TVA's proposed gas plants may also have to deploy carbon capture and sequestration technology which would drive their overnight capital costs even higher to \$2,689/kW. TVA cannot rationally rule out battery storage as a reasonable alternative on the basis of these costs.

Battery storage is also competitive with aeroderivative combustion turbines in EIA's levelized cost of energy analysis.⁴⁶ For the frame combustion turbines proposed at Colbert and Paradise, TVA used EIA's 2021 overnight capital costs data for the conclusion that "battery storage system costs are over 60% higher than Frame-type CTs with less than half the service life."⁴⁷ But the agency never acknowledged the substantial costs associated with combustion turbines that are not included in an overnight capital costs comparison.⁴⁸ Overnight costs do not include operating costs,

⁴³ Greenlink Report at 2.

⁴⁴ Cusick Report at 9-10; U.S. Energy Info. Admin., Electricity Market Module 7 (Feb. 2021), <https://www.eia.gov/outlooks/aeo/assumptions/pdf/electricity.pdf> (Att. 11)

⁴⁵ Cusick Report at 10.

⁴⁶ *Id.* at 11-13; U.S. Energy Info. Admin., Levelized Costs of New Generation Resources in the *Annual Energy Outlook 2021* (Feb. 2021), https://www.eia.gov/outlooks/aeo/pdf/electricity_generation.pdf (Att. 12).

⁴⁷ Paradise & Colbert CT EA, App. A at Comment No. 30.

⁴⁸ *Id.*; see also *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989); *NRDC v. U.S. Forest Serv.*, 421 F.3d 797, 811-814 (9th Cir. 2005)(misleading economic information did not "allow an informed comparison of the alternatives" by the agency or the public); *Hughes River Watershed Conservancy v. Glickman*, 81 F.3d 437, 446-48 (4th Cir. 1996)(inflated estimate of recreation benefits of proposed reservoir "impaired fair consideration" of its adverse impacts); *High Country Conservation*

like maintenance or, more significantly, the cost of fuel which may increase over time.⁴⁹ They also do not include the costs of greenhouse gas emissions that contribute to climate change, a cost which TVA has refused to calculate in the EA. A levelized cost of energy analysis incorporates many of these factors to provide a more complete, apples-to-apples comparison of different technologies. Again using 2021 data from EIA, the levelized cost of energy for battery storage is within 10% of the levelized cost of energy for aeroderivative combustion turbines.⁵⁰ EIA is set to release new data in March 2022, and we expect battery storage to pull even with, or be more cost-effective, than aeroderivative combustion turbines on a levelized cost of energy basis.

Other utilities have recognized the cost-effective services provided by carbon-free technology, like solar paired with battery storage. In a recent proceeding, TVA's sister utility, Alabama Power, sought approval for 400 MW of solar generation paired with batteries (solar/storage projects) specifically to increase reliability and flexibility in the utility's system. The company told the Commission that the utility chose battery storage because it "will serve a specific reliability function in the Company's generating fleet," would help during peak periods, and would be as effective as other projects in extreme weather events.⁵¹ Furthermore, the proposed solar/storage systems were cost-effective: Alabama Power described them as "economically attractive" compared to other existing resources and as "the most cost-effective options

Advocates v. U.S. Forest Serv., 52 F.Supp.3d 1174 (D.Colo. 2014)(invalidating EIS that quantified benefits but not costs of coal mining lease).

⁴⁹ We note that TVA has taken the position that "volatility of gas prices . . . is not the kind of information used by TVA in the analysis" for the proposed gas plants at Johnsonville. Letter from Brittany Kunkle, TVA, to Trey Bussey, SELC, at 1 (Jan. 28. 2022).

⁵⁰ Cusick Report at 13.

⁵¹ Rebuttal Testimony of M. Brandon Looney on behalf of Alabama Power Co. at 7:3-5, *Ala. Power Co. Petition for a Certificate of Convenience and Necessity*, Docket No. 32953 (Ala. P.S.C. Jan. 27, 2020) (**Att. 13**); Hr'g Tr. at 832:16–833:2, *Ala. Power Co. Petition for a Certificate of Convenience and Necessity*, Docket No. 32953 (Ala. P.S.C. Mar. 10, 2020) (**Att. 14**).

in [the Company's] evaluation" that would "provide excellent value for customers." ⁵²

Alabama Power's expectations for the function and cost of solar/storage projects are consistent with those of other power providers in the region. In its September 2020 Investor Presentation, NextEra Energy reported an expectation that solar/storage facilities would be cost-competitive with new gas post-2023/2024 without subsidies.⁵³ According to analysts at the Institute for Energy Economics and Financial Analysis, solar/storage projects are cost-competitive with gas now and the costs "are almost certain to decline in the years ahead."⁵⁴ NextEra itself reported to investors that "[c]ontinued declines in battery costs are expected to result" in low costs for solar/storage "even after tax credits phase down."⁵⁵ The company planned to invest more than \$1 billion in battery storage projects in 2021.⁵⁶ As other utilities have recognized, there is no need to wait to bring renewables online: economically and technologically, carbon-free sources like solar/storage are ready now.

TVA's restricted analysis also does not track the evolving facts on the ground. In 2020, TVA announced two battery storage projects, including a

⁵² Direct Testimony of John B. Kelley on behalf of Alabama Power Co. at 19:5-7, *Ala. Power Co. Petition for a Certificate of Convenience and Necessity*, Docket No. 32953 (Ala. P.S.C. Sept. 6, 2020) (**Att. 15**); Rebuttal Testimony of M. Brandon Looney on behalf of Ala. Power Co. at 4:3-5, 7:3-4, *Ala. Power Co. Petition for a Certificate of Convenience and Necessity*, Docket No. 32953 (Ala. P.S.C. Jan. 27, 2020).

⁵³ NextEra Energy, Inc., September 2020 Investor Presentation 10 (Sept. 2020), <https://bit.ly/2TcEUnH> (**Att. 16**); Dennis Wamstead, Seth Feaster & David Schlissel, Institute for Energy Economics and Financial Analysis, U.S. Power Sector Outlook 2021 (Mar. 2021), <https://bit.ly/3xDIdDo> (**Att. 17**).

⁵⁴ Dennis Wamstead et al., U.S. Power Sector Outlook, *supra* n. 53, at 10-12.

⁵⁵ NextEra Energy, Inc., September 2020 Investor Presentation, *supra* n. 53, at 27.

⁵⁶ *Id.* at 28.

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).⁵⁷

C. Demand-side resources, like energy efficiency and demand-side management, are important, low-cost components of a carbon-free alternative.

TVA cannot lawfully ignore energy efficiency and demand response technologies in its analysis which are important, low-cost components of a clean energy portfolio alternative. The TVA Act requires the utility to consider energy efficiency and “to treat demand and supply resources on a consistent and integrated basis.”⁵⁸ TVA knows how cost-effective these resources are. In its own sensitivity analysis in the 2019 IRP, when artificial caps are removed, the planning model picks energy efficiency and demand response instead of new gas generation.⁵⁹ Specifically, the sensitivity analysis revealed that 1900 MW of energy efficiency and demand response displaces the need for new gas-fired combustion turbines like the plants proposed in TVA’s Alternative B.⁶⁰ The 2019 IRP also identifies demand response as a technology with the potential to provide the same reliability and flexibility as gas plants generally.⁶¹ Finally, TVA’s CEO Jeffrey Lyash recently told Members of Congress that the utility is on track to complete its “Energy Programs Potential Study” this year assessing “regional opportunities for

⁵⁷ 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>.

⁵⁸ 16 U.S.C. § 831m-1(b)(2).

⁵⁹ TVA, 2019 IRP Working Group Presentation 52-57 (May 13, 2019) (Att. 17a).

⁶⁰ *Id.* at 55.

⁶¹ 2019 IRP ES-1 (“Gas, storage and demand response additions provide reliability and/or flexibility.”).

influencing electric load through various programs, such as energy efficiency, demand response, and electrification.”⁶²

III. TVA MUST RECONSIDER THE NO-ACTION ALTERNATIVE.

One factor identified in the 2019 IRP—changes in the “demand for electricity”⁶³—raises significant questions about the need to build the proposed gas plants in the first place. In the purpose and need section of the Draft EA, TVA states that the “Aero CTs are needed to ensure TVA maintains a reliable peaking fleet and would enhance system flexibility by facilitating the integration of intermittent renewable resources.”⁶⁴ But it is far from clear that TVA needs this capacity *at all*, which would be another 550 MW of fossil-fuel 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.⁶⁵ TVA also maintains a large reserve margin, one that is substantially larger than that recommended by the North American Electric Reliability Corporation to

⁶² Letter from Jeffrey J. Lyash, TVA, to U.S. House of Representatives, Committee on Energy and Commerce at 4 (Feb. 2, 2022) (**Att. 18**).

⁶³ *Id.* at ES-4.

⁶⁴ Draft EA at 3.

⁶⁵ 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/3l5Rqiv> (“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**).

maintain reliability,⁶⁶ and expects demand “to be flat, or even declining slightly, over the next 10 years.”⁶⁷

In addition, demand for TVA power may decline further because customers may terminate their power supply contracts with the utility. These customers include local utilities that filed a petition with the Federal Energy Regulatory Commission for unbundled access to TVA’s transmission grid.⁶⁸ FERC denied this petition, but the appeal period for that decision has not closed.⁶⁹ TVA’s largest customer, Memphis Light, Gas & Water, representing 10 percent of TVA’s load, is actively considering other power supply options.⁷⁰ TVA is of course well aware that it may serve fewer distribution utility customers in the future and accordingly may have significantly lower demand. Indeed, TVA has been so concerned about the defection of its distribution utility customers and the corresponding load loss that, in 2019, it made a significant change in its power supply contracts in an attempt to permanently lock in as much of its load as possible.⁷¹

Yet another development potentially affecting demand that TVA must evaluate is the recently established Southeast Energy Exchange Market

⁶⁶ N. Am. Electric Reliability Corp., *2020 Long-Term Reliability Assessment* 117 (Dec. 2020), <https://bit.ly/3qFPBdh> (Att. 22).

⁶⁷ 2019 IRP 1-4.

⁶⁸ 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).

⁶⁹ One of the four petitioning local power companies has signed a long-term power supply contract with TVA. Two petitioned FERC to reconsider its denial of the petition. By failing to act within 30 days, FERC effectively denied the petition for reconsideration. Currently, the local power companies have the opportunity to appeal FERC’s decision to federal court.

⁷⁰ Samuel Hardiman, *With Council Vote, Memphis Decides to Get Bids on Its Electricity Supply, a Key Step to Leaving TVA*, Memphis Commercial Appeal (April 6, 2021), <https://bit.ly/3w8pTl4> (Att. 23).

⁷¹ Two 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).

(SEEM), approved by Federal Energy Commission last year.⁷² SEEM was not part of TVA's 2019 IRP. The Draft EA must analyze whether SEEM could provide an alternative to building new generation at Johnsonville.

Finally, TVA's proposal for new aeroderivative combustion turbines at Johnsonville is out-of-sync with its plans for new solar generation. TVA appears to be fortifying its system for new solar generation that the agency has not yet proposed, and, if and when it does propose new solar, TVA will pair the new solar with new battery storage. The Draft EA says this specifically: TVA plans to add "10,000 megawatts (MW) of solar by 2035 to meet customer demands and system needs, *complemented with storage*."⁷³ In other words, TVA's claimed need for the proposed gas plants may be supplanted by its own plans for new solar generation.

These developments, and their implication that TVA has and may continue to have excess generating capacity and that it will bring new renewables online with dispatchable battery storage, are specifically the types of changes in the energy landscape that TVA pledged to evaluate in its 2019 IRP.⁷⁴ They raise serious questions about TVA's need for new aeroderivative combustion turbines at the Johnsonville site, and TVA must reconsider the no-action alternative in light of these factors.

IV. TVA MUST FULLY ASSESS THE IMPACTS OF THE PROPOSED ACTION AND ALL ALTERNATIVES ON THE ENVIRONMENT.

A. TVA must apply long-standing NEPA law.

Rather than rely on the illegal, short-lived regulations from 2020, TVA must apply National Environmental Policy Act (NEPA) and CEQ's implementing regulations that have served agencies, courts, and the public since 1978. NEPA requires TVA to take a hard look at the environmental

⁷² Southeast Energy Exchange Market, <https://southeastenergymarket.com/> (last visited Feb. 8, 2022).

⁷³ Draft EA at 1 (emphasis added).

⁷⁴ 2019 IRP ES-3.

effects of major federal actions.⁷⁵ NEPA has “twin aims”: an agency must “consider every significant aspect of the environmental impact of a proposed action”⁷⁶ and “inform the public” that it has fully considered those impacts during the decision-making process.⁷⁷ The statute also established the Council on Environmental Quality (CEQ),⁷⁸ which promulgated regulations in 1978 (1978 Regulations) to detail how agencies can fulfill those obligations.⁷⁹ With few changes, the 1978 Regulations guided NEPA review until 2020. Then, CEQ promulgated new regulations (2020 Regulations) that sought to drastically limit the scope of NEPA review.⁸⁰

Because the Johnsonville Combustion Turbine EA is closely related to decisions that predate the 2020 Regulations’ effective date, TVA must apply the 1978 Regulations. As CEQ recognizes, the 2020 Regulations are unlawful, in part because they fail to “effectuate NEPA’s statutory requirements and purposes.”⁸¹ They are being challenged in federal court,⁸² and CEQ has already proposed to “generally restore” the 1978 Regulations.⁸³ Rather than rely on a short-lived, unlawful set of rules, TVA should comply with NEPA by applying the statute and the long-standing 1978 Regulations that interpret it.

⁷⁵ *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989).

⁷⁶ *Baltimore Gas & Elec. Co. v. NRDC*, 462 U.S. 87, 97 (1983) (cleaned up).

⁷⁷ *Id.* (cleaned up).

⁷⁸ 42 U.S.C. § 4342.

⁷⁹ 43 Fed. Reg. 55978 (Nov. 29, 1978).

⁸⁰ CEQ, *National Environmental Policy Act Implementing Regulations Revisions*, 86 Fed. Reg. 55757, 55759 (Oct. 7, 2021) (“It is CEQ’s view that the 2020 NEPA Regulations may have the effect of limiting the scope of NEPA analysis, with negative repercussions for environmental protection and environmental quality, including in critical areas such as climate change and environmental justice.”) [hereinafter “2021 CEQ Proposed Rulemaking”].

⁸¹ 2021 CEQ Proposed Rulemaking at 55759.

⁸² *Wild Virginia v. Council on Environmental Quality*, No. 21-1839 (4th Cir. appeal filed Aug. 2, 2021).

⁸³ 2021 CEQ Proposed Rulemaking at 55757.

Even if the 2020 Regulations were valid, they would not apply here. The 2020 Regulations apply “to any NEPA process” begun after September 14, 2020.⁸⁴ Both the 1978 and 2020 Regulations define the “NEPA process” as “all measures necessary for compliance with the requirements of section 2 and title I of NEPA.”⁸⁵ That section requires agencies to issue “detailed statements” on “major Federal actions significantly affecting the quality of the human environment.”⁸⁶ To do so, agencies must assess environmental impacts and alternatives, balance short-term uses and long-term productivity, and identify commitments of agency resources.⁸⁷

The proposal to build new gas plants at the Johnsonville Reservation is inextricably linked to three TVA actions that predate the 2020 Regulations: the 2019 Integrated Resources Plan (2019 IRP), the Combustion Turbine Modernization Study, and the Paradise & Colbert Combustion Turbine Environmental Assessment. As a justification for the current proposal to build new gas plants on the Johnsonville Reservation, TVA cites the 2019 IRP: “The installation of the 10 Aero CT units is part of the implementation of the 2019 IRP.”⁸⁸ In discussing the purpose and need of the project, as well as the development of the single action alternative, TVA also cites the 2019 Combustion Turbine Modernization Study.⁸⁹ That study “recommended adding approximately 500-650 MW of new Aero CTs,”⁹⁰ and it expressly identified the Johnsonville Reservation as the likely site of those CTs.⁹¹ That

⁸⁴ 40 C.F.R. § 1506.13 (2020).

⁸⁵ 40 C.F.R. § 1508.1(t) (2020); 40 C.F.R. § 1508.21 (1978).

⁸⁶ 42 U.S.C. § 4332(C).

⁸⁷ *Id.* § 4332(C)(i)–(iii).

⁸⁸ Draft EA at 33. *See also id.* at 1 (“As part of the IRP, TVA identified the gas fleet, including combustion turbines (CTs), as playing a critical role in providing the flexibility needed to integrate renewable energy generation and promote distributed energy resources . . .”).

⁸⁹ *Id.* at 2–3.

⁹⁰ *Id.* at 3.

⁹¹ TVA, Aging Fossil Unit Evaluation: Oldest Combustion Turbines (CT) at 13 (Aug. 2019) (“Johnsonville is the best site for Aero CT installation.”) [hereinafter “CT Modernization Study”].

same study recommended actions TVA decided to carry out in a prior NEPA process: retire older CTs from Johnsonville, and build new frame CTs in Paradise and Colbert.⁹² TVA applied the 1978 Regulations to the Paradise & Colbert Combustion Turbine Environmental Assessment because “TVA began [the] EA before CEQ’s revised NEPA regulations . . . became effective.”⁹³

As discussed in Section IV.B, the actions proposed by TVA in these two environmental assessments are connected actions, as they rely on the same 2019 Combustion Turbine Modernization Study for their justification, and TVA could not or would not carry out the current proposal before carrying out the proposal in the Paradise & Colbert Combustion Turbine EA. TVA identified the purpose, need, and alternatives for both EAs contemporaneously, well before the 2020 Regulations went into effect. Because the 2020 Regulations are unlawful and the “NEPA process”⁹⁴ for this proposal began in 2019, TVA must apply the 1978 Regulations. In any case, regardless of whether TVA applies the 2020 or 1978 Regulations, the agency must comply with the statute and its own NEPA implementing regulations.

B. TVA must analyze impacts from closely related actions in its gas buildout.

TVA has failed to analyze and disclose the true impacts of its gas buildout by improperly segmenting its NEPA review of closely related gas proposals at Johnsonville, Paradise, and Colbert. In last year’s Paradise and Colbert Combustion Turbine Environmental Assessment, TVA reviewed a proposal to retire Johnsonville CT Units 1-16 and replace them with new CTs at sites in Paradise, Kentucky and Colbert, Alabama.⁹⁵ Here, TVA proposes new CTs at Johnsonville. Nowhere has TVA considered and disclosed the combined effects of the two proposals, which jointly result in 2,000

⁹² CT Modernization Study at 11 (“Refurbishment capital spend exceeds the new source threshold for Allen CT Plant and Johnsonville Units 1-16, pointing to retirement and replacement of these units.”).

⁹³ Paradise & Colbert CT EA at 4.

⁹⁴ 40 C.F.R. § 1508.1(t) (2020); 40 C.F.R. § 1508.21 (1978).

⁹⁵ Paradise & Colbert CT EA at 9–21.

megawatts of new fossil fuel-fired power plants and significant investment in new supporting infrastructure.

NEPA requires agencies to consider connected actions in a single environmental impact statement.⁹⁶ Actions are connected when they:

- (i) Automatically trigger other actions that may require environmental impact statements;
- (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously; or
- (iii) Are interdependent parts of a larger action and depend on the larger action for their justification.⁹⁷

An agency cannot segment NEPA review of federal projects that are “connected, contemporaneous, closely related, and interdependent.”⁹⁸

TVA’s proposal to build new gas units in Johnsonville is closely connected to the Paradise & Colbert Combustion Turbine Environmental Assessment. The two proposals are interdependent parts of the same program. Using identical language, TVA has justified both decisions 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.”⁹⁹ 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.”¹⁰⁰ The same study recommended replacing those retiring units with new frame CTs at Paradise and Colbert, as well as adding 500-650 MW of new aeroderivative CT units at Johnsonville.¹⁰¹

⁹⁶ 40 C.F.R. 1501.9(e) (2020); 40 C.F.R. § 1508.25(a)(1) (1978).

⁹⁷ 40 C.F.R. § 1501.9(e)(1) (2020); 40 C.F.R. § 1508.25(a)(1) (1978).

⁹⁸ *Del. Riverkeeper Network v. FERC*, 753 F.3d 1304, 1307 (D.C. Cir. 2014).

⁹⁹ Draft EA at 2; Colbert & Paradise EA at 1.

¹⁰⁰ Paradise and Colbert CT EA at 2; CT Modernization Study at 13.

¹⁰¹ CT Modernization Study at 13–14.

The same study made recommendations about the same generation resource at the same site: retire old CT units and build new ones at Johnsonville. What's more, the study highlighted the need to retire old CTs *before* adding new ones at Johnsonville. While identifying Johnsonville as a promising site for new CTs, the CT Modernization Study noted there would be “[a]ir permit and transmission outage completion risk *prior to* [Johnsonville Combustion Turbine Units 1 – 16] retirement.”¹⁰²

Retiring old CT units at Johnsonville and building new CT units at Johnsonville, Paradise, and Colbert are closely connected actions. They are interdependent parts of a larger action—the Combustion Turbine Modernization program—and they expressly depend on that program for their justification. Further, the Johnsonville CT proposal could not or would not proceed until Johnsonville CT units 1–16 retire. Because these actions are connected, TVA must evaluate them together to “address the true scope and impact of the activities that should be under consideration.”¹⁰³

C. TVA must accurately disclose the greenhouse gas emissions and climate impacts of new gas plants.

There is no action that contributes more significantly to climate change than building major fossil-fuel infrastructure like a new gas-fired power plant. Because “[t]he harms associated with climate change are serious and well recognized,”¹⁰⁴ carefully considering the proposed gas plant's climate impacts is critical to NEPA review.¹⁰⁵ TVA must capture the full cost of its proposal by applying the Social Cost of Greenhouse Gases. TVA ignored upstream methane emissions, as well as the significance of adding decades of greenhouse gas emissions in light of national and international decarbonization efforts. Finally, TVA must address the unresolved conflicts

¹⁰² CT Modernization Study at 13 (emphasis added).

¹⁰³ *Del. Riverkeeper Network v. FERC*, 753 F.3d 1304, 1313 (D.C. Cir. 2014).

¹⁰⁴ *Massachusetts v. EPA*, 549 U.S. 497, 521 (2007).

¹⁰⁵ *See Sierra Club v. FERC*, 867 F.3d 1357, 1374 (D.C. Cir. 2017) (holding that FERC must analyze the climate change effects for a project whose purpose was to burn gas in power plants).

between its proposal and federal policy on climate change and environmental justice embodied in President Biden's executive orders.

1. TVA must apply the Social Cost of Greenhouse Gases.

TVA must accurately quantify and consider the greenhouse gas emissions associated with the proposed combustion turbine gas units. Associated emissions must account for burning gas and leaking methane, whether onsite or upstream.¹⁰⁶ TVA should quantify those impacts using the Social Cost of Carbon, Methane, and Nitrous Oxide. 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.”¹⁰⁷ The Social Cost of Carbon translates a one-ton increase in CO₂ emissions into changes in atmospheric greenhouse gas concentrations, consequent changes in temperature, and resulting economic damages.¹⁰⁸ Those harms include “changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services.”¹⁰⁹ The current values, which adjust the 2016 values for inflation, estimate that every additional ton of CO₂ released from anywhere on Earth will cause an approximately \$51 in climate damages.¹¹⁰ The Interagency Working Group has also published values for the Social Cost of Methane and the Social Cost of Nitrous Oxide, both consistent with the

¹⁰⁶ Benjamin Storrow, Methane Leaks Erase Some of the Climate Benefits of Natural Gas, *Scientific American* (May 5, 2020), <https://bit.ly/3ixdumX> (Att. 24).

¹⁰⁷ *Fla. Se. Connection, LLC*, 162 FERC ¶ 61,233, at P 45 (Mar. 14, 2018).

¹⁰⁸ See Interagency Working Group on the Social Cost of Carbon, *Technical Support Document* at 2, 5 (Feb. 2010), available at <https://bit.ly/2TRF185> (Att. 25).

¹⁰⁹ *Id.* at 2.

¹¹⁰ Interagency Working Group on Social Cost of Greenhouse Gases, *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990* at 5 (2021), <https://bit.ly/3xedCvG> (Att. 26); Jean Chemnick, *Cost of Carbon Pollution Pegged at \$51 a Ton*, *Scientific American* (Mar. 1, 2021), <https://bit.ly/35cDPys> (Att. 27).

methodology underlying the Social Cost of Carbon.¹¹¹ The Social Cost of Methane is \$1,500 per ton¹¹²—nearly 30 times greater than the cost of carbon, accounting for methane’s increased potency as a greenhouse gas. Not only will the Social Costs of Greenhouse Gases convey the harms of new gas plants, but they allow TVA to incorporate the social benefits of reducing greenhouse gas emissions¹¹³ for evaluating carbon-free alternatives.

Executive Order 13990 instructs federal agencies to use the Social Cost of Carbon,¹¹⁴ which has been widely endorsed by economists and scientists,¹¹⁵ as well as the Social Costs of Methane and Nitrous Oxide, which are based on the same methodology. The Social Costs of Carbon, Methane, and Nitrous Oxide are 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.

TVA’s refusal to use these tools is baseless and deprives the public and the agency of essential information. TVA gives four reasons to flout President Biden’s order: (1) there is a “lack of consensus on the appropriate discount rate”; (2) the Social Cost of Carbon does not measure “actual incremental impacts”; (3) there are no criteria to determine when monetary climate

¹¹¹ Interagency Working Group on Social Cost of Greenhouse Gases, Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990 at 2 (2021).

¹¹² *Id.* at 5.

¹¹³ *Id.* at 1.

¹¹⁴ Exec. Order 13990 at 7040.

¹¹⁵ See Nat’l Acads. Sci., Eng’g & Med., *Valuing Climate Damages: Updating Estimates of the Social Cost of Carbon Dioxide* 3, 10–17 (2017), <https://bit.ly/3xenxBq> (Att. 28); 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), <https://bit.ly/3gt3AQz> (Att. 29); Richard L. Revesz et al., *Best Cost Estimate of Greenhouse Gas*, 357 Science 655 (2017) (Att. 30).

damages are significant for NEPA purposes; and (4) the Social Cost of Carbon does not account for system-wide emissions reductions.¹¹⁶

Despite TVA's contentions, the Interagency Working Group on the Social Cost of Greenhouse Gases has found a broad consensus among economists that use of a consumption-use discount rate¹¹⁷ of 3% or lower is appropriate for evaluating climate impacts.¹¹⁸ TVA cites no evidence to the contrary and ignores the Interagency Working Group's finding.

TVA's objection that these tools do not represent "actual environmental impacts" misrepresents TVA's NEPA obligations and the nature of climate change.¹¹⁹ As the Council on Environmental Quality has acknowledged, "[c]limate change is a particularly complex challenge given its global nature and the inherent interrelationships among its sources, causation, mechanisms of action, and impacts."¹²⁰ NEPA does not allow agencies to give up when facing uncertainty. Agencies must analyze and disclose "*reasonably foreseeable*" environmental effects.¹²¹ When information is incomplete or

¹¹⁶ Draft EA at 32.

¹¹⁷ A discount rate "can tell us how much future benefits and costs are worth today." EPA, *Guidelines for Preparing Economic Analysis* (Dec. 2010), <https://www.epa.gov/sites/default/files/2017-09/documents/ee-0568-06.pdf> (**Att. 31**). A lower rate results in more similar present and future values, while higher rates lead to greater disparities between present and future values.

¹¹⁸ Interagency Working Group on Social Cost of Greenhouse Gases, Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990 at 17 (2021) ("[T]he latest data as well as recent discussion in the economics literature indicates that the 3 percent discount rate used by the IWG to develop its range of discount rates is likely an overestimate of the appropriate discount rate").

¹¹⁹ Draft EA at 32.

¹²⁰ 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 2 (2016) (**Att. 32**).

¹²¹ 42 U.S.C. 4332(C); 40 C.F.R. § 1508.1(g) (2020); 40 C.F.R. § 1508.8 (1978).

unavailable, agencies must evaluate “such impacts based upon theoretical approaches or research methods generally accepted in the scientific community.”¹²² The Social Costs of Carbon, Methane, and Nitrous Oxide provide TVA with generally accepted approaches to fulfill their NEPA obligations and President Biden’s order to “capture the full costs of greenhouse gas emissions *as accurately as possible*, including by taking global damages into account.”¹²³

The fact that there is no numeric significance threshold for climate costs in NEPA review is true of every environmental effect. Significance is a multi-factor determination,¹²⁴ and there is no magic number for any kind of impact, whether that’s acres of forest lost, gallons of wastewater discharged, or metric tons of methane emitted. As with local water, land, and air impacts, it remains both useful and essential to estimate the climate impacts of building new fossil fuel plants.

Finally, TVA objects that the Social Cost of Carbon does not account for “system-wide” emissions reductions.¹²⁵ TVA’s speculative assurance that it will someday add renewables has no bearing on whether this gas plant will emit greenhouse gas pollution. NEPA requires TVA to analyze the impacts of *this* proposal. TVA is not “excused from making emissions estimates just because the emissions in question might be partially offset by reductions elsewhere.”¹²⁶

2. TVA understates the climate impacts of building a new gas plant.

By ignoring upstream methane emissions, lifecycle greenhouse gas emissions, and a rapidly decarbonizing economy, TVA fails to address full climate impacts of its proposal to build new fossil fuel infrastructure.

¹²² 40 C.F.R. § 1502.21 (2020).

¹²³ Exec. Order 13990 at 7040 (emphasis added).

¹²⁴ The 1978 Regulations provide that “significance” accounts for context and intensity. Intensity alone has ten factors. 40 C.F.R. 1508.27 (1978).

¹²⁵ Draft EA at 32.

¹²⁶ *Sierra Club v. FERC*, 867 F.3d 1357, 1374–75 (D.C. Cir. 2017).

a. TVA must analyze upstream methane emissions.

TVA has entirely failed to discuss upstream methane emissions, despite the critical role of methane in the climate crisis. Methane (CH₄), the main component of natural gas, is a highly potent greenhouse gas and contributor to air pollution. Over a 20-year period, it is 84 to 87 times more climate-forcing—that is, more powerful at warming the atmosphere—than carbon dioxide.¹²⁷ Because methane remains in the atmosphere for a relatively short period—about 12 years compared to carbon dioxide’s hundreds of years¹²⁸—aggressive reduction of methane emissions is essential to slowing the rate of global warming in the near term, forestalling some of the worst effects of climate change. In addition to contributing to climate change, methane is the primary contributor to ground-level ozone,¹²⁹ a greenhouse gas and hazardous air pollutant that causes an estimated 500,000 premature deaths per year¹³⁰ and is the primary component of urban smog.¹³¹

Gas infrastructure releases massive amounts of methane. The extraction, processing, and distribution of oil and gas makes up 23% of global methane emissions.¹³² Recent studies reveal that leaks and intentional

¹²⁷ EPA, *Understanding Global Warming Potentials*, <https://www.epa.gov/ghgemissions/understanding-global-warming-potentials#Learn%20why> (Att. 33).

¹²⁸ International Energy Agency, *Methane and Climate Change*, Methane Tracker, <https://www.iea.org/reports/methane-tracker-2021/methane-and-climate-change> (Att. 34).

¹²⁹ Climate & Clean Air Coalition, *Tropospheric Ozone*, <https://www.ccacoalition.org/en/slcps/tropospheric-ozone> (Att. 35). Ground-level ozone is also known as tropospheric ozone. *Id.* Tropospheric ozone should not be confused with stratospheric ozone, the ozone layer higher in the atmosphere that protects the Earth from the sun’s ultraviolet rays. *Id.*

¹³⁰ U.N. ENV’T PROGRAMME, GLOBAL METHANE ASSESSMENT 11 (2021), <https://bit.ly/2TanDvg> (Att. 36).

¹³¹ *Id.*

¹³² U.N. Env’t Programme, Global Methane Assessment 11 (2021), <https://bit.ly/2TanDvg>.

releases—known as venting—release much more methane than previously thought.¹³³ Recent studies also suggest that EPA’s inventory method significantly underestimates methane releases from U.S. oil and gas infrastructure,¹³⁴ corroborating results from a study published in *Science* in 2018 showing the actual supply chain emissions were more than 60% higher than the EPA inventory estimate.¹³⁵

NEPA requires agencies to analyze reasonably foreseeable greenhouse gas emissions.¹³⁶ From the wellfields to the pipelines to the plant, the infrastructure servicing the Johnsonville combustion turbines will substantially increase methane emissions. As President Biden has emphasized, “We have a narrow moment to pursue action at home and abroad in order to avoid the most catastrophic impacts of [the climate] crisis and to seize the opportunity that tackling climate change presents.”¹³⁷ Yet TVA proposes to substantially increase use of the most potent greenhouse gas during this critical moment in the climate crisis. In so doing, TVA significantly underestimates the climate impacts of its proposed gas plant by entirely ignoring upstream methane emissions.

b. TVA’s “significance” conclusion is baseless.

TVA has no rational basis to conclude that the climate impacts from a new gas plant would be insignificant. Without accounting for upstream methane emissions and lifecycle greenhouse gas emissions, TVA estimates

¹³³ Alejandra Borunda, *Natural Gas Is a Much “Dirtier” Energy Sources than We Thought*, NAT’L GEOGRAPHIC (Feb. 19, 2020), <https://on.natgeo.com/3nYGJ4T> (Att. 37).

¹³⁴ Zachary D. Weller et al., *A National Estimate of Methane Leakage from Pipeline Mains in Natural Gas Local Distribution Systems*, 54 ENVTL. SCI. & TECH. 8958 (2020) (Att. 38); Genevieve Plant et al., *Large Fugitive Methane Emissions from Urban Centers Along the U.S. East Coast*, 46 GEOPHYSICAL RESEARCH LETTERS 8500 (July 2019), available at <https://doi.org/10.1029/2019GL082635> (Att. 39).

¹³⁵ Alvarez et al., *Assessment of Methane Emissions from the U.S. Oil and Gas Supply Chain*, 361 SCI. 186, 186 (June 21, 2018) (Att. 40).

¹³⁶ *Sierra Club v. FERC*, 867 F.3d 1357, 1374 (D.C. Cir. 2017).

¹³⁷ Exec. Order 14008 at 7619.

“the increase in potential emissions of 1,141,195 metric tons of CO₂e per year associated with the operation of the proposed CTs and emergency generator would represent approximately 1.1 percent of total statewide emissions, approximately 0.02 percent of the total U.S. emissions, and 0.002 percent of the estimated 44.5 billion metric tons of total global GHG emissions for 2019.”¹³⁸ Based on those figures, TVA concludes that the proposal’s greenhouse gas emissions “would represent a less than significant contribution to state, national, and global GHG emissions.”¹³⁹

First, TVA fails to explain *why* those percentages are insignificant. If building a new fossil fuel plant in 2024 does not significantly worsen the climate crisis, what does? TVA must “explain the benchmark for its determination of insignificance in relation to [the] environmental danger” of climate change.¹⁴⁰

Second, those figures are based solely on 2019 emissions rates. Thus, TVA assumes greenhouse gas emissions will remain stable during the useful life of the plant. TVA has run some of its current combustion turbine plants for more than forty years,¹⁴¹ yet TVA fails to discuss the total greenhouse gas emissions over the lifetime of the new gas plant. Paris Agreement signatories, including the United States, have committed to slowing global warming to well under 2°C above pre-industrial temperatures, requiring immediate, aggressive cuts to greenhouse gas emissions.¹⁴² The President has set national goals to decarbonize the economy by 2050 and the electric grid by

¹³⁸ Draft EA at 32.

¹³⁹ Draft EA at 32.

¹⁴⁰ *Center for Biological Diversity v. NHTSA*, 538 F.3d 1172, 1224–25 (9th Cir. 2008) (internal quotation omitted).

¹⁴¹ CT Modernization Study at 8 (“About one-third of the CT fleet is at least 40 years old . . .”).

¹⁴² United Nations, Paris Agreement, Art. 2, Section 1(a) (aiming to hold the increase in global average temperature to “well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change”).

2035.¹⁴³ By going online in 2024, the Johnsonville gas plant will account for a drastically higher percentage of state, national, and global greenhouse gas emissions over the decades to come. TVA must analyze these emissions in light of the national and international decarbonization efforts.

3. TVA must address unresolved conflicts with President Biden's Executive Orders.

TVA must address the conflict between its proposal to build new gas plants and federal decarbonization policies. NEPA regulations require agencies to discuss “[p]ossible conflicts between the proposed action and the objectives of Federal” plans and policies.¹⁴⁴ By executive order, President Biden has established a clear, aggressive federal objective: decarbonize the electricity sector by 2035.¹⁴⁵ As part of the Paris Agreement, the U.S. has committed to cutting economy-wide greenhouse gas emissions 50-52% by 2030.¹⁴⁶ Here, TVA proposes to build new fossil fuel plants by 2024. TVA has three options: (1) decarbonize by abandoning these plants after only 11 years; (2) decarbonize through a future technology that is not currently available and that TVA has not discussed in this Environmental Assessment; or (3) violate the executive order by operating the gas plants after 2035. TVA has acknowledged this conflict elsewhere. In a letter to state regulators regarding its proposal to build a new gas plant at its Cumberland site, TVA stated, “The Executive Order raises significant new questions for TVA about the availability of natural gas as a potential replacement for coal power generation at [Cumberland]. . . .”¹⁴⁷ TVA refuses to acknowledge—much less answer—those significant questions here, ignoring serious conflicts with federal climate change policy.

¹⁴³ Exec. Order 14008 at 7622–24.

¹⁴⁴ 40 C.F.R. § 1502.16(a)(5) (2020); 40 C.F.R. § 1502.16(c).

¹⁴⁵ Exec. Order 14008 at 7624.

¹⁴⁶ Draft EA at 29.

¹⁴⁷ Letter from Paul Pearman, TVA, to Vojin Janić, Tennessee Department of Environment & Conservation (May 21, 2021) (**Att. 41**).

Similarly, Executive Order 13990 instructs agencies to use the Social Costs of Carbon, Methane, and Nitrous Oxide.¹⁴⁸ TVA states that it “considered” using the Social Costs of Greenhouse Gases, but declined to use those tools or any others.¹⁴⁹ The Executive Order states that is “*essential* that agencies *capture the full costs* of greenhouse gas emissions,”¹⁵⁰ not to merely consider doing so. TVA must address these unresolved conflicts with federal policy.

D. TVA’s environmental justice analysis is flawed.

TVA’s environmental justice analysis in the Draft EA is flawed because it never grapples with the impacts of the proposed gas plants on the specific environmental justice communities living near the Johnsonville site. In general, an environmental justice analysis has two prongs: (1) an agency must correctly characterize the demographics of the affected population, and (2) if an environmental justice community is identified, the agency must evaluate whether the proposed action will cause disproportionate adverse effects on that community.¹⁵¹ In the air pollution context, the Fourth Circuit has recognized that an agency cannot rely solely on compliance with the NAAQS or other air pollution standards to find that a proposed facility will not have disproportionate adverse effects—it must evaluate the action’s effects on the specific community in question.¹⁵²

We agree with TVA that the low-wealth community located across the Tennessee River from the Johnsonville site is an environmental justice community that warrants special consideration in compliance with Executive Orders 12898, 14008, 14057. But TVA fails to move forward with a meaningful analysis of the effects of the proposed gas plants on that specific

¹⁴⁸ Exec. Order 13990, 86 Fed. Reg. 7037, 7037 (Jan. 25, 2021).

¹⁴⁹ Draft EA at 32.

¹⁵⁰ Exec. Order 13990 at 7037.

¹⁵¹ *Friends of Buckingham v. State Air Pollution Control Bd.*, 947 F.3d 68, 87–92 (4th Cir. 2020).

¹⁵² *Id.* at 92 (“We have yet to find—and the Board and [Atlantic Coast Pipeline] do not indicate—where the Board analyzed the risk of PM_{2.5} emissions *to this specific EJ community*, without simply falling back on NAAQS.”) (emphasis in original).

community. The agency's abrupt conclusion that there will be no disproportionate air pollution effects rests on three errors. First, TVA concludes that compliance with the requirements of a PSD permit "ensures no significant impact to or deterioration of air quality" without consideration of the effects on the environmental justice community itself,¹⁵³ the approach squarely rejected by the Fourth Circuit in *Friends of Buckingham*.¹⁵⁴

Second, TVA fails to evaluate whether there will be a disproportionate effect on this environmental justice community at all, instead assuming that because wealthier communities in the study area will also experience the same pollution, the air pollution effects of the gas plant will not be disproportionate for any community.¹⁵⁵ TVA claims without analysis that "while operation of the Aero CT plant would result in localized emissions that would be dispersed throughout the study area, the impact of the those emissions would not be disproportionate on any of the communities in the study area. . . ."¹⁵⁶ But other communities in the study area are the wrong comparison point. TVA should have compared the likely effects on the environmental justice community to the air pollution in nearby communities *outside of the study area* to determine whether this affected community located close to the proposed gas plant will experience a pollution burden greater than communities farther away.¹⁵⁷ If left to stand as a precedent, the reasoning here would ensure that no TVA facility would *ever* have a disproportionate effect on communities of color or low-wealth communities as long as the agency's study areas include non-environmental justice populations. This approach renders the agency's environmental justice analysis meaningless.

Third, TVA fails to consider the disproportionate adverse effects that this environmental justice community has already endured for decades from TVA's Johnsonville facilities and other industrial facilities nearby, including the Dupont and OxyChem facilities next door to Johnsonville. TVA also fails

¹⁵³ Draft EA at 86.

¹⁵⁴ 947 F.3d at 92.

¹⁵⁵ Draft EA at 86.

¹⁵⁶ *Id.*

¹⁵⁷ 947 F.3d at 92

to consider the potential cumulative impacts of increased flooding and other severe weather experienced in this community and the excess energy burden it already carries.¹⁵⁸ As a result, this community may suffer disproportionately high and adverse impacts due to its unique history and characteristics, such as preexisting health conditions that may amplify the impacts of additional pollution.¹⁵⁹

E. TVA's analysis of flooding and wetlands impacts is incomplete.

TVA failed to properly follow its updated 2020 NEPA regulations when analyzing the effects its construction of Aero CTs at the Johnsonville facility would have on floodplains and wetlands. TVA's incomplete evaluation and analysis must therefore be supplemented or redone.

1. TVA must complete its analysis of flood risks in an area that has been devastated by flooding.

TVA devotes three sentences to analyzing the effects of its proposed alternative on floodplains. The agency summarily states that this review is sufficient, because the proposed project is sited outside of the 100-year floodplain and so is "consistent with Executive Order (EO) 11988 (Floodplain Management), as amended by EO 13690, and [will] have no significant impact on floodplains and their natural and beneficial values."¹⁶⁰ TVA's analysis is incomplete and its assertion is insufficient under applicable regulations.

When analyzing the effects of proposed projects on floodplains, TVA regulations implementing NEPA require that the agency engage in a more

¹⁵⁸ See Section E below and Att. 9.

¹⁵⁹ See Fed. Interagency Working Grp. On Env'tl. Just. & NEPA Comm., *Promising Practices for EJ Methodologies in NEPA Reviews* (Mar. 2016) ("After consideration of factors that can amplify an impact to minority populations and low-income populations in the affected environment, an agency may determine the impact to be disproportionately high and adverse.") (Att. 42).

¹⁶⁰ Draft EA at 5.

searching evaluation than what is required under Executive Orders 11988 and 13690. By undertaking its analysis only to the extent required by EO 11988 and EO 13690, TVA therefore did not meet its regulatory burden. The executive orders on floodplain management require agencies “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 or indirect support of floodplain development wherever there is a practicable alternative.”¹⁶¹ TVA asserts that it has met this obligation by determining—using Humphreys County’s Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map from 2009—that the proposed activities in the Johnsonville CT EA are outside of the 100-year floodplain.

Yet these executive orders are not the only applicable law which governs the agency’s analysis of floodplain management. TVA has also promulgated regulations implementing NEPA which lay out additional actions the agency must undertake for actions potentially affecting floodplains or wetlands.¹⁶² And establishing whether a proposed action will occur in a floodplain is only one step in the analysis. Similar to EOs 11988 and 13690, TVA must first determine whether the proposed action “will potentially occur in or affect” a floodplain.¹⁶³ After it makes such a determination, however, the regulations state that TVA may end its analysis only where three further determinations are made. Namely, the agency must find that the proposed action:

- (1) Is outside the floodplain or wetland;
- (2) Has no identifiable impacts on a floodplain or wetland; and
- (3) Does not directly or indirectly support floodplain development or wetland alteration.¹⁶⁴

In the Johnsonville CT EA, TVA only reached the first of these questions. Once TVA determined, based on badly outdated maps, that the

¹⁶¹ 80 Fed. Reg. 6425 (Feb. 4, 2015).

¹⁶² See 18 C.F.R. Subpart G.

¹⁶³ 18 C.F.R. § 1318.601.

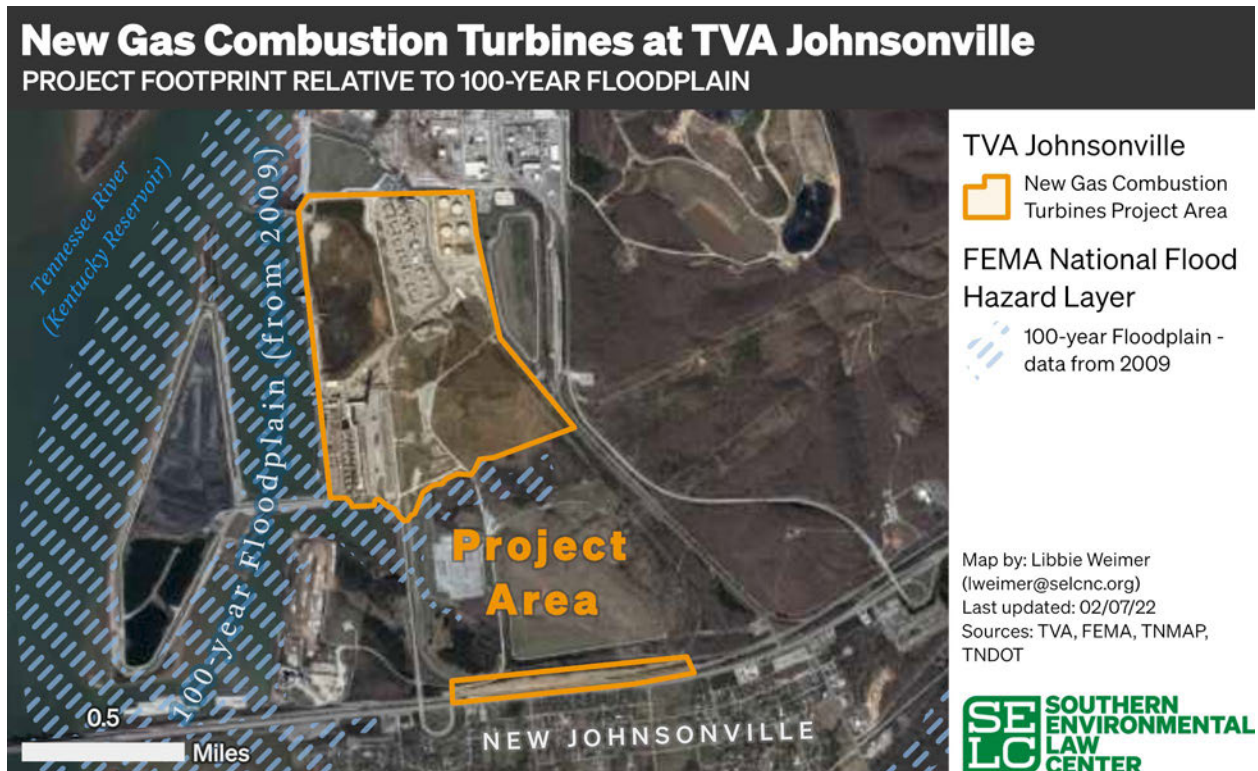
¹⁶⁴ *Id.* § 1318.601(b).

project would occur outside of the 100-year floodplain, the agency used that finding as the basis for its determination that the project would have “no significant impact on floodplains and their natural and beneficial values.”¹⁶⁵ But TVA regulations make clear that this conclusion does not automatically follow from the first finding; rather, it is an independent determination that must be made *in addition to* establishing the project’s location relative to floodplains. TVA therefore failed to adequately analyze whether, despite being located outside of a floodplain, the project would nevertheless have an identifiable impact on a floodplain or wetland or otherwise support development in such areas.

Beyond conducting an incomplete review, TVA also erred by using the wrong standard for evaluating potential impacts. In its EA, TVA states that further analysis for floodplain effects is inappropriate because the proposed actions would have no “significant” impacts on floodplains.¹⁶⁶ However, TVA regulations specify that the agency must determine whether a proposed action has any “identifiable” impacts on floodplains—a more nuanced inquiry. And given the proposed project’s location, TVA may well find that the project does have not only identifiable but significant impacts on floodplains. As seen in the map below, TVA’s proposed action, while not within the floodplain as documented in the County’s outdated 2009 FEMA floodplain map, is directly adjacent to one:

¹⁶⁵ Draft EA at 5.

¹⁶⁶ *Id.* at 5.



That TVA undertake a searching inquiry of its proposed action's effect on floodplains is all the more necessary given the outdated status of Humphreys County's current FEMA flood maps and TVA's public commitment to incorporate climate adaptation and resiliency into its operations. As an initial matter, FEMA's floodplain maps for Humphreys County are old. Although FEMA floodplain maps are supposed to be updated once every five years, Humphreys County's current floodplain maps were created over twelve years ago. And, unfortunately, weather patterns in Tennessee as well as the larger world have been anything but stable in those intervening years. TVA's own climate models indicate that the region will likely experience wetter springs and summers due to climate change, and Humphreys County has experienced severe flooding as recently as August 2021, when flash floods tore through the region and devastated local communities near the site of the proposed CTs.

Given the realities of these changing weather patterns, TVA has recently issued a *Climate Action Adaptation and Resiliency Plan* to guide the agency's actions as it confronts a changing climate. In the Climate Plan, TVA has prioritized five adaptation actions, two of which identify flood

management as a key issue for the agency. For instance, in its adaptation priority action entitled “River Management Climate Change Impact Assessment,” TVA asserts that it is actively seeking to incorporate climate data and modeling assumptions into its river management operations in order to, among other things, reduce flood risks.¹⁶⁷ This goal is relevant to TVA’s proposed activity outlined in the Johnsonville CT EA, because the proposed project is sited directly alongside the Tennessee River, a waterway TVA has management authority and control over. TVA should therefore be incorporating its current climate data and modeling assumptions into its understanding of the current floodplain at the Johnsonville site and analyzing the effects its proposed action could have on nearby floodplains based on this most up-to-date information.

Such a move would also comport with another priority action item identified in TVA’s Climate Plan. This action item, referred to as “Flood Hazards and Water Reliability,” aims to “examin[e] potential flooding events and water reliability risks to support TVA’s mission and carry out its responsibilities in managing the Tennessee River System.”¹⁶⁸ To do so, TVA plans to utilize “flood event modeling process[es]” to “address the resiliency risk of increased flooding predicted in some climate models.”¹⁶⁹ Again, these inquiries and modelling should be actively incorporated by TVA staff into all development decisions the agency undertakes along its waterways and floodplains. In other words, TVA should not rely on old, outdated maps to skirt a searching inquiry of its proposed action’s potential effects on floodplains if it has more up-to-date information readily available to incorporate into a more meaningful review.

Finally, TVA must also analyze whether its proposed action would directly or indirectly support floodplain development.¹⁷⁰ Given the proposed site’s proximity to the floodplain, there is a genuine question as to whether

¹⁶⁷ TVA, *Climate Action Adaptation and Resiliency Plan*, 12 (Aug. 16, 2021), https://www.tva.com/docs/default-source/1-float/10.22.21-updated-to-post-9.15.21-cap65d6ec5a-bbe8-4bcf-b372-c3ac3412f7db.pdf?sfvrsn=8e8d0edc_3 (hereinafter “Climate Plan”).

¹⁶⁸ Climate Plan, 13–14.

¹⁶⁹ *Id.* at 14.

¹⁷⁰ See 18 C.F.R. § 1318.601(b)(3).

and to what extent TVA's plans may affect land use immediately adjacent to the area. If the agency determines that its proposed actions will indeed impact the floodplain or support development within the floodplain, TVA must then consider the effect this action will have on natural and beneficial floodplain values and consider alternatives to its proposed action which would minimize those effects.¹⁷¹ In short, the agency must evaluate whether and to what extent its proposed action will *affect* floodplains, not merely whether it is *located in* one.

By limiting its floodplain analysis to only whether its proposed activity occurred within the 100-year floodplain, TVA impermissibly truncated its review in violation of applicable regulations. The agency must therefore redo its analysis and undertake a complete evaluation of its proposed project's potential to affect floodplains. In undertaking this analysis, TVA should use the most updated climate data and modeling assumptions available to the agency, and not base its conclusions solely on a flood map created more than a decade ago.

2. TVA must analyze alternatives to harming wetlands.

TVA's analysis of its proposed project's impacts on wetlands is also incomplete. In the Johnsonville CT EA, TVA identifies that its preferred alternative will potentially affect 0.4 acres of forested wetland permanently by clearing the area to establish a transmission line right of way. The agency asserts that temporary impacts would also occur to emergent wetlands during construction activities for that right of way.¹⁷² However, TVA maintains that "[e]ffects of wetland impacts would be minor when viewed in the context of the 5,645 acres of forested wetland resources within the surrounding 5-mile region."¹⁷³

This analysis is insufficient under Executive Order 11990 and TVA regulations implementing NEPA, which both demand that an agency identify whether there are any practicable alternatives for proposed projects construction activities occurring in wetlands. Executive Order 11990

¹⁷¹ *Id.* § 1318.602(b).

¹⁷² Draft EA at 41–42.

¹⁷³ *Id.* at 41.

mandates that “[E]ach agency . . . shall avoid undertaking . . . new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use.”¹⁷⁴ TVA’s regulations implementing NEPA similarly state that the agency “must determine if there is no practicable alternative to . . . constructing in a wetland,” and if such a determination is made, “all practicable measures to minimize impacts of the proposed action” must be implemented.¹⁷⁵

TVA asserts in the Johnsonville CT EA that it has routed its transmission line “to avoid placing any structures within a delineated wetland,” and that best management practices and site-specific erosion control plans will be implemented to minimize any temporary, minor impacts due to constructing its right of way.¹⁷⁶ However, the right of way TVA envisions would be a permanent alteration to the forested wetland, which would involve clearcutting trees and maintaining the right of way moving forward. And TVA is silent on whether any practicable alternatives exist to avoid both the temporary construction impacts as well as the permanent maintenance impacts of building and maintaining this right of way through onsite hardwood wetlands. TVA must therefore supplement its analysis.

It is crucial that TVA engage in a full and robust analysis of its proposed project’s impacts on floodplains and wetlands at the Johnsonville facility. TVA is proposing this project in Humphreys County, which, as mentioned previously, was the site of a devastating flood event which overwhelmed the community in August 2021. Since that time, both the local and federal governments have taken actions to update water management and floodplain development in the county. For instance, Humphreys County recently passed a County Flood Damage Prevention Resolution to establish eligibility to participate in the National Flood Insurance Program, and the U.S. Army Corps of Engineers has begun conducting a Floodplain Management Service Study within the area which suffered some of the most

¹⁷⁴ 42 Fed. Reg. 26961, 26962 (May 24, 1977).

¹⁷⁵ 18 C.F.R. § 1318.602(c).

¹⁷⁶ Draft EA at 42.

severe flooding last August. Local and federal action indicate a concerted focus on sound local management of water resources and activities in flood-prone areas. TVA should supplement its floodplain and wetland impact analyses to comply with applicable law and its own climate change adaptation and resiliency plans to aid in this effort.

F. TVA must address the cumulative effects of its gas buildout.

TVA has not addressed the cumulative impacts of its gas buildout at Johnsonville and across its service territory. The 2020 Regulations require agencies to analyze all “reasonably foreseeable” effects caused by the proposal.¹⁷⁷ Though the 2020 Regulations deleted the long-standing references to indirect and cumulative effects, CEQ has already proposed to restore them.¹⁷⁸ 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 actions.”¹⁷⁹ “Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”¹⁸⁰ Considering these effects is essential to agencies’ statutory obligation to assess the environmental impact of the proposed action and its alternatives,¹⁸¹ as well as “the relationship between local short-term uses of man’s environment and the maintenance and enhancement of long-term productivity.”¹⁸²

TVA has not disclosed the cumulative effects of its Johnsonville Combustion Turbine proposal. Since last year, TVA has proposed 4,950 MW

¹⁷⁷ 40 C.F.R. § 1508.1(g) (2020).

¹⁷⁸ 2021 CEQ Proposed Rulemaking.

¹⁷⁹ 40 C.F.R. § 1508.7 (1978).

¹⁸⁰ *Id.*

¹⁸¹ 42 U.S.C. § 4332(C)(i)–(ii). *See also* 2021 CEQ Proposed Rulemaking at 55763 (“[C]ourts have interpreted the NEPA statute to require agencies to analyze the reasonably foreseeable direct and indirect effects of a proposed action and alternatives.”)

¹⁸² 42 U.S.C. § 4332(C)(iv).

of new gas plants.¹⁸³ As discussed in Section IV.B, TVA made a closely related proposal to build combustion turbine units in Paradise, Kentucky and Colbert, Alabama. In the same year, TVA proposed building new gas plants in Cumberland¹⁸⁴ and Kingston.¹⁸⁵ TVA has not looked at the effects of adding decades of new greenhouse gas emissions through this massive, contemporaneous gas buildout. The “large-scale nature of environmental issues like climate change show why cumulative 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.’”¹⁸⁶ TVA must evaluate the cumulative climate impacts of its proposals to build new gas plants.

TVA has also ignored the cumulative impacts locally. For nearly seventy years, TVA operated a coal plant on the Johnsonville Reservation.¹⁸⁷ TVA’s coal ash is submerged in groundwater, which has indicated levels of toxic pollution that exceed safe drinking water standards.¹⁸⁸ Local pollution imposes additional, cumulative harms on surrounding counties that face

¹⁸³ Since 2021, TVA has proposed 550 MW at its Johnsonville site, 1,450 MW at Cumberland, 1,450 MW at Kingston, and 1,500 MW combined at Paradise and Colbert.

¹⁸⁴ TVA, Notice of Intent to Prepare Environmental Impact Statement for Cumberland Fossil Plant Retirement, 86 Fed. Reg. 25933-03 (May 11, 2021).

¹⁸⁵ TVA, Notice of Intent to Prepare Environmental Impact Statement for Kingston Fossil Plant Retirement, 86 Fed. Reg. 31780-01 (June 15, 2021).

¹⁸⁶ *WildEarth Guardians v. U.S. Bureau of Land Mgmt.*, 457 F. Supp. 3d 880, 894 (D. Mont. 2020) (citation omitted).

¹⁸⁷ TVA, Johnsonville Fossil Plant, <https://www.tva.com/Energy/Our-Power-System/Coal/Johnsonville-Fossil-Plant>.

¹⁸⁸ TVA, Updated GWPS and SSLs at the Johnsonville Fossil Plant Active Ash 2 Pond CCR Unit (July 15, 2021) (noting groundwater cobalt levels in excess of drinking water standards), available at <https://bit.ly/34iUH9Z>. See also Environmental Integrity Project, *Coal’s Poisonous Legacy: Groundwater Contaminated by Coal Ash Across the U.S.* 63 (July 2019) (showing boron, cadmium, cobalt, and sulfate at levels in excess of drinking water standards), available at <https://bit.ly/3Gzp5tU> (Att. 43).

some of the highest energy burdens—that is, cost of energy as a percentage of income—in the TVA region.¹⁸⁹ Neighboring Benton County is home to a low-income environmental justice community that has endured generations of exposure to TVA pollution.¹⁹⁰ TVA proposes to permanently fill wetlands and build infrastructure near a floodplain in a region where development and climate change have led to increasingly common and severe flooding.¹⁹¹ As TVA admits, its proposal “would likely adversely affect” three endangered species of bats,¹⁹² but TVA does not disclose the cumulative impacts of further habitat loss on these species. TVA vaguely mentions an imminent “lateral divestiture” project without describing the project or its impacts.¹⁹³ TVA notes that the Johnsonville Reservation is surrounded by other industrial sites,¹⁹⁴ yet TVA ignores past, present, and future impacts from other polluters in the area.¹⁹⁵ TVA also has not explained whether or how the proposed CTs relate to the utility’s decision in 2015 to continue operating the now-retiring CTs in order to support cogeneration for a nearby “strategic

¹⁸⁹ Att. 9.

¹⁹⁰ Draft EA at 83.

¹⁹¹ Rebecca Hersher, *The Floods in Tennessee Aren’t Freak Accidents. They’re a New Reality*, NPR, <https://www.npr.org/2021/08/23/1030325945/the-floods-in-tennessee-arent-freak-accidents-theyre-a-new-reality> (Aug. 23, 2021) (Att. 44); Christopher Flavelle, *How Government Decisions Left Tennessee Exposed to Deadly Flooding*, N.Y. Times (Aug. 26, 2021), <https://www.nytimes.com/2021/08/26/climate/tennessee-flood-damage-impact.html> (Att. 45).

¹⁹² Draft EA at 14.

¹⁹³ Draft EA at 19.

¹⁹⁴ Draft EA at 61 (noting “[l]arge-scale industrial development, including the Chemours facility, is visible immediately north of the reservation”).

¹⁹⁵ 40 C.F.R. § 1508.7 (“Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to *other past*, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) *or person* undertakes such action.”) (emphasis added).

customer.”¹⁹⁶ To the extent that TVA plans to use the proposed CTs for the purpose of continuing to supply power to that customer specifically, TVA must disclose that fact as part of the proposed action to be studied as part of its proposal, and recirculate an environmental document that fully discloses the purpose, need, alternatives, and impacts of this project. In sum, TVA must disclose the cumulative significance of building yet more fossil fuel infrastructure in an area that has experienced decades of impacts from TVA and others.

V. TVA MUST CONDUCT AN ENVIRONMENTAL IMPACT STATEMENT.

Because building new gas-fired power plants is a “major federal action[] significantly affecting the quality of the human environment,”¹⁹⁷ 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.”¹⁹⁸ Significance is determined by the impacts’ context and intensity.¹⁹⁹ Significance “must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality.”²⁰⁰ Significance also accounts

¹⁹⁶ TVA, Johnsonville Cogeneration Plant Final Environmental Assessment 1 (June 2015).

¹⁹⁷ 42 U.S.C. § 4332(C).

¹⁹⁸ *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).

¹⁹⁹ The 2020 Regulations deleted but did not replace the significance factors. As discussed, CEQ has published its intention to generally restore the 1978 regulations. 2021 CEQ Proposed Rulemaking. Therefore, the 1978 regulations, as well as the decades of case law, remain instructive guidance to determine when actions “significantly affect[] the quality of the human environment” under NEPA. 42 U.S.C. § 4332(C).

²⁰⁰ 40 C.F.R. § 1508.27(a) (1978).

for “intensity,” or the severity of the impact. Intensity includes the following factors, any one of which may require an EIS²⁰¹:

The degree to which the proposed action affects public health or safety.²⁰²

The degree to which the effects on the quality of the human environment are likely to be highly controversial.²⁰³

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.²⁰⁴

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. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.²⁰⁵

Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.²⁰⁶

The impacts of TVA’s proposed Johnsonville 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.”²⁰⁷ Local air pollution, even if in compliance with

²⁰¹ *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.”).

²⁰² 40 C.F.R. § 1508.27(b)(2) (1978).

²⁰³ *Id.* § 1508.27(b)(4).

²⁰⁴ *Id.* § 1508.27(b)(6).

²⁰⁵ *Id.* § 1508.27(b)(7).

²⁰⁶ *Id.* § 1508.27(b)(10).

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 Johnsonville—TVA closed a coal plant in 2017 and continues to operate combustion turbine units—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 Johnsonville create “cumulatively significant impacts”²⁰⁸ for the communities in Humphreys and Benton Counties. Public health, biodiversity, and economic well-being are also impacted by the “cumulatively significant impacts” of TVA’s decision to build a new fossil-fuel plant, 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.”²⁰⁹ 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.”²¹⁰ 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 those emissions.²¹¹ We have disputed the “size, nature, and effect” of TVA’s decision to build new gas. The “size” includes not only combustion turbines,

²⁰⁷ *Id.* § 1508.27(b)(2).

²⁰⁸ *Id.* § 1508.27(b)(7).

²⁰⁹ *Id.* § 1508.27(b)(4).

²¹⁰ *Hanly v. Kleindienst*, 471 F.2d 823, 830 (2d Cir. 1972).

²¹¹ 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.*

but the entire methane-leaking infrastructure required to support them. 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.²¹² 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.²¹³ The serious concerns raised by Executive Order 14008 render controversial TVA’s decision to add decades of greenhouse gas emissions that jeopardize President Biden’s goal.

Third, TVA’s proposal to build new gas plants is likely to “establish a precedent for future actions,”²¹⁴ 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].”²¹⁵ As discussed, TVA proposes to find combustion turbines necessary to integrate renewable energy. As such, TVA minimizes the environmental effects of new gas plants by improperly accounting for benefits of speculative renewables projects TVA has yet to propose. Without considering alternatives, TVA assumes its only option to integrate future renewables is with new combustion turbine gas plants, and it finds that doing so creates no significant effects on air pollution, climate change, or environmental justice. Because the need to integrate renewables will become

²¹² *California v. U.S. Dep’t of Trans.*, 260 F. Supp. 2d 969, 973 (N.D. Cal. 2003).

²¹³ Exec. Order No. 14008, 86 Fed. Reg. 7619 (Jan. 27, 2021).

²¹⁴ 40 C.F.R. § 1508.27(b)(6) (1978).

²¹⁵ 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).

greater over time, 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 construction of new 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."²¹⁶ 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."²¹⁷ The Executive Order calls on the electricity sector to completely eliminate carbon emissions by 2035.²¹⁸ TVA's decision to build new gas plants at Johnsonville imposes an unjust burden on the environmental justice community in Benton County, 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 Johnsonville has significant effects, harming the environmental justice community of Benton County and accelerating the climate crisis. TVA must take a hard look at this decision through an EIS.

²¹⁶ 40 C.F.R. § 1508.27(b)(10) (1978).

²¹⁷ Exec. Order No. 14008, 86 Fed. Reg. 7619, 7622, 7629 (Jan. 27, 2021).

²¹⁸ *Id.* at 7624.

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Johnsonville Aero CT Project [#1]
Date: Saturday, February 5, 2022 5:19:20 PM

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Name	JoAnn McIntosh
City	Clarksville
State	TN
Email	[REDACTED]
Phone Number	[REDACTED]

Please provide your comments by uploading a file or by entering them below. *

I appreciate the opportunity to voice my concerns about the proposed gas expansion at the Johnsonville plant.

TVA is moving in the wrong direction by planning an additional 550 MW of gas-fired power to the grid. I understand that 16 of the 20 CT units at Johnsonville will be retired, but TVA has already committed to replacing their generation at Paradise and Colbert. The 550 MW generated by the proposed ten Aeroderivative CTs at Johnsonville will be a commitment to more gas on the grid, thereby increasing carbon emissions when, according to TVA’s Draft EA, “TVA has a plan for 70 percent carbon reductions by 2030, a path to approximately 80 percent carbon reductions by 2035 and ASPIRES TO [my emphasis] net-zero carbon emissions by 2050.” These decarbonization goals cannot be achieved if gas is chosen over renewable options.

TVA maintains that peaker plants such as the proposed Aero CTs are necessary in order to integrate their planned 10,000 MW of solar by 2035. However, the solar plus storage technology exists today that can address the variability of solar generation, thus making new gas plants a poor financial investment as well as running counter to decarbonization goals. In addition, extreme weather events that impact the grid demonstrate that climate change and the need for decarbonization must be prioritized now. Instead of making aspirational goals, TVA needs to commit to full decarbonization, and should support and invest in forward-looking technologies and projects that achieve that commitment sooner rather than later.

JoAnn McIntosh
Clarksville, TN

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Johnsonville Aero CT Project [#2]
Date: Sunday, February 6, 2022 8:32:29 AM

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Name	Karen Wieckert
City	Nashville
State	TN
Organization	Self
Email	[REDACTED]
Phone Number	[REDACTED]

Please provide your comments by uploading a file or by entering them below. *

Hello.

This past week, I spent some time on the Kentucky Lake/Tennessee River where the Johnsonville TVA plant is located. It was a great experience, and one that I hope can be part of my world and my children and grandchild's world into the future. The grandchild is 6 months old and reallllllly cute :-)

I write today to urge you to reconsider what type of energy mix will replace the coal plant. I am thrilled, to be honest, that TVA is replacing old coal plants -- the air pollution, the ash concern, the mining are all negatively effecting communities of people and other creatures/plants. However, the future should also include reducing reliance on energy sources that negatively effect people/critters/plants. The pipeline plus the use of gas does help somewhat in replacing coal, but why not take the opportunity to truly change the mix and consider more renewable sources. Also, it might be a good opportunity to consider distributing where the power is created, rather than all in one plant.

I hope you will consider designs that minimize the need for pipelines and further gas emissions that negatively affect our long term health.

Thank you for your consideration.

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Johnsonville Aero CT Project [#3]
Date: Monday, February 7, 2022 5:33:01 PM

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Name	Joseph R Schiller
City	Clarksville
State	Tennessee
Organization	Brokenpoint Farm
Email	[REDACTED]
Phone Number	[REDACTED]

Please provide your comments by uploading a file or by entering them below. *

To the TVA:

I appreciate the opportunity to comment regarding the Environmental Assessment of the proposed Johnsonville Aeroderivative Turbine project.

TVA continues to game the NEPA by proposing pseudo-alternatives that are merely minor variations of the technology alternative it prefers. In this case the TVA had the audacity to not even offer pseudo alternatives, instead offering only a “no action alternative,” (which is mandatory) and the preferred “Aeroderivative CT alternative.” This is a clear violation of NEPA given that there are several obvious real alternative actions possible. For example, the TVA could offer a solar combined with storage alternative, a wind power and storage alternative, an energy efficiency/conservation/load management alternative, and various combinations of these as well as a combination of aeroderivative CT and solar plus storage. Given that the TVA’s rationale for installing Aeroderivative CTs is to support additional renewables, then why not include a “renewables combined with the aeroderivative CT” as an action alternative to validate this contention!

Unless the TVA is prepared to offer real alternatives, the no action alternative is the best choice because no real analysis of viable technologies is being performed. It seems TVA would like new combustion turbines and has decided not to explore the possibility that the rapidly evolving power technology industry has produced better options that would save its customers money while helping solve the climate crises (The Hidden Costs of Keeping Gas Plants Online in Texas and Beyond – RMI) . Worse, as the EA is worded, one could mistakenly interpret this action by TVA as a swap of these new aeroderivative turbines for an equivalent retirement of older Johnsonville CTs. One must read the EA carefully to discern that, in fact, the proposed aeroderivative CTs are an addition to the TVA’s existing gas turbine portfolio because it has already been decided to replace the capacity of the retired CTs at Allen and Johnsonville with new CTs to be installed Colbert and Paradise. When TVA conducted its CT modernization Study it concluded that adding this aeroderivative turbine to its fleet was a “no regrets” option. Why didn’t TVA install this “no regrets” option at Colbert and Paradise? Regardless, in a rapidly accelerating climate crisis the only “no regrets” option is to immediately install solar plus storage along with other renewable generation. Perhaps TVA has regrets about the options it chose at Colbert and Paradise but TVA now has lots of flexible gas generation with which to support lots of new solar plus storage generation at Johnsonville and throughout its service area.

TVA needs to install renewables to justify installing other technologies it claims are needed to support them. TVA has been playing this “Waiting for Godot” game for many years and it is getting very old! (Explanation: Waiting for Godot has been described as a play in which nothing happens but keeps its viewers glued to their seats. Thus, TVA continues to insist it is laying the groundwork for an ambitious renewable energy program, but never installs any!). TVA needs to rapidly and consistently install renewables to justify installing other technologies it claims are needed to support renewable sources. The TVA currently has approximately 12000 MW (12GW) of gas turbine generation available in its power portfolio. The bulk of this gas generation is combustion turbine (CT) that is well suited to supporting variable renewable energy generation. Now is the time to install significantly more solar generation to utilize this solar supporting resource.

Until, and unless, the TVA demonstrates reliability challenges in pursuing this solar build out, it should voluntarily impose a moratorium on installing any additional gas turbines until it completes its next IRP. It is imprudent for the TVA to continue to invest heavily in gas technology assets that many experts in energy economics believe are at risk of becoming stranded until it performs a comprehensive analysis of the current best technology options available for meeting its capacity and reliability goals.

The 2300 MW of solar in the TVA’s current generation portfolio is not enough to justify concern about installing additional supporting technologies such as CT. TVA is below the average in both total solar capacity installed and installed solar watts per customer, and is dropping in its rankings compared to its peer major southeastern utilities (Solar-in-the-Southeast-Report-June-2021.pdf). In fact, at least two of those utilities have already installed as much solar as TVA plans to install by 2035. Further, the TVA has more hydro resources than all its peer utilities in the southeast and hydro turbines can support solar as effectively as aeroderivative CTs (See “Most hydroelectric turbines, which use flowing water to spin a turbine, can go from cold start to full operations in less than 10 minutes. Combustion turbines, which use a combusted fuel-air mixture to spin a turbine, are also relatively fast to start up.” In <https://www.eia.gov/todayinenergy/detail.php?id=45956>).

It must also be pointed out that most, if not all the solar TVA plans to install through 2035 will likely include four-hour lithium ion or other battery storage (Solar+storage to add most new battery storage capacity in the U.S. over next three years (renewableenergyworld.com) and this will provide the bulk of required support for future solar installations (Storage Futures Study: Grid Operational Impacts of Widespread Storage Deployment (nrel.gov)). The residents of the TVA service area strongly support installation of more solar generation. Thus, the TVA’s continuing attempts to justify further fossil fuel plant construction based on “its need to support solar” must be seen as a cynical and deceptive ploy to recruit public support for its acquisition of a resource it does not need that will contribute to, not help mitigate, the climate crisis.

In summary, the TVA has not made a good faith analysis of the best technology solutions for replacing its old combustion turbines at the Johnsonville plant and the meager amount of solar TVA has installed does not justify installing the aeroderivative CTs to support it. Even if the TVA did need to support its solar installations with other generation technologies, the existing TVA hydro turbines are a more than sufficient technology to support all the solar it plans to install by 2035.

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Johnsonville Aero CT Project [#5]
Date: Tuesday, February 08, 2022 5:17:36 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.

Name	Amy Kelly
City	Maryville
State	TN
Organization	www.sierraclub.org
Email	[REDACTED]
Phone Number	[REDACTED]

Please provide your comments by uploading a file or by entering them below. *

The attached document contains 174 signatures, 97 of which are accompanied by additional personal messages.

The following spreadsheet contains names and contact information of people who signed the letter below:

* I am writing to ask you to replace all fossil fuel generation with clean, renewable energy. TVA is currently deciding to invest in gas at three additional locations making new gas builds almost 5,000 MW of TVA’s generation.

* TVA is trading one fossil fuel for another and investing ratepayer dollars to modernize existing gas turbines that will not be economical in the coming years due to climate change.

We will be the ones paying for these decisions.

* TVA is not considering the environmental impacts of climate change in their environmental reviews and is thwarting its mandate under the TVA Act to be an environmental steward.

* TVA can be a public utility that responds to the urgent demands of the day by readily supplying clean energy to businesses that are requesting it by making renewables more than 3% of its energy mix.

* TVA needs to do a full EIS on all projects that involve fossil fuels and fully consider renewable energy as an alternative in those studies by taking bids and communicating with solar and wind suppliers as often as it does gas suppliers.

Thank you for considering my comments.

Upload File #1



[sierra_club_johnsonville_ct_comments_2.8.22.pdf](#)

235.22 KB • PDF

First Name	Last Name	City	State	Postal Code	Personal Message
Lynn	Oliver	Dixon Springs	TN	37057	Also need TVA funded pilot program for solar panels for Tennessee home owners in multiple geographic areas to make people aware of alternatives to electric sources. Mother Earth seems to be fighting back with weather extremes.
Jason	Smith	Knoxville	TN	37921	
Rebecca	Cummings	Unicoi	TN	37692	Thank you for your plans to shut down your coal facilities. This is an important step toward reducing our impact on the climate as well as reducing air pollution and environmental risks from slag. Thank you. As you consider their replacements, please consider: 1) Energy-efficiency grants to encourage less energy consumption in buildings and transportation. 2) Renewables and battery storage. For the sake of our children and their children, we need to reduce our impact on the climate. 3) Encourage rooftop solar and in-home batteries through rebates and energy buy-back incentives. That way you can achieve greater renewable production without the up front land costs and without on-going maintenance costs. 4) Lobby local utility companies to reduce their monthly connection fees. This will encourage more rooftop solar and greater energy conservation. The last thing you want is for more and more people to disconnect from the grid.
Robin	Happel	Johnson City	TN	37604	
Chris	Drumright	Murfreesboro	TN	37130	
E	Petrilla	Nashville	TN	37203	
Shelby L.	Hood	Franklin	TN	37064	
Heather	Acosta	Kingsport	TN	37663	
Steven	Lipson	Nashville	TN	37212	
Cassandra	Gronendyke	Cookeville	TN	38506	It is imperative that we protect our planet for future generations to enjoy by converting our electric grid to clean, renewable energy.
Jacqueline	Friederichsen	Knoxville	TN	37917	

Kathy	Woehler	Nashville	TN	37211	
					We need clean energy for our state and planet. Our government agencies keep putting off the urgency of the damage to the planet. Excuses are long, what will you do when there is no more time? Slowly our systems are destroying our world. If anyone survives in the future after our failures, they will ask " Why didn't they do anything sooner when they had known for years. This will be the legacy that you leave for the future. If there is a world left.
Kelly	O'Brien	Springfield	TN	37172	
					Stop the gas stopgap! Gas is NOT a transition fuel that will enable more deployment of renewables -- it is a carbon-producing fossil fuel that will slow the necessary decarbonization of the grid.
JoAnn	McIntosh	Clarksville	TN	37043	
Susan	Pirolo	Silver Point	TN	38582	
Kevin	Hoban	Knoxville	TN	37919	Do the right thing!
Donna	Duncan	Lebanon	TN	37087	
Crys	Zinkiewicz	Nashville	TN	37205	Choose the future. Make it better for all!
Patricia	Dishman	Nashville	TN	37221	
Savannah	Pflueger	Mount Juliet	TN	37122	
Valerie	Crawford	Nashville	TN	37221	
John	Lund	Franklin	TN	37064	I have an extended and growing family in TN...I wish this state to be as clean and environmentally friendly as possible.
					I am very interested in moving to renewable energy sources and would gladly work with my electric power coop to share costs of converting my home to solar power to share in producing as well as consuming power.
Rhonda	Tinsley	Spring City	TN	37381	
Hiasaura	Rubenstein	Nashville	TN	37205	
Bettina	Bowers	Nashville	TN	37216	

					Please consider that we see the effects of our climate crisis on a weekly basis, massive tornados, out-of-control wildfires, excessive heat in what should be cold areas and cold months, temperatures that rise and then fall 30 degrees in one day, excessive rainfall and then none. Our usual November days used to be cold (30 to 40 degrees) and wet. Now we have summer days, bright and sunny often close to 80 degrees. It's time for us to make the shift to solar and wind energy even though I realize that there are powerful and influential people who want to continue using (and profiting from) fossil fuels. TVA should rise above the greed and power plays to provide us with sustainable power that will not harm the planet or its occupants. Please take the responsibility in moving us away from the fossil fuels that are causing the climate crisis we are witnessing.
Cynthia	McWilliams	Clarksville	TN	37040	
J.	P	Nashville	TN	37203	
John	Meyer	Maryville	TN	37801	
Donovan	Drake	Nashville	TN	37205	Make the right move for our grandchildren.
Joyce	Coombs	Corryton	TN	37721	Clean up our air now!!!
Laura	Lynch	Nashville	TN	37217	
Mary	Bristow	Brentwood	TN	37027	
Carrie	Megill	Murfreesboro	TN	37130	The rate payers in Tennessee want fossil fuels replaced with clean renewable energy. We want it for our children, our state, our world. We no longer have the time to take it slow. Please do not just trade one fossil fuel for another. Thank you
Ferdinand D	Meyer	Antioch	TN	37013	
Chris	Dacus	Bell Buckle	TN	37020	Ask yourself this: Why are you wanting to continue to kill off your customers? The answer should be that you don't want to do that. Go please go forward immediately with renewable energy. Thanks.
Cindy	Whitt	Franklin	TN	37064	Please take actions to ensure a clean energy future for all especially our grand children.

Joseph	Payne	New Tazewell	TN	37825	I am an optimist and believe a majority of TVA employees know that the best and proven way forward is to retire all the active fossil fuel plants but for fear of losing their jobs or at the least not getting that next raise. I know this from experience as a former TVA hire. You are important to their senior management only if it serves their needs, that being lining the pockets of major fossil fuel producers which in turn satisfies lobbyists lining the pockets of politicians. Somewhere along this chain of selfish thoughtless money grubbing an organized group of individuals will emerge to bring this to a halt. Maybe in time to reverse enough of the damage done by these selfish, thoughtless but very wealthy individuals.
Linda	Inness	Philadelphia	TN	37846	
Jane	Herron	Franklin	TN	37064	Gas is also a fossil fuel and should not be considered as a replacement for coal. It is past time to be moving to clean renewable energy. Our children and grandchildren are depending on you to make forward-looking, intelligent decisions.
Geneva	Andrews	Dayton	TN	37321	I certainly don't want pipelines running through MY property ? and they shouldn't run through anyone's.
Melonee	Oatsvall	Woodbury	TN	37190	
Jeff	Sims	Knoxville	TN	37914	The future of the planet and humanity depends on the action we take NOW.
Jeff	Simms	Sweetwater	TN	37874	The future of the planet and humanity depends on the action we take NOW.
Rachel	Murray	Harrison	TN	37341	Climate change is real and it's a threat to the future of the entire planet. TVA has a responsibility to do everything possible to avoid contributing to the destruction of our environment. Please do the right thing.
Steve	Riches	Crossville	TN	38555	Clean Energy Now

Dana	Moran	Knoxville	TN	37921	The best way to take care of the health of our communities is to take care of the health of our environment. We should be doing everything possible to create clean, sustainable energy and jobs!
Heather	Finotti	Knoxville	TN	37922	This is such a perfect opportunity to make a decision that will be healthier for our plant and people for a long time to come. Please help us all move forward, choose renewable energy like solar!
Alyssa	Matas	Chattanooga	TN	37405	
Mark	Mundo	Sevierville	TN	37876	
Jennifer	Miller	Hendersonville	TN	37075	I installed solar panels on my roof last year. Solar is coming whether you are with us or not.
Craig	Drew	Chattanooga	TN	37421	
Beverly	Morris	Chattanooga	TN	37419	Start setting up solar energy and wind farms to create clean energy while dismantling coal fired plants so we aren't caught without adequate energy!
Mary	Reed	Lancing	TN	37770	
Emilie	Fauchet	Brentwood	TN	37027	
Jennifer	Brown-Hall	Greeneville	TN	37745	
Catherine	Gonzales	Cleveland	TN	37323	
Nora	Robertson	Johnson City	TN	37615	I'M WORRIED ABOUT OUR FUTURE. WE NEED CLEAN ENERGY NOW. WE CANNOT WAIT ANY LONGER FOR RENEWABLE ENERGY! REPLACING COAL WITH GAS IS NOT A REAL SOLUTION FOR OUR WARMING PLANET.
Donald	Keyser	Johnson City	TN	37604	I want clean energy, as in solar or wind
David	Gresham	Knoxville	TN	37917	Gas will eventually run out, solar won't. Also, we are shipping much of our natural gas to Europe now.
Mindy	Staggs	38450	TN	38450	As a Tennessean, I support solar renewable energy.
Liz	Murphy	Lafayette	TN	37083	
Richard	Gilbert	Franklin	TN	37067	Please move into the future. Burning fossil fuels speeds up our destruction.
Dianne	Doochin	Nashville	TN	37205	

Gary	Bowers	Knoxville	TN	37922	
Ben	Petty	Tullahoma	TN	37388	
Helen	Buckley	Chattanooga	TN	37421	
Charles	Mace	Nashville	TN	37207	
Laurie	Levknecht	Jonesborough	TN	37659	Now is the time to act! Commit to clean energy!
Herman	Fletcher	Sevierville	TN	37876	
Suzanne	Rogers	Knoxville	TN	37917	Spending money on anything other than clean energy makes no sense at all. Please wake up and do the right thing! It's time to commit to renewable energy.
Jeffery	Myers	Hixson	TN	37343	
Sonja	Hunter	Lebanon	TN	37090	We need to make the switch away from dirty energy sources and go all in on clean energy for cleaner air, cleaner water and healthier Tennesseans!
Brent	Davis	Kingsport	TN	37664	
Jason	Marcum	Oneida	TN	37841	
Charles	Rogers	Kingsport	TN	37664	It is well past time to accelerate the transition to clean and renewable energy sources and away from fossil fuels.
Russell	Kennedy	Knoxville	TN	37912	Save yourself and us money and go renewable with wind and solar with battery back up.
Sandra	Kee	Waverly	TN	37185	We don't need to end up like Texas and be out of power. Coal and Gas is the way to go only!! If solar freezes then what do you have, nothing. Definitely not windmills that also freezes.
Kurt	Emmanuele	Chattanooga	TN	37405	Let's get ahead of the curve and switch to clean energy since we ultimately have to do it anyway.
Judith	Flegel	Signal Mountain	TN	37377	It is excellent and necessary to end coal plants. Replace energy production with clean renewable energy, not fossil fuels. Our environment is on the brink. Protect it and research how to continue to improve negative environmental impact. Thank you.

Kara	Dulac	Knoxville	TN	37931	In order to slow down climate change, we must make a decisive shift from energies that are destroying our planet to renewable energy which is not based on fossil fuels. Please do what's right for our environment, our citizenry, and our planet and choose renewable energy over fossil fuels.
Bill	Askew	Fayetteville	TN	37334	TVA should lead the country in the use of renewable energy to replace fossil fuels. We need solar and wind now to power the Valley's homes and industry, not one day later. Please consider the climate when the decisions are made that affect all our futures.
Jim	Steitz	Gatlinburg	TN	37738	While the closure of coal-fired plants is correct, it must be replaced with solar and wind energy, because the timetable of our climate crisis will not accommodate the more gradual emissions reductions embodied in your current trajectory, and in the proposal for gas-fired generation as replacements. Latest data on methane leakage in the natural gas industry also indicates that gas-fired generation carries a greater climate impact, nearer to that of coal-fired power, than previously supposed. TVA has a solemn responsibility to curtail its carbon emissions as rapidly as technologically possible. Every pound of carbon burned in a TVA-managed generator is a blow struck against the prospects for human flourishing in the century to come. TVA must choose electricity sources that are proportionally concordant with the most recent conclusion of climatologists, that carbon emissions must decline radically by 2030, not gradually, later, or deferentially to current complacent TVA plans.
Margaret	Davitt	Nashville	TN	37205	
Rodney	Lynch	Washburn	TN	37888	It is very important that Tennessee remains competitive and beautiful for tourists. No one likes oil. Solar is the future
Katherine	Crawford	Nashville	TN	37203	

					<p>We cannot ignore the warning signs endured by my family and others. My rural home was pounded by unprecedented flooding, snowfalls and ice storms. We have been stranded in Lewis County for a week for some of these events. My married children have huddled in storm shelters in Bowling Green, KY during the city's devastating tornadoes. My son and wife have fled New Orleans to escape hurricanes twice and their residence damaged. My husband and I sought shelter as an E-1 tornado tore across our path on the Natchez Trace Parkway. These events occurred only in the past TWO YEARS! I am a scientist and educator and taught and discussed the science of climate change for the past 20 years. It angers me that warning signs have been ignored for far too long. The economic impact increases each year industry and governments fail in their stewardship to take action. The negative impacts grow larger and harder to reverse. Please take corrective actions for my/your grandchildren's futures.</p>
Wendy	Holmgren	Franklin	TN	37069	
Curtis	Tomlin	Chattanooga	TN	37421	
Joanne	Golden	Franklin	TN	37067	Please let's move into the future of clean energy for all.
					<p>As a grandmother of four, I am extremely concerned about the failure of the United States to address climate change aggressively. We have a responsibility to future generations to do our best to alter our energy consumption to make sure our children and grandchildren have a livable world in which to flourish. I am urging TVA to provide leadership by rapidly moving away from fossil fuels to sustainable sources of energy.</p>
Margaret	Cowan	Maryville	TN	37804	
Pauline	Rogers	Spring Hill	TN	37174	
Richard	Sawyer	Corryton	TN	37721	
Alan	Hall	Nashville	TN	37221	
Tamara	Welsh	Chattanooga	TN	37405	We need to build a sustainable future!

John	Brewster	Sewanee	TN	37375	This is an historic opportunity to help build a better future for my grandchildren. Renewable energy is obviously the right choice. The fossil fuel industry brings us a future that moves us toward more problems, more pollution as less hope. Clean energy is clearly the most powerful choice. Please take this step toward a brighter future. Thanks
Michael	Dubrick	Knoxville	TN	37932	
Sarah	Rowe	Nashville	TN	37215	Please begin moving on from polluting, obsolete fossil fuels to the clean solar and wind energies (taking wildlife welfare into account) of the future!
Donald	Clark	Pleasant Hill	TN	38578	
Cynthia	Willett	Smyrna	TN	37167	
Cindy	Holt	Nashville	TN	37206	It is far past time that TVA looks to the future with renewable energy sources and gives up the illusion that natural gas is a healthy alternative to coal.
Charles & Dinah	Crow	Cumberland City	TN	37050	I am very concerned about the impact of new natural gas pipeline construction on the streams that must be crossed in the right of way. Crossing the streams can only degrade the fauna and flora downstream by creating large amounts of sediment that will impact the water quality.
Kathy	Flaherty	Maryville	TN	37803	* TVA needs to do a full EIS on all projects that involve fossil fuels and fully consider renewable energy as an alternative in those studies by taking bids and communicating with solar and wind suppliers as often as it does gas suppliers. I agree with this message, we need to think of the future.
R.T.	Williams	Nashville	TN	37204	When is a courageous stand and common sense more in play than right now? Sometime real soon we must join with one another to make a statement for our future. Those amongst us, whom we have chosen and possess the power, have the opportunity. Use it.
Shahn	Donegan	Hermitage	TN	37076	
Mary Kay	Christophersen	Bristol	TN	37620	

Greg	Loflin	Knoxville	TN	37920	
K	Melton	Butler	TN	37640	Fossil fuels must be replaced. We are in the midst of a devastating climactic time that isn't reversible! Solar, clean energy sources that don't enable more climactic distress are the wise choices. Trading fossil fuel for fossil fuel isn't an intelligent, informed choice-isn't pro environment or pro humanity but would stand as a nonsensical choice to further climate change.
Julia	Hulsey	Greenbrier	TN	37073	I never have been able to have children. But, the healthy condition of our Earth "nest" is very important for our future leaders. Plastic *must* go, along with all fossil fuels!! **Please** consider the environmental impacts of climate change and choose renewable clean energy!
Anna	Tursich	Sneedville	TN	37869	Any successful economic endeavor is forward-thinking. Right now, solar is the obvious choice over fossil fuels, but it is not the end-game. New technologies are evolving which integrate solar and other processes for improved efficiencies and reduction of negative environmental impact. TVA was initially developed to plan for the future. Now we must learn from past successes and mistakes, and look forward to providing the best and safest energy production for future generation of Americans and the world. TVA should be a leader in the industry. The influence of super wealthy individual whose only interest is in protecting their wealth has no place in the public policy of the TVA. The current practice of reducing the payback for energy provided by individual home solar projects is the kind of thing that makes your customers disrespect and distrust the TVA leadership. How will you answer to your great grand children when they ask what did you do to make the world a better place?

Ede	Pyle	Nashville	TN	37201	Having grown up in the oil patch, I have seen the damage and disruption flowing from development and production of hydrocarbons. I urge TVA to embrace solar as our next source of energy.
Lucinda	Chaffin	Nashville	TN	37215	Please replace all fossil fuel generation with clean, renewable energy.
Evelyn	Leo	Kodak	TN	37764	We worry about what this will do to job availability but if you're looking to replace dirty energy with clean and renewable there are plenty of jobs in those fields. Granted people need to be trained but that makes more jobs. Let's just do it
Sharon	Barnett	Maryville	TN	37801	This is a no-brainer for our children's future...no more investment in fossil fuels...renewable energy ONLY!!! No nuclear...because we have no way of containing the waste safely (i.e. until it is no longer a danger). We need to make solar energy a priority with affordable solar for every household.
Beth	Stanton	Morristown	TN	37814	
Morgan	Smith	Goodlettsville	TN	37072	If we're not moving forward we're falling behind.
Beverly	Wilcox	Knoxville	TN	37919	For our children's sake!
John	Minnehan	Hendersonville	TN	37075	Natural gas is not renewable, requires and relies on extracting fossil fuel energy, and increases CO2 emissions. It's time for Tennessee to implement and get on board with renewable energy. Renewable energy in the form of solar and wind energy is the way of the future, Tennessee will benefit economically, environmentally, and technologically.
Betsy	Ragland	Nashville	TN	37216	
Karen	Sorensen	Knoxville	TN	37932	TVA should be a leader in clean energy! Make TN proud!
York	Quillen	Knoxville	TN	37923	
Daniel	Martin	Nashville	TN	37206	
Vance	Sterling	Tallassee	TN	37878	How about the CEO of TVA take a cut in his income and let the common people a break on their bills!!

Amanda	Sanders	Soddy Daisy	TN	37379	
Robert	Payne	Chattanooga	TN	37421	
Christopher	Brooks	Knoxville	TN	37919	
Cherie	Martinez	Chattanooga	TN	37405	It?s about time!!
Michele	Villeneuve	Kingsport	TN	37760	
Luther	Ludwig	Murfreesboro	TN	37127	It's past time to get serious about replacing climate heating carbon fuels. Let's get with solar , I mean really!
Jeannine	Horton	Greeneville	TN	37743	Let's move Tennessee forward away from Earth, forest and life killing fossil fuel energy sources!!! Chose renewables over gas!!! Protect our greatest resources, our air, water, forests, land, Earth!!!! This rapid Climate change is real and human caused!!! Do something "great"!! Move away from oil and gas and into the future NOW! This matters to me and my family because we live here on Earth, it's our home! We have young members in our family who deserve a better cleaner future!!!
Kristina	Ilgner Lamons	Powell	TN	37849	
David	Hegseth	Kodak	TN	37764	
Kathleen	Mahoney-Norris	Farragut	TN	37934	My husband grew up in Knoxville and his father was an engineer with the TVA who worked on Norris Dam. He always talked about how spectacular this area was in its natural beauty. After my husband passed away I moved here to live in this beautiful area and appreciate all its resources. We need to take care of the beauty and healthy environment here for ourselves and our children and grandchildren, and thus need to plan strategically to move away from fossil fuels.
Timothy	Kent	Knoxville	TN	37934	Don't trade one carbon releasing energy for another! If you care about the future for our young people and the earth, go with wind and solar energy!

Sadie	McElrath	Chattanooga	TN	37411	Hello, My husband and I just bought our first electric car and we would like it to run on solar power. I'm so glad TVA is transitioning away from coal, but please replace it with a robust solar power system. It will make us more confident in TVA and more happy to be a customer. Thank you. Sadie McElrath
Paul	Slentz	Nashville	TN	37207	As a person of faith, I believe strongly that care for God's good creation is one of the most pressing demands of our time. Climate change is a current reality that is already affecting millions of people, with the greatest harm happening to the poor, in the United States and throughout the world. This is a crisis that demands the urgent reduction of greenhouse gas emissions. I urge TVA to shut down its remaining coal plants quickly and transition immediately to non-carbon fuel sources, especially solar and wind. Humankind and all the creatures we share this planet with are under dire threat now and action needs to be taken now. Thank you for your consideration of this concern that I share with so many others. Rev. Paul Slentz, Nashville
Helen	Debus	Franklin	TN	37067	
Isabel	Fleming	Goodlettsville	TN	37072	Please read!!
Keb	Wolfe	Knoxville	TN	37921	Renewable energy is what people want. You need to begin switching to it. PLEASE!!
Jennifer	Stainer	Kingsport	TN	37660	Please no more molestation of our planet. Choose SOLAR and WIND as our energy sources.
Sandra	Kilgore	Greenback	TN	37742	For the sake of our children, clean water, clean air and the future of our planet please choose renewable energy over gas!

Dan	Firth	Kingsport	TN	37664	TVA has not demonstrated that the new gas plants are necessary to support renewables. TVA has offered no analysis options where storage is included. TVA must consider that carbon capture will need to be added to maintain viability of any gas assets in just a few years in order to have any chance of net-zero emissions and should include the cost of CC in all analyses of options. TVA needs to lead by building out renewable energy assets and lead us into a renewable energy future.
Linda & Joel	Morris	Knoxville	TN	37914	I am adamantly opposed to modernizing of gas turbines. Climate change demands that TVA must concentrate on renewable energy and increasing them as a percentage of their energy mix. A full EIS must be done on all projects involving fossil fuels including alternative solar and wind.
Troy	Bidwell	Knoxville	TN	37934	
diane	keeney	Nashville	TN	37215	
Sharon	Hart	Butler	TN	37640	Time is now to move into the future of energy. That means facing up to the degradation of our planet and saying NO! That means YES to renewables. That means YES--health for all.
Kent	Minault	Kent	TN	37917	Gas is not clean energy. The leakage from the gas infrastructure around the country is a climate disaster already. Let's not build out more.

Lea	Alexander	Kodak	TN	37764	My 18 yr old daughter feels hopeless about climate change & says others in her generation feel the same. Why? Because they believe you will fail to do the right thing for the planet. As an 11 yr old for a 4H speech, she tackled the evils of fracking, but you seem unaware. Jeff, when you said our transition to clean energy was a marathon rather than a sprint, you spoke from a position of privilege, damnable ignorance of science, & feckless leadership. If we are to save the lands of indigenous peoples in Alaska from rising sea levels, we must sprint. If we are to continue to live above ground, we must sprint. How spiritually evolved are we if we accept human-caused extinction of species? Jeff and board members, we need you to show leadership for the urgent mission of creating clean energy. If you are not up to the challenge of meeting the administration's goals, please resign. Let's put that \$10M+ salary toward clean energy and battery storage! Is hope for TVA's leaders naive?
Katherine	Nelson	Nashville	TN	37215	Gas the wrong choice for Tennessee. Wind and solar make more sense for the future of clean energy in Tennessee.
Carol Michler	Detmer	Murfreesboro	TN	37130	Please consider the environmental impact over time. Renewables are far more practical in many ways, especially their minimal impact on the environment. Gas may be cleaner than coal when it burns, but consider the impact of the pipelines, of extracting it from the ground, etc. Those are very consequential aspects of gas, and not kind to the environment over time.

					I?ll never understand why TVA, which is basically a government funded utility lags so far behind when it comes to sustainability We don?t need gas from fracking or the god awful tar sands of Canada. We need renewables if this planet and its inhabitants are going to stand a chance of surviving. So get your head out of the sand and let?s set the example for investing in renewable energy sources
Tom	Gatti	Kingsport	TN	37664	
Rhonda	Bradley	Crossville	TN	38555	
					We applaud your decision to stop using coal for energy production and urge you to make this transition as quickly as possible. However, to consider replacing coal with another fossil fuel is unthinkable. It is imperative that you only pursue renewable energy sources now and in the future!
Max	Ervin	Murfreesboro	TN	37129	
					I want my children to grow up in a safe environment. This choice will not only impact us now, but in the future to come. Please reconsider and choose renewable energy!
Chriseni	Pulse	Clarksville	TN	37043	
David	Hans	Antioch	TN	37013	
Jacob	Jenne	Powell	TN	37849	
Craig	Drew	Chattanooga	TN	37421	
David	Bordenkircher	Nashville	TN	37211	Gas [proces will go up in the near future. This needs to be repeated.
					I am a long time rate paying TVA customer via KUB. It is immensely important that TVA migrate to renewable energy sources as rapidly as possible.
Michael	Pardee	Knoxville	TN	37919	
Michael	Serkownek	Maryville	TN	37801	
Gary	Sabin	Portland	TN	37148	
Grady	Warren	Lawrenceburg	TN	38464	
Sarah	Schiller	Clarksville	TN	37040	
Jean	Johnston	Decatur	TN	37322	

Dana	Lacy	Nashville	TN	37215	We are seeing the effects of climate change unfold in real time: increased heat, flooding, tornadoes, fires... etc. We really can't afford not to act. It is time to be bold and stand up for change. Others will follow!
Dorothy	Swann	Columbia	TN	38401	
John	Taylor	Fayetteville	TN	37334	Please consider favoring solar panels with battery storage over natural gas, yet another fossil fuel beset by methane release, inherent danger of pipeline placement and inability to meet the net-zero pollution goal by 2050. Yes, the CO2 emissions are better than coal but the overall impact of increasing LNG use and infrastructure will make it impossible for us to meet the yearly emission reduction goal in order to be emission-free by 2050.
Gisella	Patharkar	Mount Juliet	TN	37122	Climate change is the greatest threat and it is high time for real action. Because of climate change large coastal areas and islands may become inundated and cause huge population migrations. We need to act now. It is high time.
Bonnie	Drake	Greenbrier	TN	37073	I love the beauty of Tennessee and I am afraid that we are damaging what makes our state so attractive. With the rapid influx of new residents to our state I feel we need to look at wind and solar in place of fossil fuels.
Ellen	Getter	Chattanooga	TN	37404	Just because you're transitioning away from coal plants, you still use natural gas as an energy source. We need renewable energy now! Don't wait
JoAnn	McIntosh	JoAnn	TN	37043	The United States has set a goal to reach 100 percent carbon pollution-free electricity by 2035, but TVA is planning a gas buildout that will make that impossible. Gas is NOT a transition fuel! The technology exists today for a reliable, decarbonized grid -- please expedite deployment.
Marilyn	Finley	Maryville	TN	37803	Tennessee is falling behind in the adoption of renewable energy. This kind of action by TVA keeps us further behind.
Adam	Hughes	Knoxville	TN	37912	

Kent	Minault	Kent	TN	37917	
					These projects are detrimental to the health of our vibrant communities, our waterways, and our future. You are perpetuating environmental degradation and harm by propagating projects that you know will continue to destroy our planet and harm the most vulnerable. Please stop this unjust project!!!
Justin	Pearson	Memphis	TN	38109	
Dawn	Wetzel	Memphis	TN	38103	
					Clean energy is very important for our future.

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Appendix B – Bat Strategy Project Review Form

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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: Johnsonville Aeroderivative **Date:** 3-19-2021
Contact(s): Brittany Kunkle **CEC#:** **Project ID:** 2020-13
Project Location (City, County, State): New Johnsonville, Humphreys County, Tennessee
Project Description:

Addition of 10 natural gas-fired Aero CTs generating ~550 MW at the JOF. A new compressor station would be constructed on site & operated by TVA. 1-3 new warehouses may be constructed and three existing warehouses could be demolished.

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 checked="" 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 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 type="checkbox"/> 44. Conductor and overhead ground wire installation and replacement
<input 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 checked="" type="checkbox"/> 58. Wastewater outfalls	<input checked="" type="checkbox"/> 81. Water intakes – industrial
<input type="checkbox"/> 30. Dredging and excavation; recessed harbor areas	<input type="checkbox"/> 59. Marine fueling facilities	<input 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 checked="" 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 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 checked="" type="checkbox"/> 77. Construction or expansion of land-based buildings
<input type="checkbox"/> 23. Prescribed burns	<input type="checkbox"/> 47. Conduit installation	<input checked="" type="checkbox"/> 78. Wastewater treatment plants
<input 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 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 type="checkbox"/> 63. Foundation installation for transmission support	<input checked="" type="checkbox"/> 89. Structure demolition
<input checked="" 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 type="checkbox"/> Oct 15 - Nov 14	<input 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 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

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) Sara McLaughlin-Johnson Date 3/19/2021

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 1.0 ☒ 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 7/20/2021

TVA Action	Total 20-year	Winter	Volant Season	Non-Volant Season
5 Operate, Maintain, Retire, Expand, Construct Power Plants	1,676.73	1,295.53	276.47	104.73

STEP 12) Amount contributed to TVA's Bat Conservation Fund upon activity completion: \$ 500 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: Sara McLaughlin-Johnson

Check if Applies to Project	Activities Subject To Conservation Measure	Conservation Measure Description
		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.
		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.
		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.
		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.
		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.

<p>AR1 - Projects that involve structural modification or demolition of buildings, bridges, and potentially suitable box culverts, will require assessment to determine if structure has characteristics that make it a potentially suitable unconventional bat roost. If so a survey to determine if bats may be present will be conducted. Structural assessment will include:</p> <ul style="list-style-type: none"> ○ Visual check that includes an exhaustive internal/external inspection of building to look for evidence of bats (e.g., bat droppings, roost entrance/exit holes); this can be done at any time of year, preferably when bats are active. ○ Where accessible and health and safety considerations allow, a survey of roof space for evidence of bats (e.g., droppings, scratch marks, staining, sightings), noting relevant characteristics of internal features that provide potential access points and roosting opportunities. Suitable characteristic may include: gaps between tiles and roof lining, access points via eaves, gaps between timbers or around mortise joints, gaps around top and gable end walls, gaps within roof walling or around tops of chimney breasts, and clean ridge beams. ○ Features with high-medium likelihood of harboring bats but cannot be checked visually include soffits, cavity walls, space between roof covering and roof lining. ○ Applies to box culverts that are at least 5 feet (1.5 meters) tall and with one or more of the following characteristics. Suitable culverts for bat day roosts have the following characteristics: <ul style="list-style-type: none"> • Location in relatively warm areas • Between 5-10 feet (1.5-3 meters) tall and 300 ft (100 m) or more long • Openings protected from high winds • Not susceptible to flooding • Inner areas relatively dark with roughened walls or ceilings • Crevices, imperfections, or swallow nests ○ Bridge survey protocols will be adapted from the Programmatic Biological Opinion for the Federal Highway Administration (Appendix D of USFWS 2016c, which includes a Bridge Structure Assessment Guidance and a Bridge Structure Assessment Form). ○ Bat surveys usually are NOT needed in the following circumstances: <ul style="list-style-type: none"> • Domestic garages /sheds with no enclosed roof space (with no ceiling) • Modern flat-roofed buildings • Metal framed and roofed buildings • Buildings where roof space is regularly used (e.g., attic space converted to living space, living space open to rafters) or where all roof space is lit from skylights or windows. Large/tall roof spaces may be dark enough at apex to provide roost space 	<p>AR2 - Additional bat P/A surveys (e.g., emergence counts) conducted if warranted (i.e., when AR1 indicates that bats may be present).</p>
<p>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.</p>	

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

L1 - Direct temporary lighting away from suitable habitat during the active season.

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).

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:

Brittany Kunkle

(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)

Brittany Kunkle

 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

1.0

☒ ac ☐ trees and that use of Take will require \$

500

 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 C – Coordination

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Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

February 2, 2015

Mr. E. Patrick McIntyre, Jr.
Executive Director
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA), PROPOSED HEAT RECOVERY STEAM
GENERATOR (HRSG), JOHNSONVILLE FOSSIL PLANT (JOF), HUMPHREYS COUNTY,
TENNESSEE

TVA proposes to construct a heat recovery steam generator (HRSG) at Johnsonville Fossil Plant (JOF). The HRSG would be used to provide steam to an external strategic customer ("the customer"). TVA has a contractual obligation to provide steam to the customer, and does so using steam produced by JOF coal-fired generating units. However, TVA plans to retire all ten coal-fired units at JOF by December 2017 in order to meet requirements of a Federal Facilities Compliance Agreement (which TVA entered into with the U.S. Environmental Protection Agency in April 2011), as well as the requirements of a judicial consent decree with four states and three non-governmental organizations. Constructing the HRSG would allow TVA to continue to provide steam to the customer after JOF coal-fired units are retired.

TVA would construct the HRSG within the JOF reservation at combustion-turbine (CT) Unit 20 ("the undertaking"). Permanent modifications would be limited to a 7.4-acre area at the north end of the Johnsonville CT facility (see "Permanent Use Area" on Figure 1, below). Although TVA has not yet issued detailed designs for the HRSG, the profile would be somewhat lower than the existing CT Unit 20 exhaust stack. Two temporary use areas (covering areas of 6.4 and 4.8 acres) would be set aside for use as laydown or staging areas during construction. In addition, TVA is considering three alternatives for supplying water to the HRSG. One option would be to install a water supply line from an existing raw water intake directly west of CT Unit 20, on the Tennessee River shoreline. A second option would be to install a 708-foot water supply line underground from the existing water treatment building north to the Permanent Use Area, routing the line along the west side of the CT units. The third option is substantially similar to this latter option, but would be routed along the east side of the CT units. These options are shown on the enclosed map.

TVA is simultaneously considering a second alternative, the "No Action" alternative. Under this alternative, TVA would not provide steam to the customer. Instead, the customer would provide

Mr. E. Patrick McIntyre, Jr.
Page Two
February 2, 2015

their own steam by constructing and operating a HRSG. Since TVA would not be involved in the funding, permitting, licensing, or approval of this action, and would not provide financial assistance to the customer, this alternative would not be a TVA undertaking. However, although TVA does not know the location or size of the areas that would be affected by the customer's actions, impacts from the No Action alternative are expected to be limited to previously developed and disturbed lands on the customer's property.

TVA has determined that the undertaking's area of potential effects (APE), for archaeological resources, consist of the 7.4-acre Permanent Use Area and the three water supply line options under consideration. The APE for above-ground (architectural) resources consists of a one-half mile radius surrounding the Permanent Use Area, which is the only location where permanent structures would be constructed as part of the undertaking.

TVA finds that the undertaking would not affect archaeological resources included or eligible for inclusion in the National Register of Historic Places (NRHP). TVA has records of four previous archaeological surveys that included areas in proximity to the Permanent Use Area (Cable 1999, Ezell 2000, Kerr 1996, and McKee 2001). None of the studies resulted in the identification of archaeological sites within the project footprint or its immediate vicinity. During construction of JOF in the 1950s, and maintenance activities and additional construction since that time, significant ground disturbance has taken place within the archaeological APE. Figure 2 shows a comparison of the archaeological APE (labelled "project study area") as depicted on the TVA Land Acquisition Map, based on a 1937 land survey for TVA's Kentucky Reservoir Project, with modern aerial imagery. Prior to construction of JOF, the project area consisted of rolling terrain bisected by a small creek, with a one-story frame house, a barn, scattered outbuildings, a cemetery, and an orchard. Currently, the study area consists of nearly level ground, much of which is paved or covered in gravel. Given the degree of ground disturbance from modern development, TVA finds that the archaeological APE has virtually no potential for the presence of significant, intact archaeological sites.

The undertaking could result in visual effects to any historic architectural resources that may be present within the APE, from the introduction of a new visual element. TVA contracted with Tennessee Valley Archaeological Research (TVAR) to perform a Phase I architectural survey of the APE. Enclosed are two copies of the draft report titled, *Phase I Architectural Survey for the Proposed Construction of a Heat Recovery Steam Generator at TVA's Johnsonville Fossil Plant, Humphreys County, Tennessee*, along with two CDs containing digital copies of the report.

Background research indicated that there are no previously recorded historic architectural resources within the one-mile architectural APE. TVAR completed an architectural assessment of JOF and recommends that it is ineligible for listing in the NRHP due to a lack of architectural distinction and to loss of integrity resulting from extensive modern alterations. TVA agrees with this recommendation and finds that the undertaking would affect no historic properties included or eligible for inclusion in the NRHP.

Pursuant to 36 CFR Sections 800.4(d)(1) and 800.5(b), we are seeking your concurrence with TVA's findings and determinations,

Mr. E. Patrick McIntyre, Jr.
Page Three
February 2, 2015

Pursuant to §800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding historic properties within the APE that may be of religious and cultural significance to the tribes.

Should you have any questions or comments, please contact Richard Yarnell in Knoxville at wryarnell@tva.gov or (865) 632-3463.

Sincerely,

A handwritten signature in black ink, appearing to read "Clinton E. Jones". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Clinton E. Jones, Manager
Biological and Cultural Compliance
Safety, River Management and Environment
WT 11B-K

SCC:CSD

Enclosure

cc (Enclosure):

Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

REFERENCES CITED

Cable, John S.

1999 *Phase I Intensive Cultural Resource Survey of the New Johnsonville Natural Gas Pipeline Route Alternatives, Humphreys and Hickman Counties, Tennessee. Final Report.* Prepared for Tennessee Valley Authority, Norris, TN. Prepared by Palmetto Research Institute, Irmo, South Carolina.

Ezell, Raymond

2000 *Phase I Archaeological Survey of Two Alternate Ash Disposal Sites Near the TVA Johnsonville Fossil Plant, Humphreys County, Tennessee. Draft Report.* Submitted to Tennessee Valley Authority, Norris, TN. Submitted by TRC Garrow Associates, Inc., Nashville, TN.

Kerr, Jonathan P.

1996 *Archeological survey of Kentucky Lake, Western Tennessee and Kentucky. Volume One.* Prepared for Dr. J. Bennett Graham, Tennessee Valley Authority, Cultural Resources Division, Norris, TN. Prepared by Cultural Resources Analysts, Inc., Lexington, KY.

McKee, Larry

2001 *Phase I Archaeological Survey of a Proposed Generator Plant on the TVA Johnsonville Steam Plant Reservation, Humphreys County, Tennessee. Draft Report.* Submitted to Tennessee Valley Authority, Norris, TN. Submitted by TRC Garrow Associates, Inc., Nashville, TN.



Figure 1. Map of areas affected by the undertaking.



Figure 2. Project study area (dashed line) with the TVA Land Acquisition Map for Kentucky Reservoir (1937) superimposed on modern aerial imagery.

PHASE I ARCHITECTURAL ASSESSMENT FOR THE PROPOSED
CONSTRUCTION OF A HEAT RECOVERY STEAM GENERATOR AT
TVA'S JOHNSONVILLE FOSSIL PLANT,
HUMPHREYS COUNTY, TENNESSEE



INTERNAL COPIES, NOT INCLUDED WITH OUTBOUND LETTER:

Ashley Farless, BR 4A-C
Bo Baxter, WT11C-K
Skip Markham, BR 4A-C
Richard Yarnell, WT11D-K
EDMS, WT CA-K



TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON ROAD
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

February 23, 2015

Mr. Clinton Jones
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902

RE: TVA, CULTURAL RESOURCES ASSESSMENT, JOF/HEAT RECOVERY STEAM
GENERATOR, JOHNSONVILLE, HUMPHREYS COUNTY, TN

Dear Mr. Jones:

At your request, our office has reviewed the above-referenced cultural resources survey report in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). Based on the information provided, we concur that the project area contains no historic properties eligible for listing in the National Register of Historic Places.

If project plans are changed or archaeological remains are discovered during construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act.

Your cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jmb



TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

February 2, 2017

Mr. Clinton E. Jones
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

RE: TVA / TENNESSEE VALLEY AUTHORITY, Construction of a Heat Recovery
Steam Generator at Johnsonville Fossil Plant, Johnsonville, HUMPHREYS COUNTY,
TN

Dear Mr. Jones:

At your request, our office has reviewed the above-referenced architectural resources final report. This review is a requirement of Section 106 of the National Historic Preservation Act for compliance by the participating federal agency or applicant for federal assistance. Procedures for implementing Section 106 of the Act are codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Based on the information provided, we find that the final report meets the Tennessee State Historic Preservation Office Reporting Standards and/or the Tennessee SHPO Standards and Guidelines for Archaeological Resource Management Studies.

Your continued cooperation is appreciated.

Sincerely,



E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/dlc



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

January 25, 2018

Mr. E. Patrick McIntyre, Jr.
Executive Director
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

**TENNESSEE VALLEY AUTHORITY (TVA), JOHNSONVILLE FOSSIL PLANT
DECONSTRUCTION, HUMPHREYS COUNTY, TENNESSEE**

TVA retired Units 1 through 10 of Johnsonville Fossil Plant (JOF) on December 31, 2017 in accordance with a Federal Facilities Compliance Agreement (Docket No. CAA-04-20120-1760) that TVA signed in 2010 with the U.S. EPA, and in accordance with a judicial consent decree with four states and three non-governmental organizations. These agreements, collectively referred to as the "EPA Agreements", require TVA to reduce emissions from its coal-fired power plants, including JOF.

TVA proposes to deconstruct JOF with the goal of developing the site as a brownfield. Alternatives under consideration include (1) closing and securing the site without demolition; (2) selective demolition of most outlying structures including the coal handling facilities and a steam pipeline that was used in conveying steam to an adjacent industrial facility; and (3) demolition of the entire site except for structures that will remain in support of the continued operation of the combustion turbines. If TVA selects the latter option, all fossil plant-related structures including the powerhouse, coal handling facilities, roads and parking lots would be demolished to grade. The exhaust stack may be left in place, demolished, or disassembled in whole or part by hand. TVA has determined that the proposed deconstruction of JOF is an undertaking (as defined at 36 CFR § 800.16(y)) that has the potential to cause effects on historic properties. We are initiating consultation under Section 106 of the National Historic Preservation Act for this undertaking.

Figure 1, below, shows the area affected by the demolition project. All demolition activities would be confined to the area within the red polygon in Figure 1. TVA will continue to operate the Johnsonville Combustion Turbine Units (JCT), located within the JOF reservation. The JCT water treatment plant, diesel fire pump house, fuel oil unloading facility, 69-kilovolt (kV), 161-kV and 500-kV switchyards, and Booster Fan Building will remain in service indefinitely regardless of the plant deconstruction option carried out at JOF.

TVA determined the area of potential effects (APE) for archaeological resources to include all areas where physical actions associated with demolition would take place. Although no

physical actions related to the undertaking would take place outside the archaeological APE, facilities that are part of JOF but located outside the archaeological APE could be considered to be contributing elements to JOF, were JOF to be determined eligible for inclusion in the National Register of Historic Places (NRHP). Therefore, TVA considers the APE for aboveground properties to include JOF and all related facilities within the fossil plant reservation, exclusive of JCT.

TVA evaluated the undertaking's potential to affect archaeological resources through background research that included historic United States Geological Survey topographic maps, TVA's 1937 land acquisition map for Kentucky Reservoir, TVA's original plant grading plan from 1949, current satellite imagery (as shown in Figure 1), and previous archaeological investigations. Currently, the study area consists of level ground covered in asphalt, the powerhouse, the coal conveyor, the steam pipeline, a section of the coal yard, and an area containing utility buildings such as the yard equipment maintenance building. Prior to JOF construction in 1949-52, most of the APE consisted of terraces and stream banks associated with a small creek (Figure 2, below). Small farms were scattered around the area, although none were located in the APE. One historic cemetery is shown on the 1937 land acquisition map within the JOF reservation but outside of the archaeological APE. TVA's technical report on JOF (TVA 1958:207-208) states that the cemetery was "within an area which was to be excavated to a depth of more than 8 feet, making removal necessary." During construction of JOF the powerhouse foundation was excavated to a grade of 340 feet above mean sea level (amsl) (TVA 1958:228), which is 14-40 feet lower than the original ground surface. Excavation spoils were used as fill to create the south harbor dike and the coal yard.

One archaeological site (40HS277) was recorded previously within the APE. The site was recorded by the Tennessee Division of Archaeology in 1994 based on information provided by an artifact collector, who collected artifacts during JOF construction. Site 40HS277 was reported as measuring 100 meters by 100 meters, and yielded a Clovis point. The site was located where the JOF condenser intake and water treatment plant were later constructed (Figure 3, below; this location is also shown by Figure 19 in the enclosed report). Comparison of pre-1950 contour maps with the JOF grading plan and current setting indicates the site was destroyed by the construction of the condenser water intake. According to the site form, the site could not be relocated during a 2006 revisit. Based on this information, TVA finds that site 40HS277 is no longer extant. During four previous archaeological surveys that included areas in proximity to the APE (Cable 1999, Ezell 2000, Kerr 1996, and McKee 2001) no archaeological sites were identified in the APE or its immediate vicinity.

In 2015, TVA consulted with your office regarding TVA's proposed heat recovery steam generator (HRSG) at JOF. The archaeological APE for that study, which was north of the powerhouse area, slightly overlapped the current APE. TVA and your office agreed that the construction, maintenance, and additions at JOF since the 1950s rendered the archaeological APE void of intact archaeological sites. Our background research for the current undertaking leads to the same conclusion. Therefore, TVA finds that the proposed retirement of JOF would affect no archaeological sites.

Mr. E. Patrick McIntyre, Jr.
Page 3
January 25, 2018

In TVA's previous consultation on the HRSG in 2015, we proposed that JOF is ineligible for inclusion in the NRHP due to a lack of architectural distinction and to the loss of integrity resulting from extensive modern alterations. Your office agreed (letter dated February 23, 2015). Based on this previous consultation TVA finds that JOF is ineligible for inclusion in the NRHP.

TVA finds that the proposed deconstruction of JOF would have no effect on historic properties. Pursuant to 36 CFR Part 800.4(d)(1), we are seeking your concurrence with TVA's finding of "no historic properties affected".

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 Ted Wells by email, ewwells@tva.gov or by phone, (865) 632-2259.

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

References Cited

Cable, John S.

1999 *Phase I Intensive Cultural Resource Survey of the New Johnsonville Natural Gas Pipeline Route Alternatives, Humphreys and Hickman Counties, Tennessee. Final Report.* Prepared for Tennessee Valley Authority, Norris, TN. Prepared by Palmetto Research Institute, Irmo, South Carolina.

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Mr. E. Patrick McIntyre, Jr.

Page 4

January 25, 2018

Kerr, Jonathan P.

1996 *Archeological Survey of Kentucky Lake, Western Tennessee and Kentucky. Volume One.* Prepared for Dr. J. Bennett Graham, Tennessee Valley Authority, Cultural Resources Division, Norris, TN. Prepared by Cultural Resources Analysts, Inc., Lexington, KY.

McKee, Larry

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Tennessee Valley Authority (TVA)

1958 *The Johnsonville Steam Plant: A Comprehensive Report on the Planning, Design, Construction, Costs, and First power Operations of the Initial Six-Unit Plan. Technical Report No. 31.* Tennessee Valley Authority, Knoxville, TN.

INTERNAL COPIES ONLY, NOT TO BE INCLUDED WITH OUTGOING LETTER:

Sheliah D. Baker, LP 5P-C
A. Michelle Cagley, KFP 1T-KST
Stephen C. Cole, WT 11D-K
Carol Freeman,
Susan R. Jacks, WT 11C-K
Stacey S. McCluskey, OSA 1D-M
Rebecca J. Seaton, JOF A-NJT
M. Susan Smelley, BR 4A-C
Edward W. Wells, WT 11D-K



0 0.4 Miles

Legend

- JOF Retirement APE
- JOF Reservation



Figure 1. JOF Reservation (TVA fee-owned) and JOF Deconstruction APE.

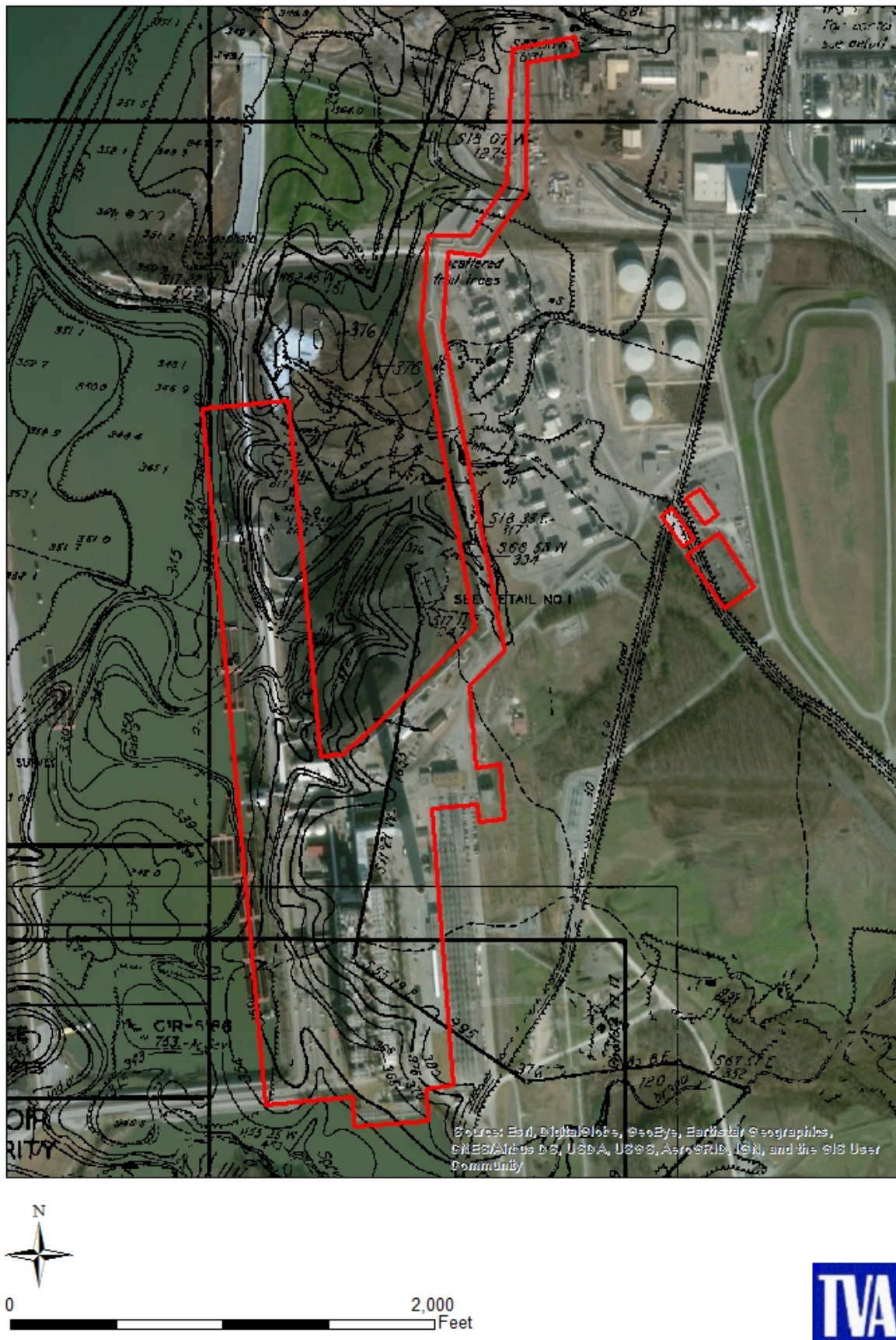


Figure 2. TVA's 1937 land acquisition map for Kentucky Reservoir, overlaid on the archaeological APE.

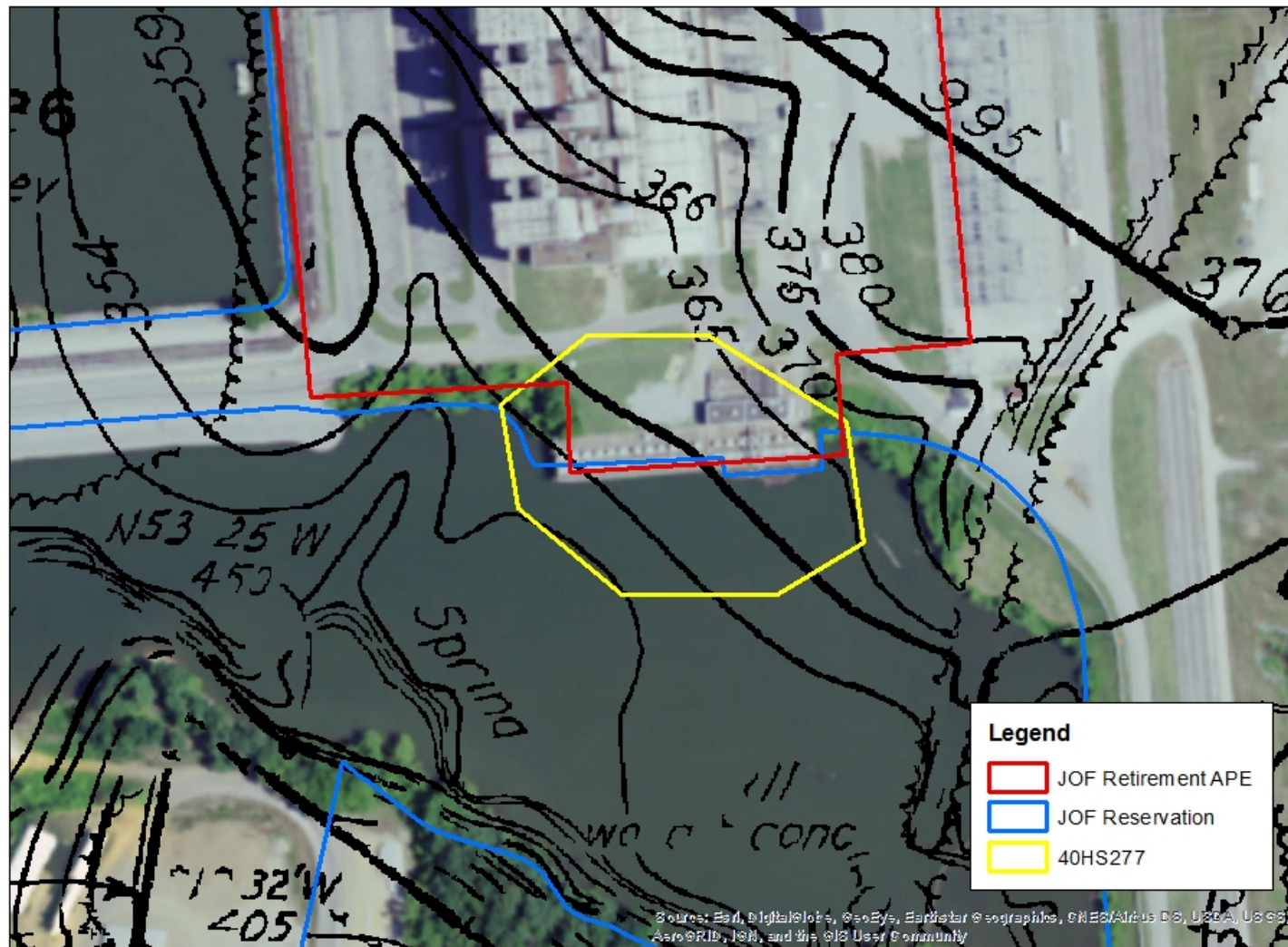


Figure 3. Recorded location of 40HS277, currently occupied by the JOF condenser water intake and water treatment plant. Overlay shows TVA's 1937 land acquisition map, with original contours. Normal summer pool elevation of Kentucky Reservoir is 359 feet amsl.



TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

February 14, 2018

Mr. Clinton E. Jones
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

RE: TVA / Tennessee Valley Authority, Johnsonville Fossil Plant Deconstruction, , Humphreys County, TN

Dear Mr. Jones:

In response to your request, we have reviewed the cultural resources survey report and accompanying documentation submitted by you regarding the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Considering the information provided, we concur that no historic properties eligible for listing in the National Register of Historic Places will be affected by this undertaking. If project plans are changed or archaeological remains are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Questions or comments may be directed to Casey Lee (615 253-3163).

Your cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/cjl



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

March 21, 2018

Mr. E. Patrick McIntyre, Jr.
Executive Director
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA), JOHNSONVILLE FOSSIL PLANT, COAL YARD CLOSURE, COAL YARD RUNOFF POND CLOSURE, PROCESS WATER BASIN, AND BORROW PIT, HUMPHREYS COUNTY, TENNESSEE

TVA has ended power generation at the Johnsonville Fossil Plant (JOF) in Humphreys County, Tennessee. Earlier this year we consulted with your office regarding TVA's proposed deconstruction of the generating facility. Our offices agreed that deconstruction of JOF would result in no effects on historic properties. TVA proposes four additional actions at JOF related to the deconstruction of JOF:

- Closure of the JOF Coal Yard (CY)
- Closure of the JOF Coal Yard Runoff Pond (CYRP)
- Construction of a Process Water Basin (PWB)
- Development of a Borrow Site

Figure 1, below, shows the location of each of these proposed actions. The JOF CY is a graded area where TVA stockpiled coal prior to pulverizing it and feeding it into the plant's generating units. The JOF CYRP is a pond that was constructed to hold runoff from the CY. TVA proposes to close the CY one of three ways; capping the CY in its current footprint, consolidating the material in the CY footprint and capping it, or removing the CY material to an offsite landfill and covering the CY with soil and vegetation. TVA would also close the CYRP and construct a new storm water outfall to convey drainage from the site to Kentucky Lake. The PWB would be constructed to capture and treat storm water and process water flows from the Johnsonville gas plant site (also called the combustion turbine or "CT" site). TVA would construct the PWB within the footprint of the CY and/or the CYRP. TVA would obtain fill material for the CY, PWB, and CYRP projects from a new soil borrow site located south of the JOF generating facility.

The proposed actions would necessitate use of a construction laydown yard. Two existing laydowns areas located east of the plant switchyard would be utilized for this purpose. The actions also require the use of haul roads. Existing paved and gravel roads would be used as haul roads (the laydown yard and haul roads are shown in Figure 1). TVA does not consider

Mr. E. Patrick McIntyre, Jr.
Page 2
March 21, 2018

the continued use of an existing construction laydown, or the use of existing paved/gravel roads as haul roads, to have potential to result in effects on historic properties. TVA determined that the area of potential effects (APE) for archaeological sites includes the CY, the CYRP, and the proposed borrow site.

Part of the area affected by the JOF Deconstruction project extends into the CY, and was discussed in our January 25, 2018 letter to your office concerning that project. Figure 2, below, shows the CY and CYRP areas with modern satellite imagery. Figure 3 shows an overlay of TVA's 1937 land acquisition map for Kentucky Reservoir on satellite imagery of these areas. In evaluating the potential for intact Holocene deposits in the CY and CYRP areas, we examined TVA's 1937 land acquisition map for Kentucky Reservoir, TVA's original plant grading plan from 1949, current satellite imagery (as shown in Figure 1), and previous archaeological investigations. Prior to construction of JOF these areas consisted of two branches of a small creek and its terraces. As documented in TVA's technical report on JOF (TVA 1958:207-208) and by the 1949 grading plan, TVA construction crews excavated and graded soil to depths ranging from approximately 3 feet to nearly 20 feet throughout the CY and surrounding area during plant construction (JOF was constructed between 1949 and 1952). Based on these historical documents TVA finds that the CY and CYRP areas have no potential to contain intact archaeological sites due to these past land disturbing activities.

TVA proposes to borrow soil from an approximately 164-acre area south of the generating site (see Figure 1). The proposed soil borrow straddles an existing transmission line corridor. TVA performed a Phase I Archaeological survey of the portion of the proposed soil borrow that lies in the transmission line corridor in 2016, and consulted with your office on the findings. The survey identified no archaeological sites, and your office agreed (by letter dated March 20, 2017) with TVA's finding of "no historic properties affected".

In order to identify archaeological sites in the remaining portion of the proposed soil borrow, which encompasses approximately 100 acres, TVA retained Tennessee Valley Archaeological Research (TVAR) to perform a Phase I Archaeological survey. Enclosed are two copies of the draft report, titled, *A Phase I Archaeological Survey of a Proposed Borrow Pit in New Johnsonville, Humphreys County, Tennessee*.

The survey included the excavation of 470 shovel test pits in the APE. One isolated find, consisting of three flakes, was identified. The survey identified no archaeological sites. TVAR recommends that the isolated find is ineligible for inclusion in the National Register of Historic Places. The survey findings indicate that the majority of the APE has been affected by severe soil erosion.

TVA has read the enclosed report and agrees with the authors' findings and recommendations. Based on this survey, TVA finds that the proposed undertaking would have no effect on historic properties.

Pursuant to 36 CFR Part 800.4(d)(1), we are seeking your concurrence with TVA's finding that no historic properties would be affected by the proposed undertaking.

Mr. E. Patrick McIntyre, Jr.
Page 3
March 21, 2018

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 in Knoxville by email, sccole0@tva.gov or by phone, (865) 632-2551.

Sincerely,

A handwritten signature in black ink, appearing to read "Clinton E. Jones".

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

INTERNAL COPIES ONLY, NOT TO BE INCLUDED WITH OUTGOING LETTER:

Sheliah D. Baker, LP 5P-C
A. Michelle Cagley, KFP 1T-KST
Stephen C. Cole, WT 11D-K
Carol Freeman, BR 4A-C
Marty M. Gamble, WT 11C-K
Susan R. Jacks, WT 11C-K
Stacey S. McCluskey, OSA 1D-M
Rebecca J. Seaton, JOF A-NJT
M. Susan Smelley, BR 4A-C
Edward W. Wells, WT 11D-K
ECM, WT CA-K

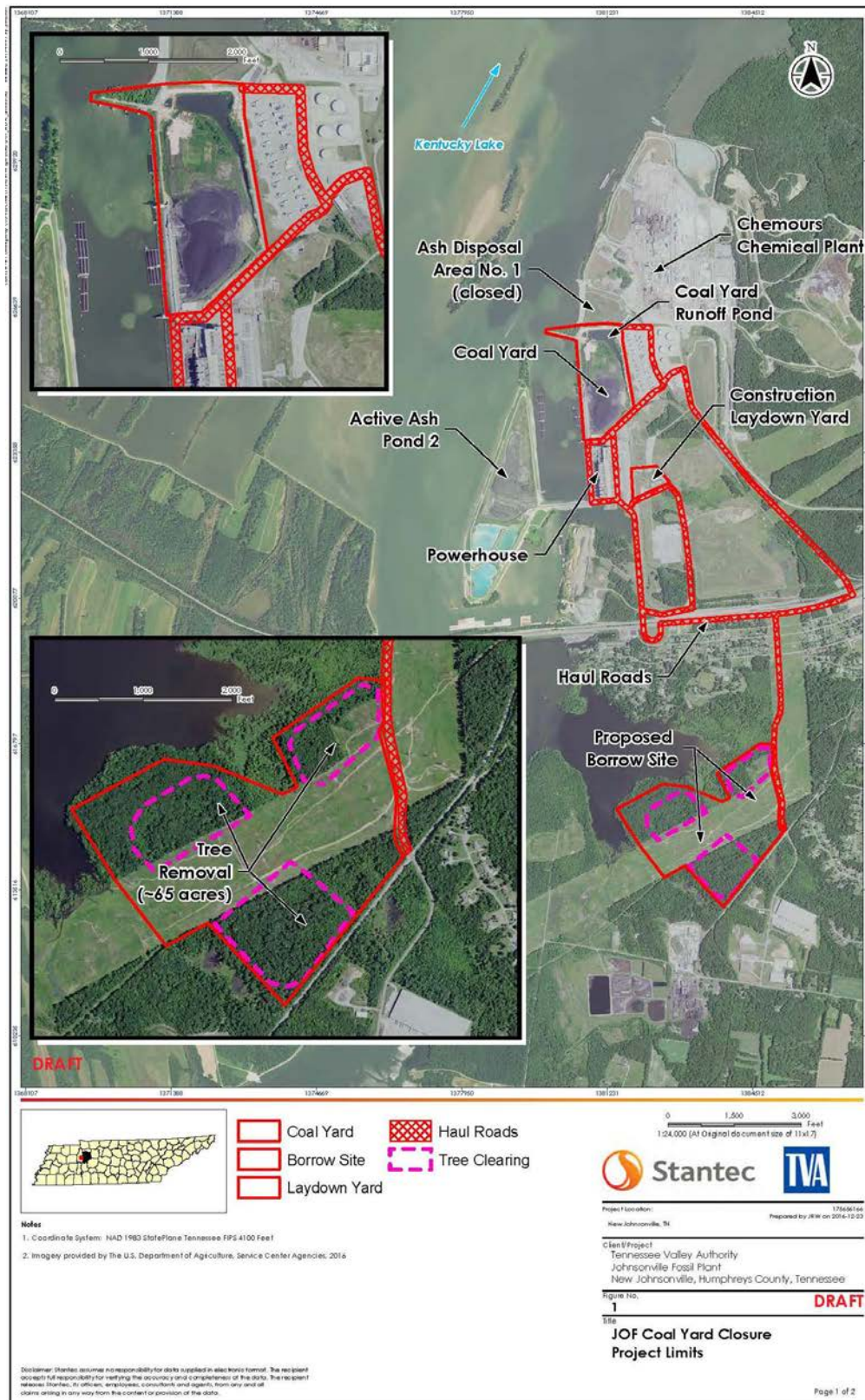
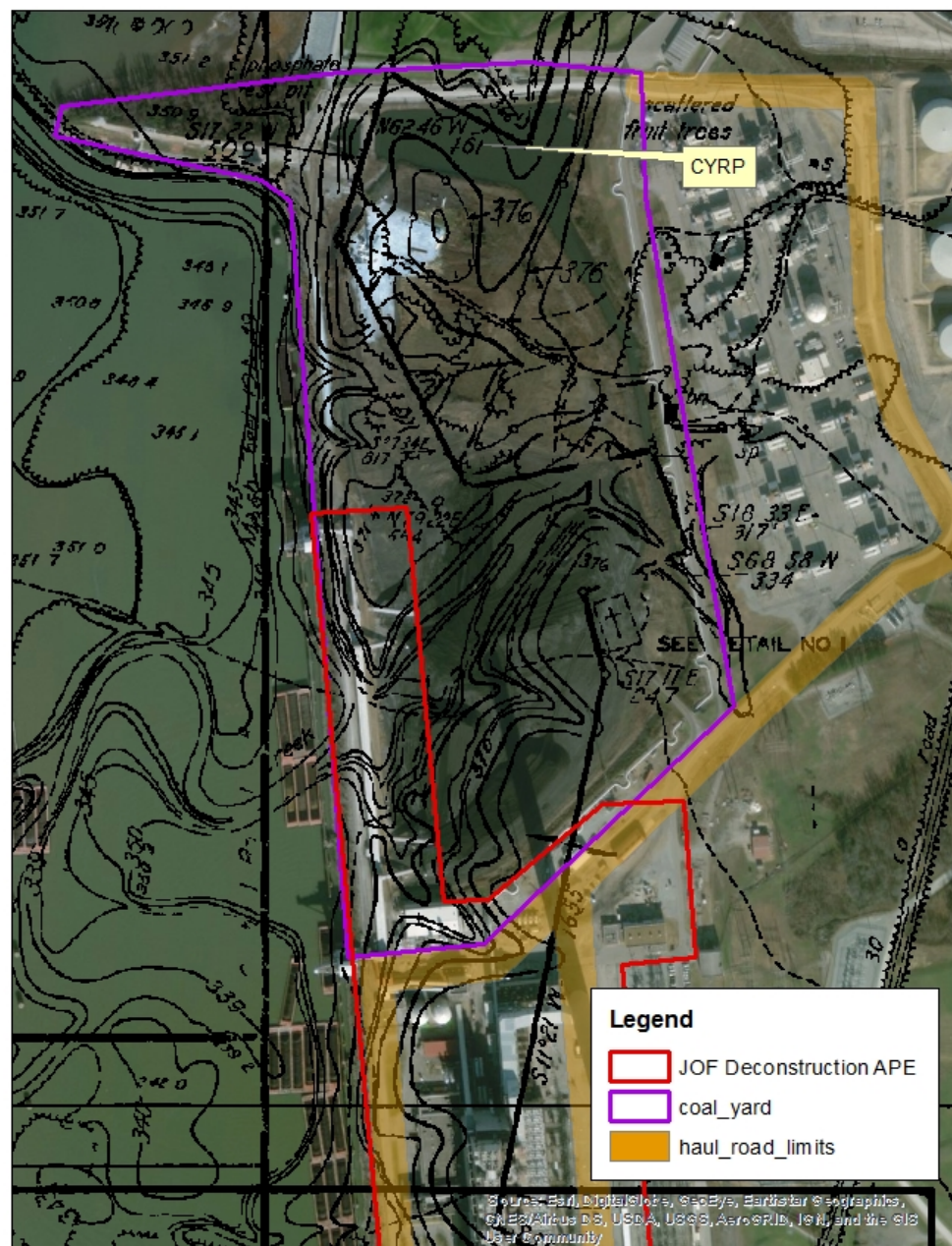


Figure 1. Locations of the proposed actions.



Figure 2. Location of the CY, CYRP, and haul roads in relation to the JOF Deconstruction APE.



0 1,000 Feet



Figure 3. Project area with overlay of the 1937 land acquisition map.

A Phase I Archaeological Survey of a Proposed Borrow Pit in
New Johnsonville, Humphreys County, Tennessee



Tennessee
Valley
Archaeological
Research



TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
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April 5, 2018

Mr. Clinton E. Jones
Tennessee Valley Authority
Biological and Cultural Compliance
400 West Summit Hill Drive
Knoxville, TN 37902

RE: TVA / Tennessee Valley Authority, Johnsonville Fossil Plant Coal Yard Closure, Coal Yard Runoff Pond Clouser, Process Water Basin, and Borrow Pit, New Johnsonville, Humphreys County, TN

Dear Mr. Jones:

In response to your request, we have reviewed the archaeological resources survey report and accompanying documentation submitted by you regarding the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Considering the information provided, we concur that no historic properties eligible for listing in the National Register of Historic Places will be affected by this undertaking. If project plans are changed or archaeological remains are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Questions or comments may be directed to Jennifer Barnett (615) 687-4780.

Your cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jmb