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JOHNSONVILLE FOSSIL PLANT DECONTAMINATION AND DECONSTRUCTION
FINAL ENVIRONMENTAL ASSESSMENT
Humphreys County, Tennessee

Prepared by:
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Symbols, Acronyms, and Abbreviations

µR/hr	microRem per hour
AADT	Average Annual Daily Traffic
ACM	Asbestos-Containing Material
APE	Area of Potential Effect
BMP	Best Management Practice
CCR	coal combustion residual
CCW	Condenser Circulating Water
CEQ	Council of Environmental Quality
CT	combustion turbine
dB	decibel
dBA	A-weighted decibel
EA	Environmental Assessment
EO	Executive Order
EPA	Environmental Protection Agency
FTA	Federal Transit Authority
gpm	gallons per minute
HazMat	hazardous materials
HRSG	heat recovery steam generator
HUC	Hydrologic Unit Code
JCT	Johnsonville Combustion Turbine
JOF	Johnsonville Fossil Plant
kV	kilovolt
LF	linear feet
L_{dn}	Day-Night Sound Level
LOS	Level of Service
mg/L	milligrams per liter
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PCB	polychlorinated biphenyl
pCi/g	picocuries per gram
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
Ra-	radium
RCRA	Resource Conservation and Recovery Act
SF	square feet
SHPO	State Historic Preservation Office
SR	State Route
SWPPP	Storm Water Pollution Prevention Plan
TDEC	Tennessee Department of Environment and Conservation
TENORM	Technologically Enhanced Naturally Occurring Radioactive Materials
TRM	Tennessee River Mile
TSI	Thermal System Insulators
TVA	Tennessee Valley Authority
U.S.	United States
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VdB	vibration decibels

CHAPTER 1 - PURPOSE OF AND NEED FOR ACTION

1.1 Introduction and Background

The Tennessee Valley Authority (TVA) Johnsonville Fossil Plant (JOF) located near New Johnsonville in Humphreys County, Tennessee, ceased operation on December 31, 2017. Prior to retirement, JOF was the oldest fossil plant in the TVA system with ten coal-fired generating units with a total capacity of 1254 megawatts (MW). The original six units were constructed between 1949 and 1956, followed by the construction of four additional units in 1956. Units 5 through 10 ceased power generation in 2012 and were retired on December 31, 2015. Units 1 through 4 ceased operation and were retired on December 31, 2017.

Decommissioning activities at JOF have already begun on Units 5 through 10 under an agreement that TVA entered into with the United States (U.S.) Environmental Protection Agency (EPA) in April 2011. Decommissioning is the performance of activities required to ready a facility for deactivation and demolition. Work to be performed includes removal of equipment, components, and parts that can be used at other TVA sites, draining of oil/fluids from equipment, removal of ash from boilers, removal of polychlorinated biphenyl (PCB) transformers, removal of furniture/furnishings, removal of information technology assets, removal of plant records, etc.

TVA's agreement with EPA is a Federal Facilities Compliance Agreement that resolved a dispute over how the Clean Air Act's New Source Review program applied to maintenance and repair activities at TVA's coal-fired power plants. TVA also entered into a judicial consent decree with the States of Alabama, Kentucky, Tennessee, and North Carolina, and three environmental advocacy groups (1) the Sierra Club, (2) the National Parks Conservation Association, and (3) Our Children's Earth Foundation. The consent decree is substantively similar to the Federal Facilities Compliance Agreement. These agreements (collectively called the "EPA Agreements") require TVA to reduce emissions across its coal-fired generating system and take other actions at its coal plants, including retiring some of its units (hence TVA's previous retirement of JOF Units 5-10).

Separate from JOF, the Johnsonville Combustion Turbine (JCT) facility will continue operations on the site, and the EPA Agreements do not affect the operation of this facility. The JCT facility is comprised of sixteen individual combustion turbine (CT) units added in the 1970s with an additional four CT units added in 2000 (20 total CT units). Utilizing fuel oil or natural gas, and water from the water treatment building, a recently installed heat recovery steam generator (HRSG) at the JCT facility site will continue to provide treated water and steam to the Chemours manufacturing facility adjacent to JOF. The JCT facility will continue operations and is not considered in this Environmental Assessment (EA).

Similarly, the impact of activities associated with the closure of Ash Pond 2, the Coal Yard, and the Coal Yard Runoff Pond, remediation of any contaminated soils associated with the coal yard, re-purposing of the coal yard runoff pond, and closure of the National Pollutant Discharge Elimination System (NPDES) outfalls in conjunction with closure of discharge and stormwater permits, will be assessed in separate environmental reviews, since all such activities would occur independently of the deconstruction of JOF.

TVA is investigating the future disposition of the JOF plant. Options include: 1) securing and maintaining the entire plant, 2) securing and maintaining portions of the plant, 3) deconstructing/demolishing the plant, or 4) leaving the plant as is and taking no action.

Securing and maintaining part or all of the plant (i.e., Options 1 and 2) entails de-energizing the facilities and placing JOF in an “idle and vacant” status during which basic maintenance is continued to prevent safety issues. Under all options, the water treatment building and reverse osmosis (R.O.) trailers, diesel fire pump house, fuel oil unloading facility, 69-kilovolt (kV), 161-kV, and 500-kV switchyards, and the Booster Fan Building would remain in service indefinitely.

Figure 1-1 shows the location of JOF in west-central Tennessee on the east bank of the Kentucky Reservoir of the Tennessee River. JOF is located in New Johnsonville approximately 5 miles southwest of the Town of Denver, and 65 miles west of Nashville. The approximately 62-acre Deconstruction Project Area for this EA is shown on Figure 1-2. The portion of the Deconstruction Project Area on the western side that appears to fall outside of the JOF boundary (i.e., the portion located over the water) represents the mooring cells, which will remain in place, but demolition requires removing all the ladders, walkways (catwalks), etc. from the mooring cells. Buildings and structures at JOF considered for deconstruction/demolition could include the following (Figures 2-1 through 2-3):

- Powerhouse Units 1 through 10
- Flue Gas Stack
- Old Water Treatment Plant and Sump
- Office Wing
- Service Bay
- Red Storage Barn North of the Service Bay
- Crusher Building
- Coal Barge Unloaders (down to the concrete pad; foundation will remain)
- Aboveground Coal Conveyors and Coal Conveyor Tunnels to 3 feet below final grade
- Steam Line
- Tank Farm
- Wash Pad Facility North of the Utility Building
- Storage Building and Warehouses near the Utility Building
- Utility Building
- Gasoline Island
- Diesel Fueling Island and associated piping (to 3 feet below final grade)
- Retired Underground Tank
- Receiving Conveyor and Hopper Building
- Red Warehouse
- Electrical Control Building
- Hydrogen Trailer Port A
- Hydrogen Trailer Port B
- Guard House
- Railroad and crossties

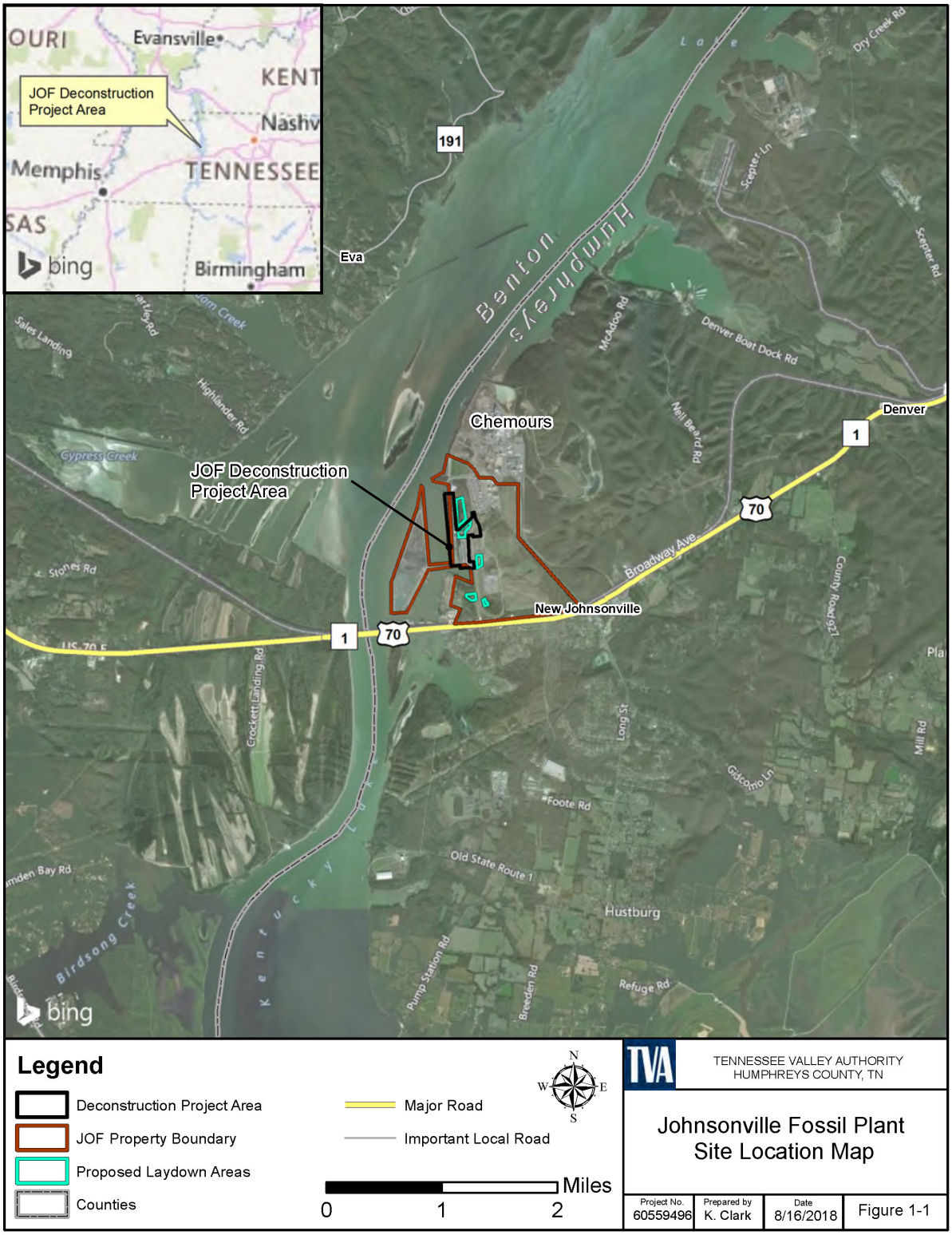


Figure 1-1. Johnsonville Fossil Plant Site Location Map

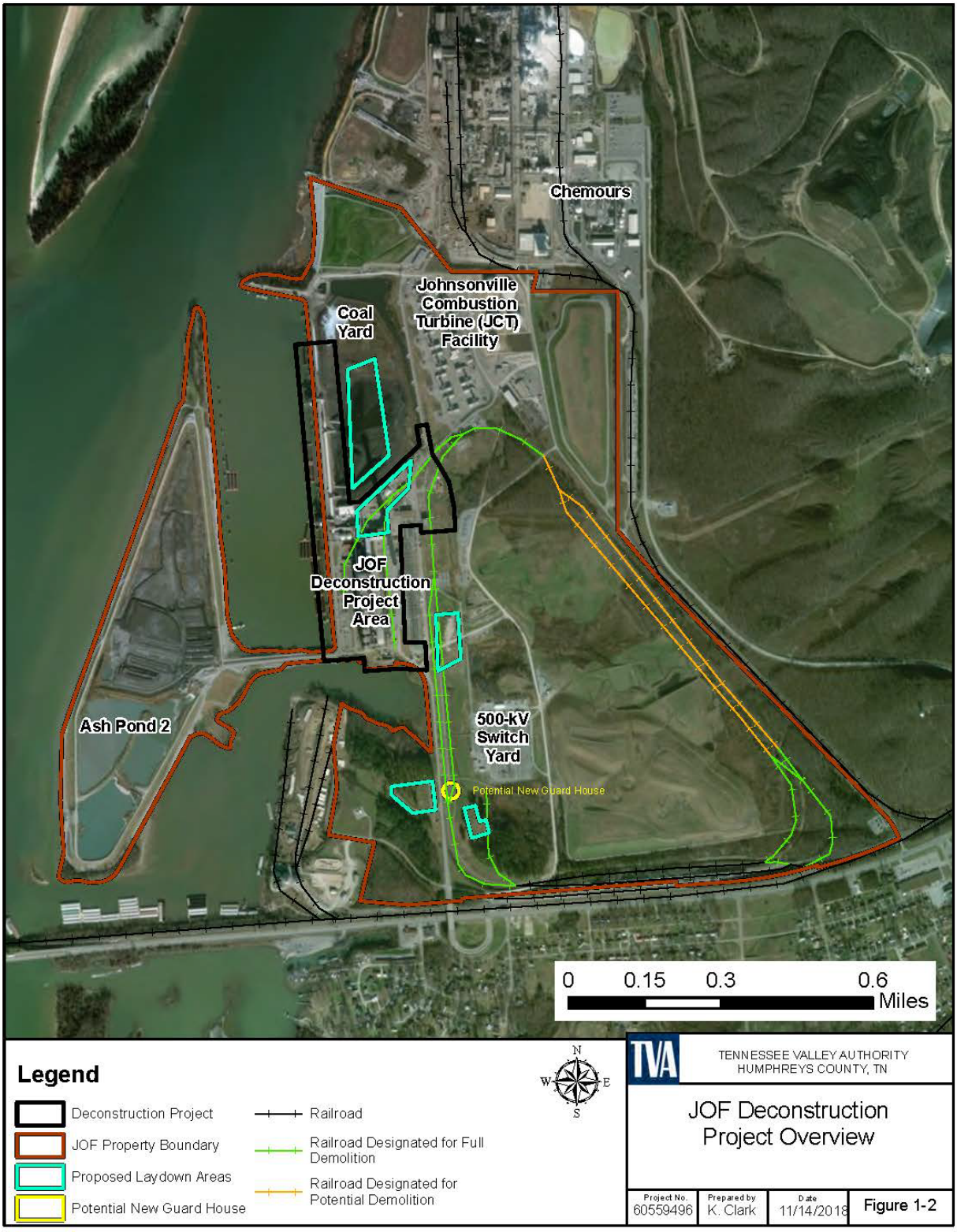


Figure 1-2. JOF Deconstruction Project Overview

The following features are also included for consideration for deconstruction/demolition. These items are either located below ground or are too small to be displayed on Figures 2-1 through 2-3:

- Select plant roads and parking lots
- Street Lighting
- Intake Condenser Circulating Water Tunnels
- Discharge Condenser Circulating Water Tunnels
- All decommissioned piping from the tank farm (that may contain residuals) to the Utility Building, the Coal Pile, and the Tug Fueling Station
- Coal Conveyor Tunnels and Transfer Pits to 3 feet below final grade (facilities below 3 feet would be abandoned in place)
- Dock Service Building
- Rotary Car Dumper (and associated railroad track, ties, and ballast)
- Sanitary Sewer Connections from Demolished Facilities (Main Network of Sewers, connected to the Johnsonville municipal waste system, will remain)
- Plant Perimeter Fencing *(only under Alternatives C1 through C4)*

The following buildings and facilities located within the Deconstruction Project Area will remain in place and operational at JOF:

- Intake Pump Station
- Water Treatment Building and R.O. Trailers
- Booster Fan Building
- Draft Sys XFMR YD
- Diesel Fire Pump House
- Demineralized Water Tanks
- Combustion Turbine (CT) Storage Building
- CT Facility (20 units)
- Road access from US Highway 70 past the switchyard to the CT site
- JCT Perimeter Fencing
- Fuel Oil Truck Unloading Facility for the JCT
- Coal Yard Drainage Pond (to become the process water basin)
- Switch Houses
- 69-kV, 161-kV and 500-kV switchyards and all associated insulating oil piping and pits

1.2 Purpose and Need

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

1.3 Decision to be Made

This EA is being prepared to inform TVA decision makers and the public about the environmental consequences of the Proposed Action. The decision TVA must make is whether to assess, close, and secure power production facilities, and implement an operations and

maintenance program to maintain structures and equipment for all or part of the plant; demolish the facility to grade; or to take no action. TVA is working with the Tennessee Department of Environment and Conservation (TDEC), U.S. Fish and Wildlife Service (USFWS), and Tennessee Historical Commission in assessing the impacts of its decision.

1.4 Related Environmental Reviews and Consultation Requirements

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

- *TVA 2015a, Integrated Resource Plan 2015 Final Supplemental Environmental Impact Statement*
- *TVA 2015b, Johnsonville Cogeneration Plant Final Environmental Assessment*
- *TVA 2014, City of Waverly Sewer Line and Outfall Environmental Assessment*

1.5 Scope of the Environmental Assessment

TVA has prepared this EA to comply with the National Environmental Policy Act (NEPA) and associated implementing regulations. TVA considered the possible environmental effects of the Proposed Action and determined that potential effects to the environmental resources listed below were relevant to the decision to be made; thus, the following environmental resources are addressed in detail in this EA:

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

1.6 Necessary Permits or Licenses

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

- Air Construction Permit and modification of existing Title V Permit.
- NPDES Permit for JOF (TN 0005444). The current permit is administratively continued; TVA would continue to work under the current NPDES permit through the closure process.
- Permits associated with disposal of sewage and sanitary wastewater into the Johnsonville Municipal Waste System
- Aboveground storage tank registrations and permits will require updating, provided the tanks are abandoned or removed. Underground storage tanks would be removed and/or retired and sites remediated within the deconstruction project area footprint.
- Oil Spill Prevention, Control, and Countermeasure Plan or Integrated Pollution Prevention and Spill Response Plan would be updated to reflect the removal of the fossil plant.
- Coverage under JOF Multi-Sector General Stormwater Permit (Stormwater) (TNR05000) for discharges from industrial sites. The Notice of Coverage was issued June 12, 2015 and expires April 14, 2020. During project demolition activities, TVA would modify the site operational Storm Water Pollution Prevention Plan (SWPPP) as necessary to reflect current site conditions.
- U.S. Army Corps of Engineers (USACE) Section 404 permit, if wetlands in the project area are filled or dredged, and associated Section 401 certification from the State of Tennessee if a Section 401 permit is needed.
- Notification of Demolition (State of Tennessee and National Emission Standards for Hazardous Air Pollutants).
- Consistent with the National Flood Insurance Program, the local floodplain administrator would be contacted, when appropriate, to determine the actions necessary to ensure substantive compliance with local floodplain regulations, and thereby minimize adverse impacts to floodplains and their natural and beneficial values.

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

1.7 Public Involvement

The Johnsonville Fossil Plant Decontamination and Deconstruction Draft EA was released for comment on August 20, 2018. The comment period closed on September 19, 2018. The Draft EA was transmitted to various agencies and TVA consulted with federally recognized tribes. The Draft EA was posted on TVA's public NEPA review website (http://www.tva.gov/nepa). A notice of availability including a request for comments on the Draft EA was published in newspapers serving the Humphreys County, Tennessee area. Comments were accepted through September 19, 2018, via TVA's website, mail, and e-mail.

Three public comment submissions were received via TVA's website and one additional comment was submitted by email. Additionally, a comment letter was received from TDEC. The comments and responses to comments are included in Appendix E.

CHAPTER 2 - ALTERNATIVES

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

2.1 Description of Alternatives

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

Under all of the action alternatives, the following buildings and facilities will remain at JOF:

- Intake Pump Station
- Water Treatment Building and R.O. Trailers
- Booster Fan Building
- Draft Sys XFMR YD
- Diesel Fire Pump House
- Demineralized Water Tanks
- Combustion Turbine (CT) Storage Building
- CT Facility (20 units)
- Road access from Highway 70 past the switchyard to the CT site
- JCT Perimeter Fencing
- Fuel Oil Truck Unloading Facility for JCT
- Coal Yard Drainage Pond (to be addressed under a separate analysis)
- Switch Houses
- 69-kV, 161-kV and 500-kV switchyards and all associated insulating oil piping and pits will remain operational.

2.1.1 Alternatives Considered but Eliminated

2.1.1.1 Alternative A1 – Assess, Close, and Secure Site; Implement Operations and Maintenance Program to Maintain Structures and Equipment

The primary objective of Alternative A1 is to minimize environmental and safety risks and close the site. The plant staff and regular maintenance activities would be reduced and labor from other TVA sources would be utilized as necessary. Retirement and deconstruction activities for this alternative include abandoning five intake (Units 6 through 10) and three discharge (associated respectively with Units 6 and 7, 8 and 9, and 10) condenser circulating water (CCW) tunnels in-place by installing bulkheads. The Units 1 through 5 intake and Unit 1, Units 2 and 3, and Units 4 and 5 discharge tunnels would remain active. Raw river water supply to the water treatment building and fire protection would be supplied by the existing tunnels and pumping equipment. Otherwise, all existing buildings, structures and facilities would remain in place.

Under Alternative A1, approximately thirteen workers would be required to perform the necessary operations and maintenance activities at JOF, after the plant has been decommissioned (i.e., safely removed from service). Operations and maintenance activities would include ensuring remaining equipment and systems (sump pumps, raw and domestic water systems, fire water systems, water pumps, inlet tunnels, discharge tunnels, elevators, air conditioning systems, heat systems, ventilation fans, communications systems, electrical systems and feeds, and machinery and computing equipment) remain operational and required lighting is available where needed.

Alternative A1 was eliminated from consideration in the EA because other projects are in progress which will result in the installation of pumps to continue supplying water to the water treatment building and fire protection system. Therefore, Alternative A1 was no longer distinguishable from Alternative A2 (described below) and was eliminated from further consideration.

2.1.2 Alternatives Carried Forward for Analysis

2.1.2.1 Alternative A2 – Assess, Close, and Secure Site; Close all CCW tunnels; Implement Operations and Maintenance Program to Maintain Structures and Equipment

The objective of Alternative A2 is to de-energize non-essential systems at JOF Units 1-10 and associated facilities, to minimize environmental and safety risks, and to convert the powerhouse and associated facilities to a closed “cold, dark, and dry” status. Existing JOF buildings, structures, and equipment within the Deconstruction Project Area shown on Figure 2-1 would remain in place. Activities associated with Alternative A2 include:

- CCW intake and discharge tunnels would be abandoned in place by installing bulkheads and/or stop logs;
- Projects would be executed to supply raw river water to the water treatment building and fire protection system through installation of new pumping and piping systems;
- Maintenance of fire protection, fire detection, and fire alarm systems, if present, in all buildings;
- Removal of ash from sluice piping;
- Removal of sluice piping outside the powerhouse;
- Abandon sluice piping located beneath the harbor;
- Removal of loose lagging and insulation from Units 7-10 precipitators and from the common trunk duct;
- Maintenance of all HVAC systems and ventilation fans, if present, required for cooling of electrical equipment or personnel safety;
- Addition of heat tracing for critical fire protection supply lines for an unheated environment;
- Periodic roof and structural inspections;
- Periodic hazardous materials condition surveys and removal of hazardous materials over time;
- Removal of all PCB-containing and PCB-contaminated electrical equipment, followed by monitoring of any known PCB-contaminated areas (as required by federal regulation);
- Maintenance of stack lighting according to Federal Aviation Administration regulations;
- Maintenance of building lighting, necessary elevator(s), emergency lighting, exit signs required for walk downs and maintenance or egress;
- Maintenance of electrical systems and feeds;
- Maintenance of non-retired/removed machinery and equipment;

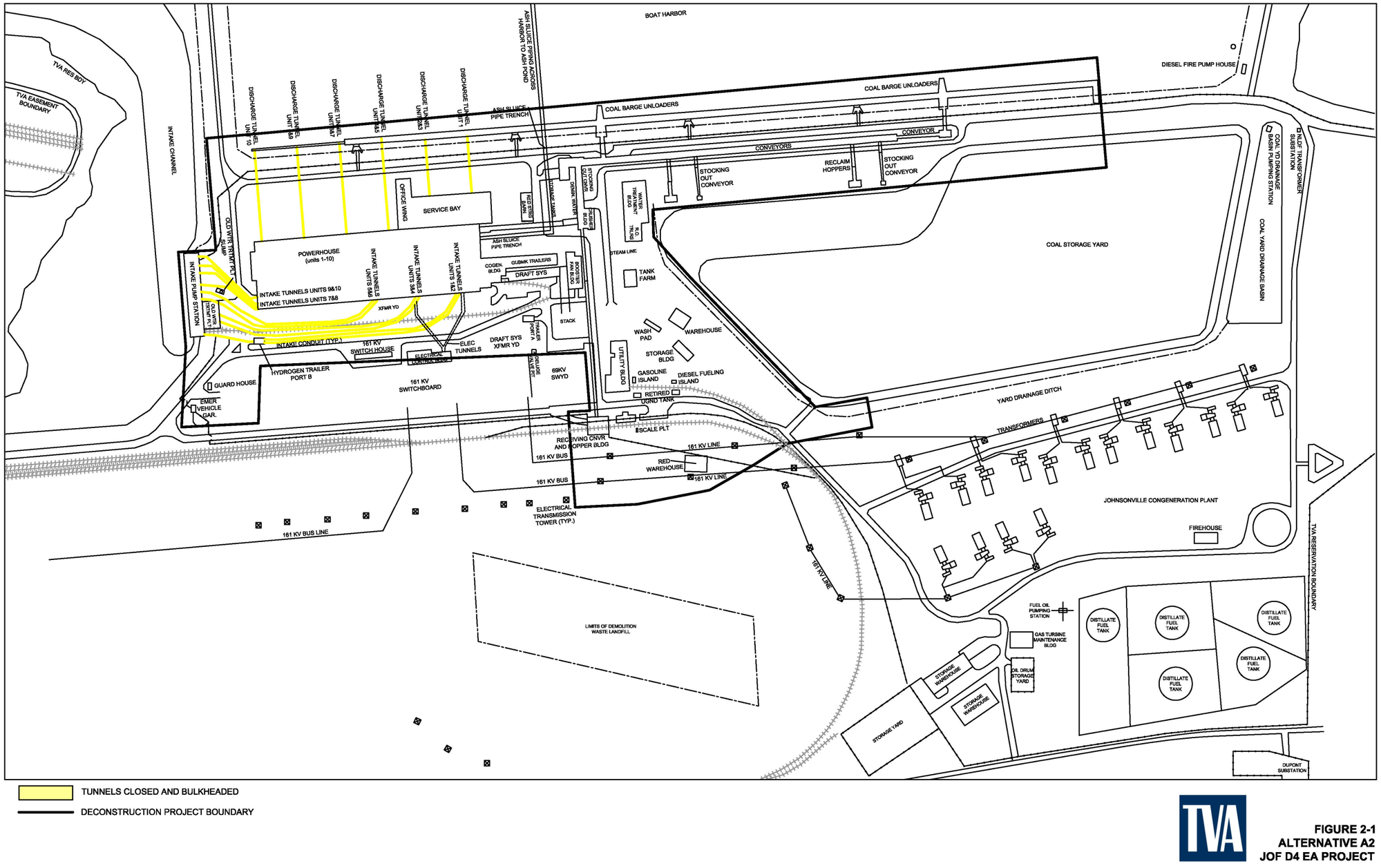


Figure 2-1. JOF Alternative A2

- Maintenance of the operation of select sump pumps to prevent below-grade flooding or unpermitted discharges to the environment; and
- Continued investigation of retired equipment that could be used at other TVA facilities.
- Transmission Projects:
    - Johnsonville CT Feed – removal of start-up/emergency feed from common auxiliary boards in the JOF powerhouse, providing an alternate location for continued power feed to the JCT facility site unit 13 emergency transformer, and providing an alternate power source for the CT storage warehouse.
    - Replacement of the 500- and 161-kV switchyard transformers and installation of Supervisory Control and Data Acquisition control of the 500-kV switchyard.
    - Installation of new capacitor banks.
    - Installation of Supervisory Control and Data Acquisition control of the 161- and 69-kV yards and retirement of several breaker feeding units and bus modules.
    - Replacement of 161-kV bus insulators with high-strength insulators, transfer of certain connections, and the reconfiguration of several breakers to 'Normally Open.'

Under Alternative A2, thirteen workers would be required to perform the necessary operations and all maintenance activities at JOF once the facility has been decommissioned (i.e., safely removed from service). Personnel from other TVA facilities may be used, as necessary, to assist with performing operations and maintenance activities.

2.1.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Alternative B includes the actions described in Alternative A2 along with the removal of most outlying structures including the coal handling facilities. Figure 2-2 shows the buildings and structures that would be demolished under Alternative B. This option could include removal of the following buildings/structures to a minimum of 3 feet below grade:

- Old Water Treatment Plant and Sump
- Office Wing
- Service Bay
- Red Storage Barn North of the Service Bay
- Crusher Building
- Coal Barge Unloaders (down to the concrete pad; foundation will remain)
- Aboveground Coal Conveyors and Coal Conveyor Tunnels to 3 feet below final grade (those below 3 feet would be abandoned in place)
- Steam Line
- Tank Farm
- Wash Pad Facility North of the Utility Building
- Storage Building and Warehouses near the Utility Building
- Utility Building
- Gasoline Island
- Diesel Fueling Island and associated piping (to 3 feet below final grade)
- Receiving Conveyor and Hopper Building
- Red Warehouse
- Electrical Control Building

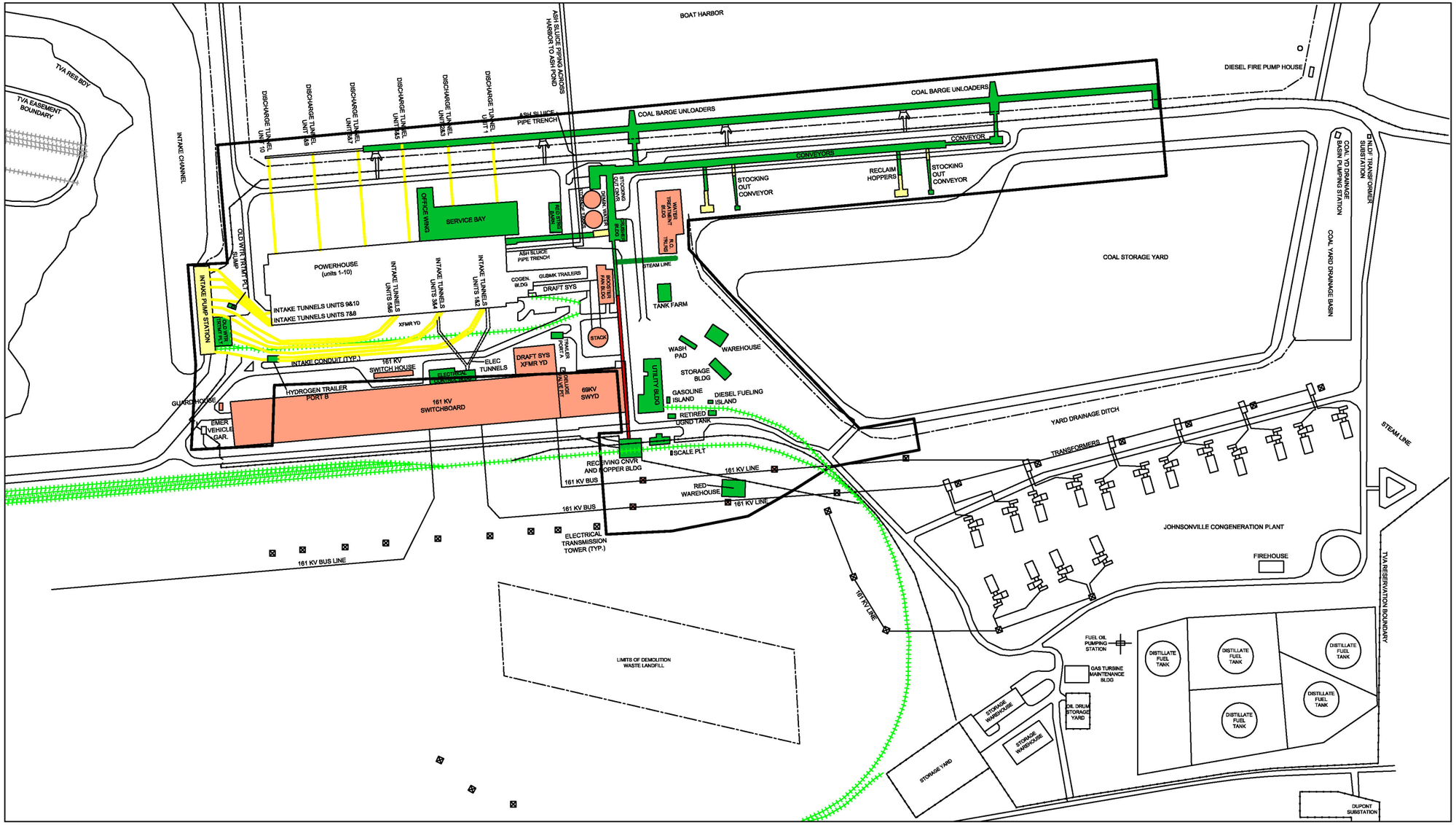


Figure 2-2. JOF Alternative B

- Hydrogen Trailer Port A
- Hydrogen Trailer Port B
- Retired Underground Tank
- Railroad and crossties

The following features are also included for consideration for deconstruction/demolition under Alternative B. These items are either located below ground or are too small to be displayed on Figure 2-2:

- Select plant roads and parking lots
- Street Lighting
- Removal of decommissioned piping where deemed necessary
- Dock Service Building
- Rotary Car Dumper (and associated railroad track, ties, and ballast)

Additionally, Alternative B could include:

- Removal of hazardous materials in structures being demolished
- Abandonment or removal of sanitary sewer connections from demolished facilities (main network of sewers, connected to the Johnsonville municipal waste system, will remain)
- Installation of bulkheads for coal conveyor tunnels remaining below final grade, reclaim hopper emergency egress, and electrical cable tunnels
- Plugging of conduit banks and penetrations to coal handling tunnels
- Abandonment/plugging of unused electrical manholes

Under Alternative B, approximately five workers would be required to perform all necessary operations and maintenance activities at JOF once the facility has been decommissioned (i.e., safely removed from service). Personnel from other TVA facilities may be used, as necessary, to assist with performing operations and maintenance activities.

2.1.2.3 Alternatives C1, C2, C3, and C4 – Demolish to Grade ("Brownfield") with Stack Options

All four Alternative C options (Figure 2-3) would include the removal actions described under Alternatives A2 and Alternative B. Additionally, the Alternative C options could include removal of:

- Powerhouse Units 1 through 10
- 600-foot tall Flue Gas Stack
- Roads and Parking Lots
- Guard House
- Plant Perimeter Fencing

The common objective of all four Alternative C options is to remove all unneeded structures, roads, and parking lots. In addition, 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, to remove hazardous materials. All removed structures would be demolished to 3 feet below final grade leaving roughly 40 feet of basement wall. Further, all basements, pits, and trenches would be backfilled up to the surrounding grade while providing proper drainage. All disturbed areas would have

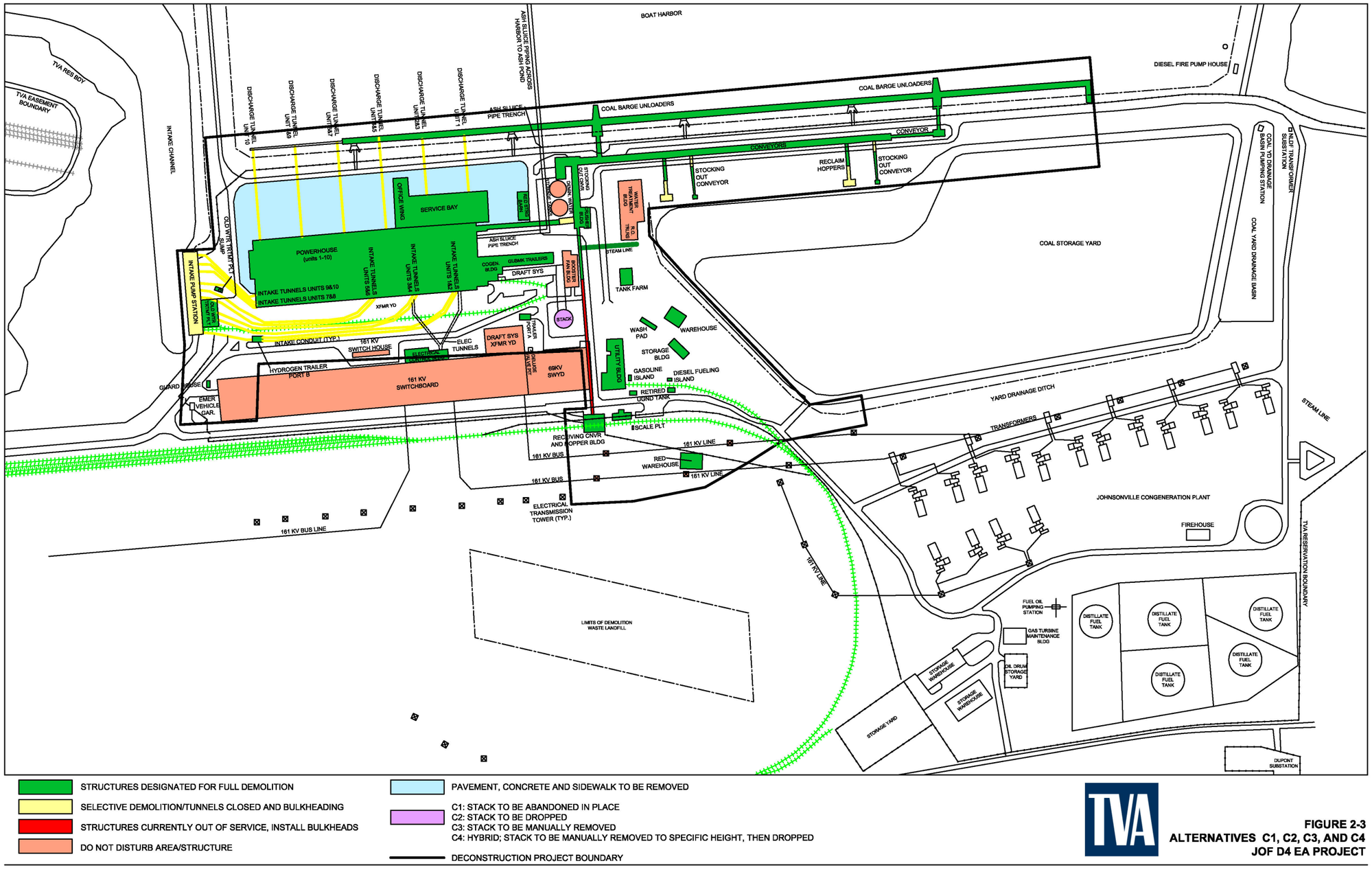


Figure 2-3. JOF Alternatives C1, C2, C3, and C4

topsoil installed and seeded or otherwise stabilized. Additionally, a new guard house would be constructed south of the JOF facility as shown in Figure 1-2.

Demolition could occur through the use of explosives, mechanical deconstruction, or a combination of these processes. The estimated cost for the demolition portion in this estimate includes the salvage value of all scrap metal. All clean concrete and masonry would be processed and used for backfill as appropriate.

All Alternative C options include the assumption that, with the exception of the municipal sewer line, all buried utilities would be cut, capped, and abandoned in place. All hollow pipe utilities would be decommissioned and sealed with a mechanical cap or plug. This work is normally done during deactivation.

Alternatives C1 through C4 include the deconstruction item of sealing the intake and discharge tunnels with bulkheads. Sealing would consist of erecting bulkheads within the intake and discharge tunnels. Valves would be abandoned in place.

2.1.2.3.1 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

Under Alternative C1, the flue gas stack would remain in place.

2.1.2.3.2 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

Under Alternative C2, the flue gas stack would be dropped by conventional construction equipment including cranes, excavators, and explosives.

2.1.2.3.3 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Under Alternative C3, the flue gas stack would be removed by hand (mechanical deconstruction) or other controlled deconstruction method.

2.1.2.3.4 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Under Alternative C4, the flue gas stack would be removed through a hybrid method. The stack would first be lowered to a specific minimum height by hand (mechanical deconstruction) or other controlled deconstruction method, followed by explosive drop/fall to fully demolish the remaining portions of the structure.

2.1.3 Alternative D – No Action

Under the No Action Alternative, TVA would not perform any deconstruction or other disposition activities. Consequently, JOF Units 1-10 would be left in place in their current condition. Additionally, TVA would take no action to maintain the units in operable condition. The plant would not generate power, and it would not be possible to restart the units. The plant would not be heated, cooled, or supplied with electricity. TVA would continue to restrict access to JOF. Periodic inspections and critical maintenance would be performed as needed. TVA would maintain the NPDES permit, implement the Integrated Pollution Prevention Plan, and perform environmental monitoring and reporting as required.

2.2 Comparison of Alternatives

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

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

Resource Area	Impacts from Alternatives						
	A2	**B**	**C1**	**C2**	**C3**	**C4**	**D**
Land Use and Prime Farmland	No impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No impacts.
Noise and Vibration	No significant impacts.	No significant impacts.	Similar, but slightly larger impacts than Alternative B.	Similar, but slightly larger impacts than Alternative C1.	Similar impacts to Alternative C1.	Similar to Alternative C2.	No impacts.
Geology and Groundwater	No impacts to geology. Minor impacts to groundwater.	Similar impacts, but less than Alternative A2.	Similar to Alternative B. Short-term impacts to groundwater would be greater, but long-term impacts would be less than Alternative B.	Similar to Alternative C1.	Similar to Alternative C1.	Similar to Alternative C1.	No impacts to geology. Minor impacts to groundwater; greater than the other alternatives.
Surface Water	No impacts due to tunnel sealing activities. Minor beneficial impacts due to lack of operational discharges. Temporary and minor long-term potential for direct discharges from remaining buildings, structures and facilities.	No impacts due to tunnel sealing activities. Temporary minor impacts due to potential stormwater runoff. Similar long-term impacts as under Alternative A2.	Greater, though still minor, temporary impacts than Alternative B. Long-term potential impacts reduced.	Greater, though still minor, temporary impacts than Alternative C1. No long-term direct discharges.	Minor temporary impacts, smaller than Alternative C1.	Minor temporary impacts, greater than Alternative C1, and smaller than Alternative C2.	Minor impacts.
Floodplains	No significant impacts.	Minor beneficial impact.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.	No impacts.

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

Resource Area	Impacts from Alternatives						
	A2	B	C1	C2	C3	C4	D
Wetlands	No impacts.	No impacts.	No impacts.	No impacts.	No impacts.	No impacts.	No impacts.
Aquatic Ecology	No impacts.	No impacts.	No impacts.	No impacts.	No impacts.	No impacts.	Higher potential for contaminants entering surface and groundwater.
Wildlife	No impacts.	Minor insignificant impacts to wildlife. No impacts to migratory birds.	Similar impacts as under Alternative B. Minor insignificant beneficial impacts once landscaping is in place.	Same as Alternative C1.	Same as Alternative C1.	Same as Alternative C1.	No impacts.
Vegetation	No impacts.	No impacts.	No impacts.	No impacts.	No impacts.	No impacts.	No impacts.
Threatened and Endangered Species (Aquatic Species)	No impacts.	No impacts.	No impacts.	No impacts.	No impacts.	No impacts.	No impacts.
Threatened and Endangered Species (Terrestrial Ecology)	No impacts with implementation of best management practices.	No impacts with compliance with TVA's programmatic consultation with the USFWS.	Similar to Alternative B.	Similar to Alternative B.	Similar to Alternative B.	Similar to Alternative B.	No impacts.
Threatened and Endangered Species (Plants)	No impacts.	No impacts.	No impacts.	No impacts.	No impacts.	No impacts.	No impacts.

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

Resource Area	Impacts from Alternatives						
	A2	B	C1	C2	C3	C4	D
Air Quality and Climate Change	Minor.	Minor, but less than Alternative A.	Similar to Alternative B	Similar to Alternative C1, but with an intense, short-term release of fugitive dust.	Similar to Alternative C1.	Similar to Alternative C2.	No direct impacts. Minor indirect adverse impacts.
Hazardous Materials, and Solid and Hazardous Waste	Minor direct and indirect impacts.	Similar to Alternative A2, but larger due to more extensive demolition and abatement activities.	Similar to Alternative B.	Similar to Alternative B.	Similar to Alternative B.	Similar to Alternative B.	Moderate impacts.
Transportation (Rail and Roadway)	No impacts.	Temporary and insignificant impacts.	Temporary and minor impacts	Similar to Alternative C1.	Similar to Alternative C1.	Similar to Alternative C1.	No significant impacts.
Visual Resources	Minor direct impacts.	Minor impacts during demolition.	Similar to Alternative B.	Similar to Alternative B, but with minor beneficial impacts due to stack removal.	Similar to Alternative C2.	Similar to Alternative C2.	Minor direct and indirect impacts.
Natural Areas and Parks	No impacts.	No impacts.	No impacts.	No impacts.	No impacts.	No impacts.	No impacts.
Recreation	Temporary and minor impacts to recreational boating.	Similar to Alternative A2, but for a longer duration.	Similar to Alternative B, but for a longer duration.	Similar to Alternative B, but for a longer duration.	Similar to Alternative B, but for a longer duration.	Similar to Alternative B, but for a longer duration.	No impacts.
Cultural and Historic Resources	No effect.	No effect.	No effect.	No effect.	No effect.	No effect.	No effect.

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

Resource Area	Impacts from Alternatives						
	A2	**B**	**C1**	**C2**	**C3**	**C4**	**D**
Utilities and Service Systems	Minor impacts.	Minor beneficial impacts.	Minor beneficial impacts.	Minor beneficial impacts.	Minor beneficial impacts.	Minor beneficial impacts.	Minor impacts.
Safety	Minor Impacts.	Similar but reduced impacts as compared to Alternative A2.	Similar to Alternative B, but onsite demolition activities would continue for a longer duration.	Similar to Alternative C1, but with added safety risk due to the use of explosives.	Similar to Alternative C1.	Similar to Alternative C2.	Minor impacts.
Socioeconomics and Environmental Justice	Minor short-term socioeconomic beneficial impact. No impacts to environmental justice.	Minor short-term socioeconomic beneficial impact. No impacts to environmental justice.	Similar to Alternative B, but slightly larger benefit. No impacts to environmental justice.	Similar to Alternative C1. No impacts to environmental justice.	Similar to Alternative C1. No impacts to environmental justice.	Similar to Alternative C1. No impacts to environmental justice.	No impacts.

2.3 Identification of Mitigation Measures

This section provides a summary of best management practices (BMPs) and mitigation measures that TVA would employ to avoid or reduce adverse impacts from the alternatives analyzed. TVA's analysis of potential impacts includes consideration of BMPs and mitigation implemented as required to reduce or avoid adverse effects. BMPs and mitigation measures are discussed in Chapter 3 and summarized below.

2.3.1 Mitigation Measures

- TVA would work to minimize one-time emissions of fugitive dust from facilities expected to produce large volumes (such as demolition of the stack) by working with the demolition contractor on a site-specific plan. The plan may use mitigation methods that include the treatment of fall zones, misting, and application of tackifier inside the stacks, or cleaning and removal of ash and other materials. The fall zones may have berms to reduce the lateral extent of the dust cloud. Also, a hardened berm near the base of the stack could act as a backstop to prevent rock and debris spreading from the base of the stacks during demolition.

- TVA would conduct presence/absence surveys prior to demolition of the structures to determine if migratory birds or listed bat species are utilizing these buildings. If listed bats are found, these buildings would not be demolished until one of two mitigation actions occurs: 1) bats are transitioned out of the buildings, or 2) consultation with USFWS is completed. If active nests of migratory birds are present and demolition activities must occur within the active nesting season, TVA would coordinate with USFWS Wildlife Services, who assists with managing any potential impacts to birds, to determine best options for carrying out demolition activities.

- TVA would schedule any necessary removal of trees to be conducted between October 15 and March 31, outside of the summer roosting season of the listed bat species. However, if tree removal must occur during this time frame a bat habitat assessment would be performed and TVA would track and document removal of potentially suitable summer roost trees and include in annual reporting in accordance with TVA's programmatic biological assessment 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 committed to implementing specific conservation measures to ensure that direct and indirect impacts to federally-listed bat species would be minor.

- Osprey nests observed on the lighting structures around the coal yard would be removed when lighting structures are demolished. No nests would be removed while they are occupied and active (typically March-July).

- To minimize potential impacts to surface waters during explosive demolition activities, TVA would develop a project-specific SWPPP as required under the General Permit for Stormwater Discharges Associated with Construction Activities (TDEC 2016) prior to beginning demolition.

- To mitigate the potential for impacts to public safety, TVA would restrict or close roads in the vicinity should blasting be used to demolish the stack (Alternatives C2 and C4). No barge or boat traffic would be allowed in the area during the stack blasting activities. TVA would work with the demolition contractor to create a detailed site-specific plan for

any public road closures that would be distributed to affected parties, including emergency personnel.

- TVA would evaluate the potential for vibration and blast impacts under Alternatives C1 through C4. TVA would require the demolition contractor to develop and implement a blast plan to minimize vibration effects at JOF and in the vicinity. After obtaining site-specific data provided by the blasting contractor, and if deemed necessary during development of the demolition plan, TVA would work with a documentation services company to prepare a vibration model simulating the effects of discharge of the explosives or vibrations due to the stack hitting the ground. If indicated by the results, imported fill, dirt binder, and geofabric could be used for mitigation of noise and vibration.

- During the construction planning process, TVA would determine mitigation measures to minimize potential impacts to onsite power transmission equipment from vibrations caused by explosive demolition of the stacks. These measures could include switchyard alignment, staging personnel in the switch houses, and scheduling the demolition during off-peak hours. Use of such mitigation measures would address any power disruptions.

- Under Alternatives C1 through C4, explosives would be managed under the direction of a licensed blaster, 24-hour security would be provided to monitor the explosives, and detailed security plans would be developed and provided to area emergency response agencies as part of measures that would be taken to mitigate potential impacts on the safety of personnel and the public.

- If construction or operations have the potential to emit pollutants greater than acceptable thresholds in JOF's existing Title V permit, mitigation would include a request to modify the permit, which would be required for the prevention of significant deterioration of air quality.

2.3.2 Best Management Practices

- The site specific demolition plan would include dust control BMPs to control dust leaving the site during any demolition activity, site grading, and transportation of demolition debris, as well as during the removal of hazardous and solid waste. TVA would continue to follow dust control BMPs in accordance with its Title V permit.

- TVA would follow dust control BMPs to reduce fugitive dust emissions from roadways and unpaved areas, such as wet suppression (equipment, demolition areas, and unpaved vehicle access routes during hauling), covering waste or debris piles, and using covered containers to haul waste and debris. TVA also routinely requires onsite contractors to maintain engines and equipment in good working order.

- TVA would take precautions to avoid attracting migratory birds, bats and other wildlife to the area by securing inactive structures that could potentially be used as nesting areas. Any openings in structures would be closed to the extent possible and deterrents may be used. Though at the time of publication of the EA no threatened or endangered species were identified that could be potentially impacted by the Proposed Action, inactive structures could be used in the future by migratory birds or federally listed Indiana bats and northern long-eared bats (NLEBs) for roosting.

- Surface water quality impacts resulting from disturbance during demolition would be minimized by the use of stormwater pollution prevention BMPs to reduce the extent of disturbance and erosion. The Tennessee Erosion and Sediment Control Handbook would be referenced to ensure BMPs to be used during demolition are appropriate (TDEC 2012).

- Any work conducted in waters of the State may require USACE Section 404 and TDEC Section 401/ARAP permits depending on the project impacts and location. Potential surface water impacts during demolition in these areas would be avoided by designing demolition activities to minimize any impacts to adjacent waters. Measures, such as installation of turbidity curtains in adjacent waters, could be considered to help minimize any incidental discharge of fill to receiving streams. Surface water impacts would be minor with the implementation of BMPs, as well as compliance with the requirements of the USACE and TDEC permitting process. The installation of bulkheads in the tunnels would be conducted in accordance with BMPs intended to avoid release of sediments or contaminants to surface water. BMPs and wastewater treatment would be employed, as needed, to mitigate any pollutant discharge. The implementation of BMPs, protocols to respond to onsite spills prior to discharge, and site clean-up would help to reduce the potential for any releases to surface waters.

- To minimize adverse impacts on natural and beneficial floodplain values, TVA would revegetate areas using native and/or non-invasive species to promote the rapid establishment of desirable vegetation and inhibit the establishment of invasive plants.

- To minimize potential effects on the safety of the public and workers, fencing and security personnel would remain for all alternatives. TVA would also periodically assess the condition of remaining site facilities as they deteriorate.

- The use of BMPs, including safety procedures and security measures, would minimize potential safety impacts.

- TVA would manage all solid waste and hazardous wastes generated from construction activities in accordance with standard procedures for spill prevention and cleanup along with waste management protocols in accordance with pertinent federal, state, and local requirements.

- Construction debris and wastes would be managed in accordance with federal, state, and local requirements. Prior to demolition activities, hazardous materials will require special removal, handling, and disposal by appropriately trained and licensed personnel and contractors. Best management practices, including dust suppression and environmental controls, would be employed to minimize or prevent releases of hazardous materials.

2.4 Preferred Alternative

TVA's preferred alternative is demolition to a brownfield site (Alternatives C2, C3, or C4). Under these alternatives, Units 1-10 and other structures would be demolished to a minimum of 3 feet below final grade (Brownfield) along with removal of the 600-foot tall flue stack.

Alternatives A2, B, C1, and D have a higher potential for environmental impacts than the other action alternatives since existing structures would be left in place at the facility. Deteriorating

structures would cause an increasingly unsafe environment for operations and maintenance personnel. Remaining structures would decrease in structural stability over time, and furthermore they would become more environmentally unstable. Alternatives C2, C3, and C4 have the lowest cumulative cost of all action alternatives.

CHAPTER 3 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Land Use and Prime Farmland

3.1.1 Affected Environment

No residential or commercial land uses occur in the immediate vicinity of the existing JOF powerhouse and ancillary structures. The National Land Cover Database (2011) identifies the dominant land uses in the project area as open water, developed (high, medium, and low-intensity and open space), and cultivated crops (Homer et al. 2012). The National Land Cover Database is based on satellite analysis of land cover. Therefore, while it is useful for understanding large regional areas, on a local scale, there can be inconsistencies in the classification data as compared to the actual land cover. For example, cultivated crops are not present at JOF and water is not present in the JOF coal yard. The National Land Cover Database classified land use/land cover within the JOF Deconstruction Project Area is described in Table 3.1-1 and shown in Figure 3.1-1. The majority of JOF is accurately classified as developed to varying levels of intensity. JOF is an industrial site with typical industrial coal plan land cover and land uses.

Residential land uses occur approximately 3,000 feet south of the JOF Deconstruction Project Area. Land use within the 3-mile region around the project area is mostly mixed forest, hay pasture, scrub-shrub and developed land. Other common land use types within the region include open water, evergreen forest and grasslands (Homer et al. 2012).

Table 3.1-1. Land cover within the JOF Project Area

Land Use Type	Acres within the JOF Project Area and Laydown areas
Water	24.7
Developed, High Intensity	22.4
Developed, Medium Intensity	19.8
Developed, Low Intensity	5.2
Cultivated Crops	3.4
Evergreen Forest	1.3
Barren Land (Rock/Sand/Clay)	1.1
Developed, Open Space	0.87
Total Area	78.86

Source: Homer et al. 2012

* This wetlands calculation is based on the satellite data. Wetlands are evaluated in detail in Subsection 3.6.

The study areas for this evaluation consist of approximately 78.86 total acres within the existing JOF property (the 63-acre Deconstruction Project Area and four of the five laydown areas that are located outside of the Deconstruction Project Area boundary) on which deconstruction activities may take place. The proposed deconstruction activities would be located within previously developed lands at JOF. According to the State of Tennessee, Comptroller of the Treasury, there is no zoning associated with the TVA property (State of Tennessee 2018).

Figure 3.1-1. Land Use/Land Cover at the JOF Project Site

The Farmland Protection Policy Act was passed by Congress in 1981 as part of the Agriculture and Food Act (Public Law 97-98). It is intended to minimize the amount of farmland that is

irreversibly converted from agricultural uses by federal activities. Prime farmland includes federally recognized prime farmland, unique farmland, and farmland of statewide or local importance. Projects are subject to Farmland Protection Policy Act requirements if they may irreversibly convert farmland (directly or indirectly) to non-agricultural use and are completed by a Federal agency or with assistance from a Federal agency (Natural Resources Conservation Service [NRCS] 2018a).

Figure 3.1-2 presents both the soils and prime farmland classifications in the proposed project area, including the laydown areas. According to the NRCS soil data mapper, Ps (Paden Silt Loam) is considered either prime farmland or farmland of statewide importance (NRCS 2018b). There are 4.96 acres of Ps soils in the project area. The 4.96 acres of prime farmland or farmland of statewide importance represents 0.004 percent of farmland in Humphreys County (U.S. Department of Agriculture [USDA] 2012). In 1982, Tennessee had 11.5 million acres of prime farmland. The most recent National Resources Inventory survey from 2012 showed that this had been reduced to 10.6 million acres, which represents a loss of approximately 900,000 acres of prime farmland state-wide in the last thirty years (USDA 2015).

3.1.2 Environmental Consequences

3.1.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

Under Alternative A2, no land-disturbing construction activities would be undertaken by TVA. Therefore, there would be no changes to land use.

3.1.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Under Alternative B, some ancillary structures would be demolished in addition to closing and securing the site. Direct impacts to land use would be the transformation of a developed area to an undeveloped area. However, as TVA would maintain the areas where the structures were located, it would not be a major land use change. Essentially, land use would go from an industrial application to a vegetated vacant area. As the land would remain in TVA possession, and would not be accessible by the public, or used for other activities, this change in land use would be considered insignificant. No indirect impacts to land use are anticipated.

Based on soil mapping, there are 4.96 acres of prime farmland located within the proposed project area at JOF. Some of these acres were previously impacted by the construction of existing structures, and therefore, would no longer be considered prime farmland. The remaining potential prime farmland soils are located on federal property and land use is designated ‘urban development’ and planned for industrial use; thus, the conversion of those soils has also already occurred. Therefore, there would be no impact to prime farmland.

3.1.2.3 Alternative C1 – Demolish to Grade (“Brownfield”), Stack Remains

Impacts to land use under Alternative C1 would be the same as those under Alternative B. Land use would change from industrial to vacant, but the land would not be open to alternative uses.

Impacts to prime farmland under Alternative C1 would also be the same as those under Alternative B.

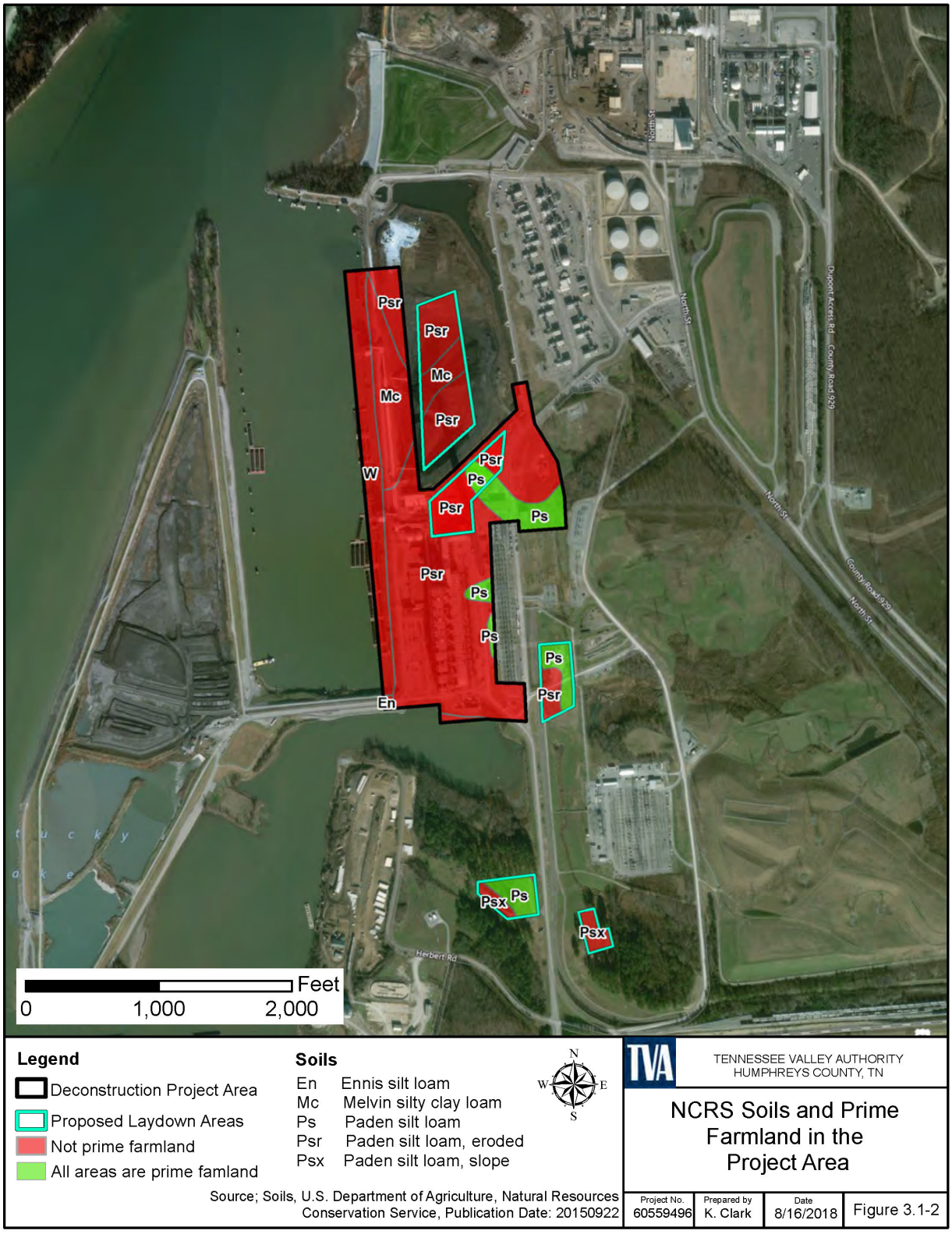


Figure 3.1-2. Soils and Prime Farmland within the JOF Project Area

3.1.2.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

Impacts to land use under Alternative C2 would be the same as those under Alternative B. Land use would change from industrial to vacant, but the land would not be open to alternative uses.

Impacts to prime farmland under Alternative C2 would also be the same as those under Alternative B.

3.1.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Impacts to land use under Alternative C3 would be the same as those under Alternative B. Land use would change from industrial to vacant, but the land would not be open to alternative uses.

Impacts to prime farmland under Alternative C3 would also be the same as those under Alternative B.

3.1.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Impacts to land use under Alternative C4 would be the same as those under Alternative B. Land use would change from industrial to vacant, but the land would not be open to alternative uses.

Impacts to prime farmland under Alternative C4 would also be the same as those under Alternative B.

3.1.2.7 Alternative D – No Action

Under Alternative D, no changes to the current status of the JOF facility would occur. No deconstruction or decontamination activities would occur. Therefore no impacts to land use or prime farmland would occur.

3.2 Noise and Vibration

3.2.1 Affected Environment

Noise

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 and 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 (i.e., higher sensitivities would be expected during the quieter overnight periods).

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

To account for sound fluctuations, environmental noise is commonly described in terms of the equivalent sound level. The equivalent sound level is the constant sound level that conveys the same noise energy as the actual varying instantaneous sounds over a given period. It averages the fluctuating noise heard over a specific period as if it had been a steady sound. The day-night

sound level (L_{dn}) is the 24-hour average noise level with 10-dBA added between 10 p.m. and 7 a.m. to account for the fact that most people are more sensitive to noise while they are sleeping.

The JOF Units 1-10 and the associated coal facilities do not currently generate any significant noise since operations ceased completely as of December 31, 2017. Current operations at the JCT facility and the Chemours facility still generate noise. The noise generated by these operations is minimal and typical of industrial sites. Most of the noise generated by the JCT is related to truck traffic or maintenance work. Coal unloading has historically been one of the dominant noise-generating activities at JOF; however, coal unloading has also been terminated. Current operations at JOF will produce much less noise than what has been previously reported. Therefore, no additional noise study has been deemed necessary at this time.

There are no federal, state, or local regulations for community noise levels in Humphreys County; however, EPA (1974) guidelines recommend that L_{dn} not exceed 55 dBA. Research by the U.S. Air Force has established suggested levels of annoyance experienced by nearby receptors to various background L_{dn} levels (Table 3.2-1).

Table 3.2-1. Estimated Annoyance from Background Noise

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

Source: Federal Interagency Committee on Noise 1992.

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

The area surrounding JOF consists of open rural property, industrial property and a residential area to the south of SR-70. The closest residences are located approximately 0.5 miles from the JOF site. Trees growing between the site and those residences block the line of site and help to attenuate noise from JOF. Noise sensitive locations are areas where excessive noise would be highly disruptive to normal activities. These locations include schools, hospitals, residential areas and historic properties. There are no noise sensitive locations within 0.5 miles of the JOF deconstruction project footprint (NEPAssist 2018).

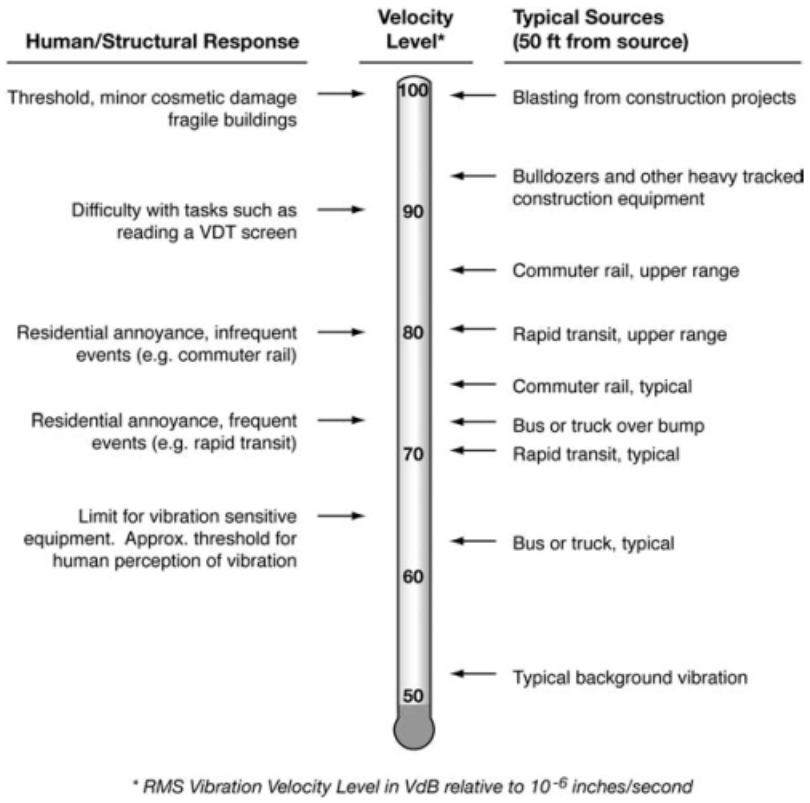
Vibration

There are three primary types of receivers that can be adversely affected by ground vibration: people, structures, and equipment. Construction activities, including the operation of heavy machinery, traffic and blasting can create ground vibration. If the vibration amplitudes are high enough, there is the possibility of physical and cosmetic damage to structures, and the possibility of interference with the functioning of sensitive machinery. Ground vibrations and ground noise can also be annoying to people who live or work near sources of vibration. The length of time and strength of vibration varies with the equipment used. The vibration from blasting has a high amplitude and short duration, whereas vibration from grading is lower in amplitude but longer in duration. Equipment typical of continuous vibration include: excavation equipment, static compaction equipment, tracked vehicles, traffic on a highway, vibratory pile drivers, pile-extraction equipment, and vibratory compaction equipment. Equipment or activities typical of single-impact or low-rate repeated impact vibration include: impact pile drivers, blasting, drop balls, “pogo stick” compactors, and crack-and-seat equipment (Caltrans 2013). During the potential deconstruction activities, most of the continuous-type vibration sources would be present at the project site. Depending on the proposed action chosen, blasting and drop balls may be used at the project site.

As vibrations travel through the ground, they encounter an increasingly large volume of material as they travel outward, and the energy density in each wave decreases with distance from the source. The amplitudes of vibrations decrease, or have a dampening effect, in direct proportion to the distance from the source, except along the surface, where their amplitudes decrease in direct proportion to square of the distance to the source. Therefore, the farther away from the source, the smaller the amplitude of the vibration; as a result, perception of vibration would be reduced over distance. Many factors affect the rapidity of damping, such as soil type. Moisture content and temperature of soil, and the frequency of the vibration sources can influence dampening. Clays tend to exhibit higher damping than sandy soils (Caltrans 2013).

Caltrans has developed a simple method for predicting vibration amplitudes from construction equipment for a variety of vibration sources and soil types. The method calculates Peak Particle Velocity, a measure of vibration. For pile driving, there are few cases of direct damage to structures located farther from a pile than the length of that pile. Settlement of soil as the result of pile driving, however, has potential to damage surface and buried structures at greater distances. Although pile driving is not likely to be used in the proposed project, vibrations associated with pile drivers can be used to estimate vibrations caused by hydraulic breakers (used in pavement and concrete demolition projects) (Caltrans 2013). Traffic, including heavy trucks, rarely generates vibrations high enough to cause structural or cosmetic damage due to the damping effects of vehicle suspensions (Caltrans 2013).

The Federal Transit Authority (FTA) developed a noise and vibration impact assessment manual for estimating vibrations generated, possible damage levels and dampening distances. Figure 3.2-1 presents typical levels of ground-borne vibration at 50 feet for a variety of common construction equipment. At 50 feet from the source, community annoyance begins at a velocity level of 70 vibration decibels (VdB) for frequent events. Damage to structures occurs at 100 VdB for one-time activities such as blasting operations (FTA 2006). There are no residences or privately owned structures located within 50 feet of any of the proposed actions at the JOF project site.



Source: FTA 2006

Figure 3.2-1. Typical Levels of Ground-Borne Vibration

3.2.2 Environmental Consequences

3.2.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

Noise

If Alternative A2 is selected, minor increases in noise in close proximity to closure activities may occur during the removal of hazardous materials and the closure of the CCW tunnels. Due to the distance of the project area from residences (0.5 miles), these increases in noise would not be perceived by the general public. Therefore, no increases in current noise levels surrounding the JOF project area are anticipated under this alternative and no direct noise related impacts are anticipated. Minor indirect impacts to noise could occur due to increased traffic on local roads during closure activities. These impacts would be temporary and would blend in with existing traffic noise along SR-70. After the activities are complete, the traffic generated by the approximately thirteen employees needed to maintain JOF would not contribute to increases in noise. Therefore, indirect impacts to noise under Alternative A2 would be minor.

Vibration

If Alternative A2 is selected, no perceptible changes to current vibration levels would occur, and no structural or cosmetic damage to structures would occur. Therefore, no impacts associated with vibrations are anticipated under Alternative A2.

3.2.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Noise

Minor increases in noise associated with the demolition of accessory structures and the coal handling equipment would occur. Due to the temporary and intermittent nature of demolition and the site's location, and the distance to the nearest receptors (0.5 miles), direct impacts related to noise from Alternative B would be similar to those described for Alternative A2. Indirect impacts due to increased traffic under Alternative B would be similar to those under Alternative A2.

Vibration

In addition to the noise produced under Alternative A2, Alternative B would produce minor vibrations during the demolition of the accessory structures and the coal handling equipment. Due to the distance (0.5 miles) of the nearest residential structures, these minor vibrations would not cause structural or cosmetic damage, and would not be perceptible to residents.

3.2.2.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

Noise

Under Alternative C1, demolition activities would last approximately 15 to 18 months. Most of the work would occur during the day on weekdays. However, demolition activities could occur at night or on weekends, if necessary. During the demolition phase, noise would be generated by a variety of construction equipment and vehicles. Noise increases would be similar to those under Alternatives A2 and B, but would occur over a longer time period and would also include blasting noise. While the flue gas stack would remain under this alternative, the Powerhouse structure (e.g., boilers and boiler building) could be demolished using explosives. Regardless, due to the distance (0.5 miles) of the nearest residences, these increases in noise would not be perceived and would therefore be insignificant. Indirectly, demolition activities would increase traffic on roads near the plant, which could also increase intermittent noise at some nearby residences. However, these increases in noise would be temporary as they would primarily be limited to contractors entering and leaving the site. Heavy equipment, once staged, would remain onsite until no longer needed. Although indirect noise impacts would occur over a longer time period than under Alternatives A2 and B, indirect traffic-induced noise increases would blend in with exiting traffic noise on SR-70 and would therefore be minor.

Vibration

Vibrations during building demolition activities would be the same as those under Alternative B, although for a longer duration. In addition, vibrations associated with explosives would also occur.

Vibrations from explosive demolition events can potentially affect nearby structures. If deemed necessary during development of the demolition plan, a documentation services company would be contracted to evaluate the potential for vibration impacts. The documentation services company would use site-specific data provided by the blasting contractor to prepare a vibration model simulating the effects of discharge of the explosives or vibrations due to the stack hitting the ground. The model results would be compared to thresholds developed by the U.S. Bureau of Mines for vibration damage. The study would assess structures within a 0.5-mile radius of the stack. The installation of imported fill, dirt binder and geofabric could also serve as a form of noise/vibration control.

3.2.2.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

Noise

Under Alternative C2, deconstruction activities would include all of the impacts described above for Alternative C1, including blasting noise related to both removal of the Powerhouse structure and the flue gas stack. Removal of the stack (whether initially or after some amount of hand-removal) would entail the use of explosives. As stated in Section 3.2.1, the noise associated with a blast would be a one-time event and would be the equivalent of a thunderclap at the source. The noise associated with the collapse of the structures would follow closely behind and would be perceived as a single boom. Due to the distance (0.5 miles) to the nearest residence and the lack of sensitive receptors within 0.5 miles, this single noise occurrence would be considerably muted for members of the general public. With warning to the public prior to blasting activities, residents would be prepared for a single loud noise. Therefore, direct impacts to noise levels in the area associated with blasting would be minor and temporary. Indirect impacts to noise levels would be similar to Alternatives B and C1.

Vibration

Under Alternative C2, the impacts would be similar to those described above under Alternative C1, including vibrations associated with explosives.

A blast radius of influence includes three dimensions. First, at JOF, there would be an immediate 1000 feet safety perimeter around the stack. Second, debris from the explosives could travel up to a 100-feet radius around the stack. Third, debris from the stack could be expelled several hundred feet, up to 1.5 times the stack height (approximately 1,200 feet) from the end of the stack when it falls. Seismologic analyses carried out at recent demolitions of other tall industrial stacks in the U.S. strongly suggest that the vibrations would not result in measurable effects on nearby structures (Protec 2013). These seismological analyses were conducted to measure the effects from demolition-related vibrations on standing structures in the vicinity of the stack demolitions. In each case, vibrations were below the recommended limits set by the U.S. Bureau of Mines Report (Siskind et al. 1980). The report authors in each case concluded the demolitions would not cause vibrational damage to structures outside the radius of influence. Vibrations resulting from the demolition of the JOF stack would be of similar magnitude. Therefore, no damage to structures is anticipated. In order to add further protection, TVA would require the demolition contractor develop and implement a blast plan in order to minimize vibration effects at JOF and in the vicinity. Due to the temporary nature of the operation, implementation of the blast plan, the site's location, and distance to nearest receptors (0.5 miles), vibration effects on the environment are expected to be minor and temporary.

3.2.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Noise

Under Alternative C3, the impacts would be similar to those described above under Alternative C1.

Vibration

Under Alternative C3, the impacts would be similar to those described above under Alternative C1.

3.2.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Noise
Under Alternative C4, the impacts would be similar to those described above under Alternative C2.

Vibration
Under Alternative C4, the impacts would be similar to those described above under Alternative C2.

3.2.2.7 Alternative D – No Action

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

3.3 Geology and Groundwater

3.3.1 Affected Environment

JOF is located along the eastern bank of the Tennessee River within the Highland Rim Physiographic Province. The site is underlain by alluvial deposits varying in thickness from less than 20 feet along smaller tributary streams up to more than 60 feet within the floodplain of the Tennessee River. The underlying bedrock consists of the Lower Mississippian Age Fort Payne Formation and Devonian Age Chattanooga Shale (Hardeman 1966).

Groundwater aquifers in the Highland Rim Province are found mainly in carbonate rocks of Mississippian, Silurian, and Devonian age. Well depths are typically 50 to 200 feet deep, and the wells yield 5 to 50 gallons per minute (gpm). Groundwater quality is generally hard, with high iron, sulfide, or sulfate concentrations (TVA 2015a).

TVA conducts groundwater monitoring at two closed, capped ash disposal areas on the JOF property: the DuPont Road Dredged Ash Disposal Area (also known as the DuPont Dredge Cell), and the South Rail Loop Ash Disposal Area. Monitoring at both sites is conducted in accordance with TDEC Rule 0400-11-01-04. Monitoring at the DuPont Road Dredged Ash Disposal Area is conducted in accordance with a TDEC-approved Groundwater Detection Monitoring Program Plan. Monitoring at the South Rail Loop Ash Disposal Area is conducted in accordance with a TDEC-approved facility closure/post-closure plan (TVA 2018a; TVA 2018b). The DuPont Road Dredge Cell is located approximately 1,000 feet northwest of the project area, and the South Rail Loop Ash Disposal Area is located approximately 1,500 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.

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 background well B13, and in a duplicate sample of well B12. 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 background well B13. These results are attributed to dissolution and migration of chloride salts from DuPont process waste landfills situated upgradient of JOF (TVA 2018a).

Sampling has been performed at the South Rail Loop Ash Disposal Area since 2000, with the most recent sampling event occurring in March 2018. Constituents do not exceed their respective MCLs, and concentrations exhibit stable/decreasing trends for all constituents. Nickel and zinc have historically exceeded their respective UPLs, and these exceedances were documented again in the most recent sampling event (TVA 2018b).

Groundwater is not used as a potable water supply at JOF, and it is highly unlikely that any constituents originating from CCR disposal results in impacts to offsite wells or potable water supplies. Groundwater beneath the DuPont Road Dredged Ash Disposal Area flows to the southwest, towards the project area, and discharges at Kentucky Lake on the west side of the project area. As a result, it is possible that constituents from the DuPont Road Dredge Cell or from other offsite facilities are present in groundwater beneath the project area.

3.3.2 Environmental Consequences

3.3.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

Alternative A2 would not alter the geology or groundwater because existing buildings, structures, and facilities would remain in place and would be monitored for environmental and safety hazards. Installation of bulkheads in the intake and discharge tunnels would stop surface water flow within the tunnels, but would not affect geology or groundwater. Periodic inspections and maintenance would be performed as needed to ensure that any contaminated equipment would not degrade and impact groundwater quality. However, with materials remaining in place over the long-term, degradation and contamination of groundwater may occur, and there could be minor impacts to groundwater over time from these remaining sources.

3.3.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Removal of facilities under Alternative B is not expected to impact the geology of the project area. In the short-term, the physical activities required to remove facilities and structures could result in a release of contamination that could impact groundwater quality. Demolition would be conducted in accordance with any applicable environmental and safety regulations, limiting the potential for a release of contaminants. In the long term, the potential for contamination of groundwater would be lower than that for Alternative A, because fewer potential contamination sources would remain onsite. Therefore, impacts to groundwater for Alternative B would be minor.

3.3.2.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

Removal of facilities, roads, parking lots, foundations, and basements under Alternative C1 is not expected to impact the geology of the project area. In the short-term, the physical activities required to remove these items could result in a release of contamination that could impact groundwater quality. The potential for this is higher than in Alternative B, because Alternative C1 would include abatement of potentially contaminated areas that would be left undisturbed in Alternative B. Demolition and environmental abatement would be conducted in accordance with any applicable environmental and safety regulations, limiting the potential for a release of contaminants. In the long term, the potential for contamination of groundwater would be lower than that for Alternative B. This is because all environmental contamination sources would be removed. Therefore, overall impacts to groundwater for Alternative C1 would be minor.

3.3.2.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

Under Alternative C2, the impacts would be similar to those described above under Alternative C1. Drop removal of the flue gas stack would not have any additional effect on geology or groundwater.

3.3.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Under Alternative C3, the impacts would be similar to those described above under Alternative C1. Controlled removal of the flue gas stack would not have any additional effect on geology or groundwater.

3.3.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Under Alternative C4, the impacts would be similar to those described above under Alternative C1. Hybrid removal of the flue gas stack would not have any additional effect on geology or groundwater.

3.3.2.7 Alternative D – No Action

Under Alternative D, the JOF structures would remain in place with no immediate change to the existing geology or groundwater. Similar to Alternative A1, under the No Action Alternative, there would be a higher potential for long-term impacts to groundwater quality because of the higher risk of contamination as the structures degrade, without any periodic inspections and maintenance. Overall, the potential impacts of this alternative on geology and groundwater would be minor, but greater than the other alternatives. The same amount of potentially hazardous materials would remain onsite under Alternatives A2 and D, but these materials would be subject to inspection and maintenance under Alternative A2, resulting in a higher potential for release under Alternative D. Alternative D would also have a higher potential for release than Alternatives B, C1, C2, C3, and C4, because no materials would be removed from the site under Alternative D.

3.4 Surface Water

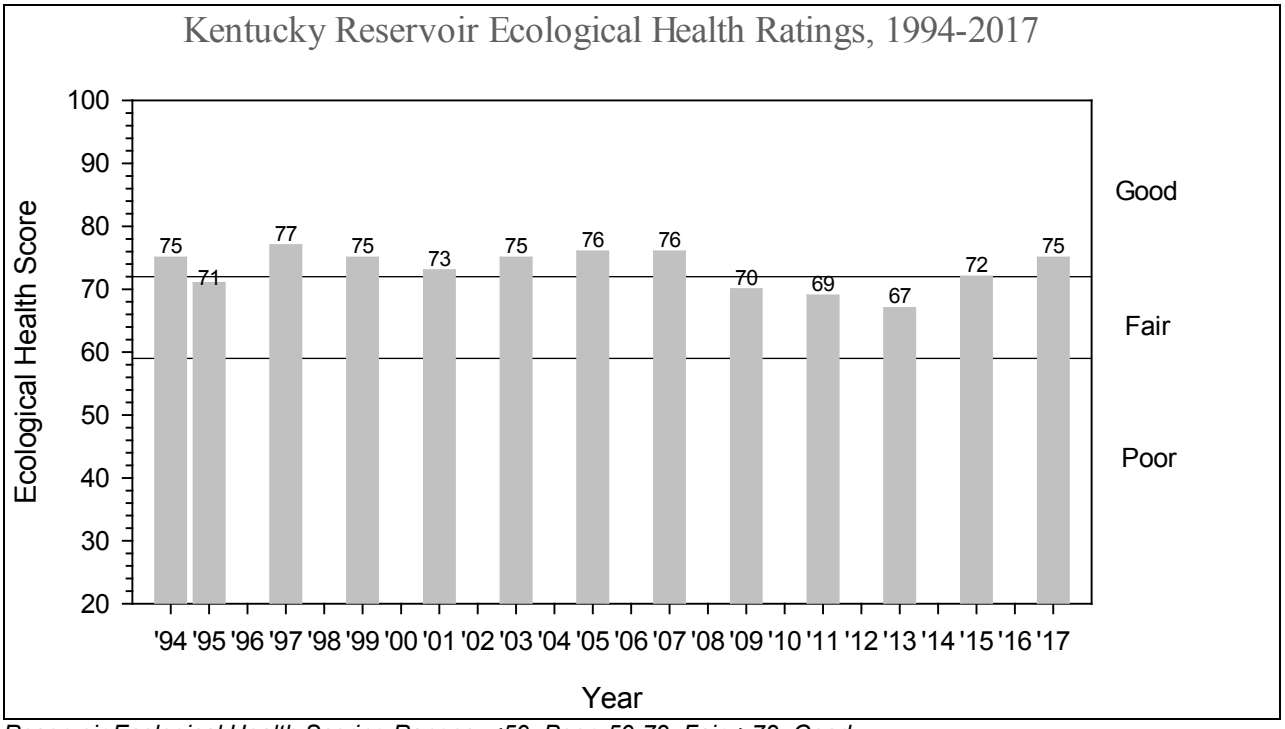
3.4.1 Affected Environment

JOF is located in Humphreys County, near New Johnsonville, Tennessee. The facility is situated on the east bank of the Tennessee River, just south (upstream) of the confluence of the Tennessee River Mile (TRM) 99.4, and Trace Creek. This reach of the lower Tennessee River is part of the Kentucky Reservoir, the largest reservoir in the eastern U.S. This reservoir extends for 184 miles and drains the entire Tennessee Valley watershed. This segment of the Tennessee River 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).

JOF withdraws water from the Kentucky Reservoir from a bay located on the south side of the plant. The coal-fired units at JOF were officially retired in December 2017, but the cooling water intake structure will remain in place and be available for future use. Under current operations, site stormwater, runoff from the coal pile, and remaining plant flows are conveyed via pipeline to Ash Pond 2 then discharged from the NPDES Outfall 001.

TVA conducted Reservoir Ecological Health assessments on the Kentucky Reservoir annually from 1994 through 2017 (TVA 2018c). Values of Good, Fair, or Poor are assigned to each metric monitored by TVA. The overall ecological health condition for Kentucky Reservoir rated

"good" in 2017 (Figure 3.4-1 and Table 3.4-1). Ecological health scores for Kentucky Reservoir have fluctuated between "good" and the upper end of the "fair" range and have generally followed reservoir flow conditions. The indicators most responsive to flow are dissolved oxygen and chlorophyll, which typically receive lower ratings during dry, low flow years.



Reservoir Ecological Health Scoring Ranges: <59=Poor, 59-72=Fair, >72=Good

Figure 3.4-1. Kentucky Reservoir Overall Yearly Health Ratings

Table 3.4-1. Ecological Health Indicators for Kentucky Reservoir – 2017

Monitoring location	Dissolved oxygen	Chlorophyll	Fish	Bottom life	Sediment
Forebay	Fair	Fair	Good	Good	Good
Mid-reservoir	Good	Good	Good	Good	Good
Big Sandy embayment	Poor	Poor	Good	Poor	Good
Inflow	--	--	Good	Good	--

The ecological health of Kentucky Reservoir has been monitored using the same methodology since 1994. Ecological health evaluations focus on five indicators: dissolved oxygen, chlorophyll, sediment quality, benthic macroinvertebrate community (bottom life), and the fish assemblage. TVA monitors four locations on Kentucky Reservoir—the deep, still water near the

dam, called the forebay (TRM 23.0); the middle part of the reservoir (TRM 85.0); the river-like area at the extreme upper end of the reservoir in the Tennessee River (miles 200 to 206), called the inflow; and the Big Sandy embayment (Big Sandy River Mile 7.4)—usually on a two-year cycle. Only bottom life and the fish assemblage are assessed at the inflow monitoring location.

Dissolved oxygen rated “fair” at the forebay, “good” at the mid-reservoir, and “poor” at Big Sandy embayment monitoring location. This indicator has rated “good” at the mid-reservoir all years monitored except 2011, when it rated “fair”. Dissolved oxygen ratings have varied between “good” and “fair” at the forebay and “good”, “fair” and “poor” at the embayment location.

Prevailing weather patterns and the related changes in reservoir flows are major factors in differing dissolved oxygen conditions from year to year. Poorer dissolved oxygen conditions typically occur as a result of reduced flows through the reservoir during dry conditions. Low dissolved oxygen concentrations often develop in a portion of the lower water column during summer at the forebay and embayment locations. However, the low dissolved oxygen exists only for a short time at the forebay, while the quieter flows in the embayment reduce water exchange and mixing within the water column, resulting in extended periods with low dissolved oxygen.

Consistent with dissolved oxygen, chlorophyll rated “fair” at the forebay, “good” at the mid-reservoir, and “poor” at the Big Sandy embayment monitoring location. Elevated chlorophyll concentrations are common on Kentucky Reservoir, typically rating “poor” or at the low end of the “fair” range at the forebay and embayment locations. By contrast, chlorophyll typically rates “good” at the mid-reservoir because the reservoir is narrower in this reach and flows (i.e. velocity) generally are sufficient to produce mixing within the water column, which tends to limit light exposure for phytoplankton/algae.

The fish assemblage rated “good” at the four locations monitored. Historically, the fish assemblage has rated “good” at the transition and in the “good” to “high-fair” range at the other monitoring locations. In 2017, the diversity and abundance of fish observed at each location were consistent with long-term averages, and fish health was assessed a “good” rating with low incidences of disease and parasites. A total of fifty-six different species were observed reservoir wide. Some of the more interesting species observed included American eel, rainbow darter, river darter, and silver chub. The invasive species silver carp was observed at the forebay, mid-reservoir, and embayment locations.

Monitoring results for bottom life were generally similar to previous years. Bottom life rated “good” at the forebay, mid-reservoir, and inflow locations and “poor” at the Big Sandy embayment location. Samples from the embayment contained fewer individuals and less variety of organisms than those from the other monitoring locations; the organisms consisted mostly of midges, worms, and small mollusks known as fingernail clams. “Low-fair” to “poor” ratings are common for Big Sandy and are likely a factor of the low dissolved oxygen conditions that develop in the lower water column each year.

Sediment quality rated “good” at the three locations this indicator is monitored: the forebay, mid-reservoir, and Big Sandy embayment. No pesticides were detected and concentrations of metals were within expected background levels. Sediment quality commonly rates “good” at the forebay and mid-reservoir locations and “good” or “fair” at the Big Sandy location due to elevated levels of arsenic. Arsenic occurs naturally in soils and the concentrations in sediments deposited in the embayment are generally near – slightly above or below – suggested background concentrations.

The federal Clean Water Act requires all states to identify all waters where required pollution controls are not sufficient to attain or maintain applicable water quality standards and to establish priorities for the development of limits based on the severity of the pollution and the sensitivity of the established uses of those waters. States are required to submit reports to the EPA. The term "303(d) list" refers to the list of impaired and threatened streams and water bodies identified by the state. The lower Tennessee River is not listed on the 2016 TDEC 303(d) List; therefore, it is not considered impaired and is assumed to fully meet its designated uses.

Existing Wastewaters and Drainage Areas

There are several existing wastewater streams at JOF permitted to be discharged by the Johnsonville NPDES permit (Number TN0005444) (TDEC 2011). Additionally, stormwater discharges are authorized by the TMSP No. TNR053188. The majority of the process flows will eventually cease now that the fossil site is no longer generating. However, all flows are not expected to cease completely until sometime in 2021. Currently, sluice waste streams have ceased; however, station sumps, the filter plant flows, wash waters, and fire protection water, in addition to other ancillary flows, are still flowing and being discharged. Currently the remaining plant process waters are discharged to the eastern side of Ash Pond 2 near the causeway; whereas runoff from the coal pile and northern portion of the site are discharged to the northern portion of Ash Pond 2. Ultimately, these waters are discharged from Outfall 001 at the southernmost point of Ash Pond 2 into the Kentucky Reservoir. Water discharges at the spillway outlet are monitored according to NPDES permit requirements. Currently 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: pH (range from 6-9 s.u.); total suspended solids (average monthly concentration 30.0 milligrams per liter (mg/L), and daily max 86.6 mg/L); and Oil and Grease (average monthly concentration 14.0 mg/L, and daily max 19.0 mg/L).

As described in Section 1.1, TVA recently installed a heat recovery steam generator (HRSG) on Unit 20 at the JCT facility site to provide treated water and steam to the Chemours manufacturing facility adjacent to JOF. The HRSG utilizes fuel oil or natural gas, and water from the water treatment plant to produce the steam. With the introduction of this generator several low volume flows were added and are listed in Table 3.4-2 below.

Table 3.4-2. Average and Maximum Flow Rates by Wastewater Type

Wastewater	Average Flow (gpm)	Maximum Flow (gpm)
Misc. Demineralized Water Usage	6	6
Misc. Raw Water Usage	2	2
Sample Panel Cooling Water	126	126
HRSG Thermal Quench Water	7	10
HRSG Blowdown	13	19
Auxiliary Boiler Thermal Quench Water	30	30
Auxiliary Boiler Blowdown	58	58

3.4.2 Environmental Consequences

3.4.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

Under Alternative A2, all existing buildings, structures and facilities would remain in place. While the associated environmental impacts of closure activities for Ash Pond 2, the Coal Yard, and the Coal Yard Runoff Pond will be analyzed in other environmental reviews, for purposes of the analysis here, it is assumed these units would be maintained onsite until closure. All condenser circulating water intake and discharge tunnels would be abandoned in-place by installing bulkheads.

Sealing of Cooling Water Intake and Discharge

The installation of bulkheads in the tunnels would be conducted in accordance with BMPs intended to avoid release of sediments or contaminants to surface water. The sealing process would occur entirely within the tunnels, and would not be expected to cause adverse impacts to surface water quality as long as the proper BMPs were utilized. If hydrostatic testing of the bulkheads is required, the resultant discharges would be managed in accordance with NPDES Permit TN0005444 or the TDEC General NPDES Permit for Discharges of Hydrostatic Test Water (TN670000).

Long-Term Operational Impacts

Because the facility structures would remain in place, there would be no change in management of the onsite stormwater and process wastewater that is currently treated in impoundments and discharged from the site until the remaining flows are rerouted prior to the closure of individual impoundments. With the coal-fired units no longer in operation, the only significant remaining flows would be surface runoff stormwater flows, discharges from the JCT facility, and possibly some sump or dewatering flows. BMPs and wastewater treatment would be employed, as needed, to mitigate any pollutant discharge. The specific characteristics of future discharges are unknown at this time. However, the total loadings to the Tennessee River/Kentucky Reservoir should decrease significantly from current conditions.

Because buildings, structures, and facilities would remain in place, there would be a long-term potential for direct discharges of chemicals, hazardous waste, and solid waste, including but not limited to friable asbestos releases, to receiving streams through sump discharges, stormwater releases, and directly to adjacent surface waters. Periodic inspections and maintenance of the remaining facilities would be performed as needed to ensure that any contaminated equipment would not impact surface water quality. The implementation of BMPs, protocols to respond to onsite spills prior to discharge, and site clean-up would help to reduce the potential for any releases to surface waters.

Discharges associated with Ash Pond 2, the Coal Yard, and the Coal Yard Runoff Pond, would continue under all alternatives, until the remaining flows are re-routed prior to closure of individual impoundments. Management plans would be updated to reflect current conditions. TVA would continue to comply with current NPDES permits and monitoring requirements.

With the use of proper BMPs and compliance with all Federal, State, and Local regulations and guidelines, surface water impacts associated with direct, indirect or cumulative impacts would be expected to be temporary and minor.

3.4.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Under Alternative B, ancillary structures such as the office wing, coal handling facilities, aboveground conveyors, crusher building, dock service building, electrical control building, hydrogen trailer ports A and B, rotary car dumper, warehouse and storage area, storage building, tank farm and wash pad facility, and red storage barn north of the Service Bay would be removed. All condenser circulating water intake and discharge tunnels, as well as a tunnel extending west from the Receiving Conveyor and Hopper Building, would be abandoned in-place by installing bulkheads. Abandonment or removal of sanitary sewers connections from the facilities to be demolished would also be included, although the main network of sewers that serve the JCT Units, transmission facilities, water treatment building, and other remaining buildings would remain. Other structures such as roads, parking lots, foundations, and basements would remain. Discharges associated with Ash Pond 2, the Coal Yard, and the Coal Yard Runoff Pond would continue under all alternatives, until the remaining flows are re-routed prior to closure of individual impoundments. Management plans would be updated to reflect current conditions. TVA would continue to comply with current NPDES permits and monitoring requirements

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

Surface Runoff During Demolition

Demolition activities have the potential to temporarily affect surface water quality via stormwater runoff. TVA would obtain coverage under the General Permit for Stormwater Discharges Associated with Construction Activities (TDEC 2016) prior to beginning demolition. This permit requires the development of a project-specific SWPPP. Surface water quality impacts resulting from disturbance during demolition would be mitigated by the use of stormwater pollution prevention BMPs to minimize the extent of disturbance and erosion. The Tennessee Erosion and Sediment Control Handbook would be referenced to ensure BMPs to be used during demolition are appropriate (TDEC 2012). Stormwater would discharge via either the current NPDES permitted discharge points or designated construction stormwater outfalls. BMPs would be installed, inspected, and maintained for the duration of demolition as needed to avoid contamination of surface water adjacent to the project area. All proposed project activities would be conducted in a manner to ensure that waste materials are contained, and the introduction of pollution materials to the receiving waters would be minimized. 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 TN0005444. Monitoring of current industrial stormwater outfalls would continue throughout the demolition process, with modifications as directed by the SWPPP. Therefore, only temporary, minor impacts to surface water quality would be expected due to surface water runoff from the demolition site.

Any work conducted in waters of the State may require USACE Section 404 and TDEC Section 401 certification/ARAP permits depending on the project impacts and location. Potential surface water impacts during demolition in these areas would be avoided by designing demolition activities to minimize any impacts to adjacent waters. Mitigation measures, such as turbidity curtains in adjacent waters, would be considered to help mitigate any incidental discharge of fill to receiving streams. Surface water impacts would be minor with the implementation of BMPs, as well as compliance with the requirements of the USACE and TDEC permitting process. In the event a permit is required, any compensatory mitigation for impacts to streams would be identified through the permitting process.

Portable toilets would be provided for the additional construction workforce as needed. These toilets would be pumped out regularly, and the sewage would be transported by tanker truck to a publicly-owned wastewater treatment works that accepts pump out. There would be no discharge to adjacent surface water, and therefore no impacts to surface water quality.

Once demolition was completed and demolished areas were restored, impacts associated with demolition activities and stormwater runoff would cease. With the implementation of appropriate BMPs, only temporary, minor impacts to surrounding surface waters are expected from demolition activities.

Sealing of Cooling Water Intake and Discharge

The installation of bulkheads in the tunnels would be the same as described for Alternative A2. The installation would occur entirely within the tunnels, and would be conducted in accordance with BMPs intended to avoid release of sediments or contaminants to surface water. The installation process would not be expected to cause adverse impacts to surface water quality as long as the proper BMPs were utilized. If hydrostatic testing of the bulkheads is required, the resultant discharges would be managed in accordance with NPDES Permit TN0005444 or the TDEC General NPDES Permit for Discharges of Hydrostatic Test Water (TN670000).

Long-Term Operational Impacts

The main operational change that would take place with the demolition of the facility would be the change in management of the onsite stormwater and process wastewater that is currently treated in impoundments and discharged from the site. With the coal-fired units no longer in operation, the only significant remaining flows would be surface runoff stormwater flows, flows from the JCT facility and possibly some sump or dewatering flows. Any remaining minor flows would be redirected to other treatment systems as necessary. This re-routing would conceptually employ onsite non-CCR impoundments and new ditches or piping to enable the proper handling and treatment of the non-CCR waste streams. BMPs and wastewater treatment would be employed, as needed, to mitigate any pollutant discharge. The specific characteristics of future discharges are unknown at this time. However, the total loadings to the Tennessee River/Kentucky Reservoir should decrease significantly from current conditions.

As with Alternative A2, leaving the facility in place results in the potential for direct discharges of chemicals, hazardous waste, and even solid waste, including but not limited to friable asbestos releases to receiving streams through sump discharges, stormwater releases, and directly to adjacent surface waters. However, the potential for these discharges would be lower than that for Alternative A2, because some facilities, with their associated equipment and hazardous materials, would be removed. Periodic inspections and maintenance of the remaining facilities would be performed as needed to ensure that any contaminated equipment would not impact surface water quality. The implementation of BMPs, protocols to respond to onsite spills prior to discharge, and site clean-up would help to reduce the potential for any releases to surface waters.

Discharges associated with Ash Pond 2, the Coal Yard, and the Coal Yard Runoff Pond would continue under all alternatives, until the remaining flows are re-routed prior to closure of individual impoundments. Management plans would be updated to reflect current conditions. TVA would continue to comply with current permits, and TVA would comply with applicable monitoring requirements.

With the use of proper BMPs and compliance with all Federal, State, and Local regulations and guidelines, surface water impacts associated with direct, indirect or cumulative impacts would be expected to be temporary and minor.

3.4.2.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

Under Alternative C1, all designated buildings and structures would be decontaminated to remove hazardous materials prior to demolition. All buildings and equipment would be demolished and backfilled to grade, resulting in a "Brownfield" site. The intake and discharge channels would be sealed off and all equipment removed. In addition, roads, parking lots, and foundations would be removed, environmental issues would be abated, and basements, trenches, and pits would be backfilled to grade. All disturbed areas would be covered with topsoil and seeded. The main network of sewers that serve the JCT Units, transmission facilities, water treatment building, and other remaining buildings would remain. The stack, Ash Pond 2, Coal Yard, and Coal Yard Runoff Pond would continue operating, until the remaining flows are re-routed prior to closure of individual impoundments.

Wastewaters generated during the implementation of Alternative C1 may include construction stormwater runoff, dewatering of work areas, domestic sewage, non-detergent equipment washings, dust control, and hydrostatic test discharges.

Surface Runoff During Demolition

The types of impacts to surface water from demolition would be the same as described for Alternative B, but would be more extensive, due to the greater extent of demolition activities. Demolition would cover a greater area of the site, and would also require more intrusive ground disturbance because it would involve excavations to remove foundations, pavement, and contaminated soils, and backfilling of basements and trenches. Alternative C1 would also include remediation of contaminated soils. Because these soils would remain undisturbed in Alternatives A2 and B, Alternative C1 would temporarily have a higher potential than Alternatives A2 or B for releasing these materials to surface water during demolition. Alternative C1 would have no potential for release of fugitive dust, fill, and residual ash to adjacent surface water during stack demolition, because the flue gas stack would remain in place.

Similar to Alternative B, TVA would obtain coverage under the General Permit for Stormwater Discharges Associated with Construction Activities (TDEC 2016), develop a SWPPP, and implement BMPs described in the Erosion and Sediment Control Handbook prior to beginning demolition. These measures would minimize the potential for release of sediment and contaminants during demolition. BMPs would be installed, inspected, and maintained for the duration of demolition as needed to avoid contamination of surface water adjacent to the project area. All proposed project activities would be conducted in a manner to ensure that waste materials are contained, and the introduction of pollution materials to the receiving waters would be minimized. 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 TN0005444. Monitoring of current industrial stormwater outfalls would continue throughout the demolition process, with modifications as directed by the SWPPP. Therefore, only temporary, minor impacts to surface water quality would be expected due to surface water runoff from the demolition site under Alternative C1.

Any work conducted in waters of the State may require USACE Section 404 and TDEC Section 401 certification/ARAP permits depending on the project impacts and location. Potential surface water impacts during demolition in these areas would be avoided by designing demolition activities to minimize any impacts to adjacent waters. Mitigation measures, such as turbidity

curtains in adjacent waters, would be considered to help mitigate any incidental discharge of fill to receiving streams. Surface water impacts would be minor with the implementation of BMPs, as well as compliance with the requirements of the USACE and TDEC permitting process. In the event a permit is required, any compensatory mitigation for impacts to streams would be identified through the permitting process.

Portable toilets would be provided for the additional construction workforce as needed. These toilets would be pumped out regularly, and the sewage would be transported by tanker truck to a publicly-owned wastewater treatment works that accepts pump out. There would be no discharge to adjacent surface water, and therefore no impacts to surface water quality.

Once demolition was completed and demolished areas were restored, impacts associated with Alternative C1 demolition activities and stormwater runoff would cease. With the implementation of appropriate BMPs, only temporary, minor impacts to surrounding surface waters are expected from demolition activities.

Sealing of Cooling Water Intake and Discharge

The installation of bulkheads in the tunnels would be the same as described for Alternatives A2 and B. The installation would occur entirely within the tunnels, and would be conducted in accordance with BMPs intended to avoid release of sediments or contaminants to surface water. The installation process would not be expected to cause adverse impacts to surface water quality as long as the proper BMPs were utilized. If hydrostatic testing of the bulkheads is required, the resultant discharges would be managed in accordance with NPDES Permit TN0005444 or the TDEC General NPDES Permit for Discharges of Hydrostatic Test Water (TN670000).

Long-Term Operational Impacts

The main operational change that would take place with the demolition of the facility would be the change in management of the onsite stormwater and process wastewater that is currently treated in impoundments and discharged from the site. With the coal-fired units no longer in operation, the only significant remaining flows would be surface runoff stormwater flows. Any remaining minor flows would be redirected to other treatment systems as necessary to comply with a modified NPDES permit. This re-routing would conceptually employ onsite non-CCR impoundments and new ditches or piping to enable the proper handling and treatment of the non-CCR waste streams. BMPs and wastewater treatment would be employed, as needed, to mitigate any pollutant discharge. The specific characteristics of future discharges are unknown at this time. However, the total loadings to the Tennessee River/Kentucky Reservoir should decrease significantly from current conditions, and would also be lower than those associated with Alternative B.

There would be no ongoing potential for direct discharges of chemicals, hazardous waste, or solid waste, because all equipment, structures, and contaminated soil would be removed from the area. There would be no requirement for periodic inspections, maintenance, or BMPs to ensure that any contaminated equipment would not impact surface water quality.

Discharges associated with Ash Pond 2, the Coal Yard, and the Coal Yard Runoff Pond alternatives would continue under all alternatives, until the remaining flows are re-routed prior to closure of individual impoundments. Management plans would be updated to reflect current conditions. TVA would continue to comply with current permits, and TVA would comply with applicable monitoring requirements.

With the use of proper BMPs and compliance with all Federal, State, and Local regulations and guidelines, surface water impacts associated with direct, indirect or cumulative impacts of Alternative C1 would be expected to be temporary and minor.

3.4.2.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

The scope of Alternative C2 would be the same as that of Alternative C1, except that the stack would be removed using drop removal methods. The type and volume of wastewaters generated during the implementation of Alternative C2 would be the same as those for Alternative C1, and would include construction stormwater runoff, dewatering of work areas, domestic sewage, non-detergent equipment washings, dust control, and hydrostatic test discharges.

Surface Runoff During Demolition

The types of impacts to surface water from demolition would be the same as described for Alternatives B and C1, but would be more extensive than either, due to the greater extent of demolition activities. Demolition would cover a greater area of the site than Alternative B, and would also include removal of the stack. Alternative C2 would potentially release fugitive dust, fill, and residual ash to adjacent surface water during demolition, due to the uncontrolled nature of the dropping of the stack in a single, brief action. This action would result in the generation of fugitive dust and debris, which would then be subject to potential erosion and transport to adjacent surface water.

The type and amount of remediation of contaminated soils would be the same as described for Alternative C1. TVA would obtain coverage under the General Permit for Stormwater Discharges Associated with Construction Activities (TDEC 2016), develop a SWPPP, and implement BMPs described in the Erosion and Sediment Control Handbook prior to beginning demolition. Any work conducted in waters of the State may require USACE Section 404 and TDEC Section 401/ARAP permits depending on the project impacts and location. Mitigation measures, such as turbidity curtains in adjacent waters, would be considered to help mitigate any incidental discharge of fill to receiving streams. These measures would minimize the potential for release of sediment and contaminants during demolition. Only temporary, minor impacts to surface water quality would be expected due to surface water runoff from the demolition site under Alternative C2.

Once demolition was completed and demolished areas were restored, impacts associated with Alternative C2 demolition activities and stormwater runoff would cease. With the implementation of appropriate BMPs, only temporary, minor impacts to surrounding surface waters are expected from demolition activities.

Sealing of Cooling Water Intake and Discharge

The installation of bulkheads in the tunnels would be the same as described for Alternatives A2 and B. The installation would occur entirely within the tunnels, and would be conducted in accordance with BMPs intended to avoid release of sediments or contaminants to surface water. The installation process would not be expected to cause adverse impacts to surface water quality as long as the proper BMPs were utilized. If hydrostatic testing of the bulkheads is required, the resultant discharges would be managed in accordance with NPDES Permit TN0005444 or the TDEC General NPDES Permit for Discharges of Hydrostatic Test Water (TN670000).

Long-Term Operational Impacts

Under Alternative C2, there would be no ongoing potential for direct discharges of chemicals, hazardous waste, or solid waste, because all equipment, structures, and contaminated soil would be removed from the area. There would be no requirement for periodic inspections, maintenance, or BMPs to ensure that any contaminated equipment would not impact surface water quality. With the use of proper BMPs and compliance with all Federal, State, and Local regulations and guidelines, surface water impacts associated with direct, indirect or cumulative impacts of Alternative C2 would be expected to be temporary and minor.

3.4.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

The scope of Alternative C3 would be the same as that of Alternative C1, except that the stack would be removed using hand removal methods. The type and volume of wastewaters generated during the implementation of Alternative C3 would be the same as those for Alternative C1, and would include construction stormwater runoff, dewatering of work areas, domestic sewage, non-detergent equipment washings, dust control, and hydrostatic test discharges.

Surface Runoff During Demolition

The types of impacts to surface water from demolition would be the same as described for Alternatives B and C1, but would be more extensive than either, due to the greater extent of demolition activities. Demolition would cover a greater area of the site than Alternative B, and would also include removal of the stack. However, Alternative C3 would have the lowest potential for the release of fugitive dust, fill, and residual ash to adjacent surface water during demolition, because the stack would be removed in a controlled manner using hand methods. The use of hand removal would minimize the generation of fugitive dust and debris, thus minimizing the potential erosion and transport of these materials to adjacent surface water.

The type and amount of remediation of contaminated soils would be the same as described for Alternative C1. TVA would obtain coverage under the General Permit for Stormwater Discharges Associated with Construction Activities (TDEC 2016), develop a SWPPP, and implement BMPs described in the Erosion and Sediment Control Handbook prior to beginning demolition. Any work conducted in waters of the State may require USACE and TDEC/ARAP permits depending on the project impacts and location. Mitigation measures, such as turbidity curtains in adjacent waters, would be considered to help mitigate any incidental discharge of fill to receiving streams. These measures would minimize the potential for release of sediment and contaminants during demolition. Only temporary, minor impacts to surface water quality would be expected due to surface water runoff from the demolition site under Alternative C3.

Once demolition was completed and demolished areas were restored, impacts associated with Alternative C3 demolition activities and stormwater runoff would cease. With the implementation of appropriate BMPs, only temporary, minor impacts to surrounding surface waters are expected from demolition activities.

Sealing of Cooling Water Intake and Discharge

The installation of bulkheads in the tunnels would be the same as described for Alternatives A2 and B. The installation would occur entirely within the tunnels, and would be conducted in accordance with BMPs intended to avoid release of sediments or contaminants to surface water. The installation process would not be expected to cause adverse impacts to surface water quality as long as the proper BMPs were utilized. If hydrostatic testing of the bulkheads is required, the resultant discharges would be managed in accordance with NPDES Permit

TN0005444 or the TDEC General NPDES Permit for Discharges of Hydrostatic Test Water (TN670000).

Long-Term Operational Impacts
Under Alternative C3, there would be no ongoing potential for direct discharges of chemicals, hazardous waste, or solid waste, because all equipment, structures, and contaminated soil would be removed from the area. There would be no requirement for periodic inspections, maintenance, or BMPs to ensure that any contaminated equipment would not impact surface water quality. With the use of proper BMPs and compliance with all Federal, State, and Local regulations and guidelines, surface water impacts associated with direct, indirect or cumulative impacts of Alternative C3 would be expected to be temporary and minor.

3.4.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal
Under Alternative C4, impacts would be similar to those under Alternative C2.

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

Permits would continue to be renewed with applicable monitoring requirements included. Permits and associated pollution prevention plans would be modified to indicate the changes from current conditions. The scope of this document does not include the management of the onsite impoundments, but the discharge of the sumps and stormwater would need to be re-routed prior to the closure of impoundments to ensure these discharges are still appropriately handled through the TDEC NPDES permit program. Minor impacts are anticipated with this alternative.

3.5 Floodplains

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

Floodplains associated with the project area are shown in Figure 3.5-1. Portions of the proposed decontamination/deconstruction project would take place within the 100-year floodplain of the Tennessee River on Kentucky Reservoir from TRM 99.4 to 99.9, left descending bank. At Johnsonville FP, the 100- and 500-year flood elevations would both be 375.0 feet above mean sea level. The following facilities are located within the floodplain: the inlet and outlet structures of the condenser circulating water intake and discharge tunnels, portions of roadways, and a catwalk at the mooring cells adjacent to Kentucky Reservoir.

3.5.2 Environmental Consequences

As a federal agency, TVA adheres to the requirements of Executive Order (EO) 11988, Floodplain Management. The objective of EO 11988 is "to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative" (EO 11988, Floodplain Management). The EO is not intended to prohibit floodplain development in all cases, but rather to create a consistent government policy against such development under most circumstances (U.S. Water Resources Council 1978). The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative. Because the proposed action involves deconstructing certain structures already present in the floodplain at the JOF plant site, there is no practicable alternative to deconstructing them in the floodplain.

The Flood Control Storage Loss Guideline is used to evaluate potential activities located within the Flood Control Storage Zone of TVA reservoirs. The Flood Control Storage Zone is the space between the January 1 Flood Guide elevation and the TVA Flood Risk Profile, which is reserved for storing flood waters.

3.5.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

Under Alternative A2, all intake and discharge tunnels would be abandoned in place by installing reinforced concrete bulkheads.

The inlet and outlet structures of the condenser cooling water tunnels are located within the 100-year floodplain of Kentucky Reservoir. The concrete bulkheads would be located inside the tunnels, which would not increase flood elevations and would therefore be consistent with EO 11988 and the TVA Flood Control Storage Loss Guideline. Thus, there would be no significant impact to floodplains and their natural and beneficial values resulting from implementing Alternative A2.

3.5.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Under Alternative B, the installation of concrete bulkheads within intake and discharge tunnels would be the same as discussed in Alternative A2. In addition, portions of roadways and a catwalk at the mooring cells adjacent to Kentucky Reservoir and within the floodplain, would be demolished. The remaining facilities to be demolished under Alternative B would be located outside the 100-year floodplain, which is consistent with EO 11988 and would result in no impact to floodplains.

Similar to Alternative A2, the inlet and outlet structures of the condenser cooling water tunnels are located within the 100-year floodplain of Kentucky Reservoir. The concrete bulkheads would be located inside the tunnels, which would be consistent with EO 11988 and the TVA Flood Control Storage Loss Guideline.

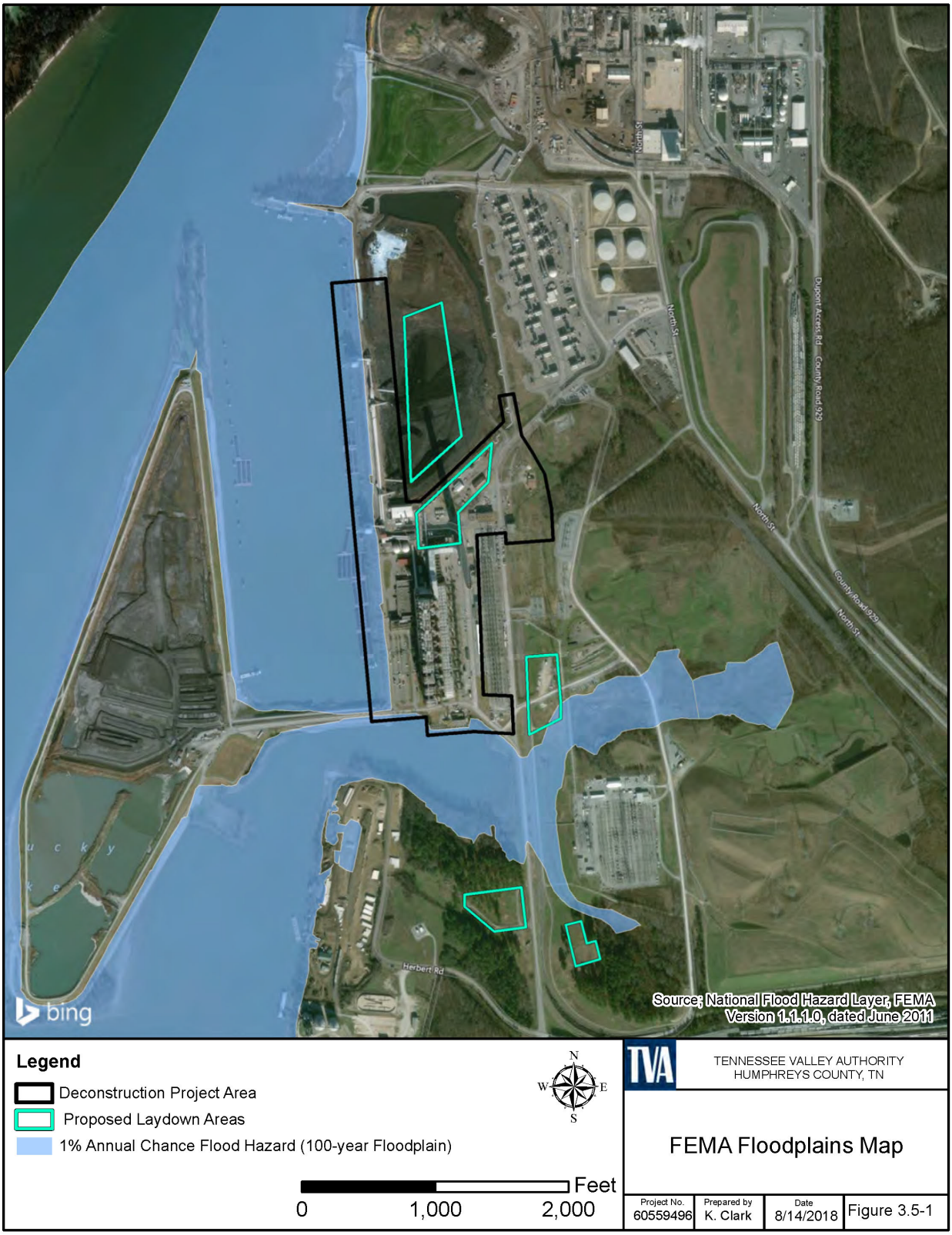


Figure 3.5-1. FEMA Floodplains Map

Demolition of the catwalk and portions of roadways within the 100-year floodplain would have a minor beneficial impact on floodplains and their natural and beneficial values, which is consistent with EO 11988.

3.5.2.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

The impacts of Alternative C1 on floodplains would be the same as Alternative B. Alternative C1 would include sealing the intake and discharge tunnels with concrete bulkheads as would be done under Alternatives A2 and B, and the same removal of portions of roadways and a catwalk at the mooring cells adjacent to Kentucky Reservoir, as would be done under Alternative B.

All other additional activities of Alternative C1 would occur outside of the 100-year floodplain, which is consistent with EO 11988 and would result in no impact to floodplains.

3.5.2.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

Under Alternative C2, the impacts would be similar to those described above under Alternative C1.

3.5.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Under Alternative C3, the impacts would be similar to those described above under Alternative C1.

3.5.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Under Alternative C4, the impacts would be similar to those described above under Alternative C1.

3.5.2.7 Alternative D – No Action

Under the Alternative D, TVA would not perform any deconstruction or other disposition activities at JOF. Therefore, there would be no changes to impacts to floodplains because there would be no physical changes to the current conditions found within the local floodplains.

3.6 Wetlands

3.6.1 Affected Environment

The TVA JOF is located in the Western Highland Rim subregion of the greater Interior Plateau ecoregion (Griffith et al. 2009). Wetlands in this region are typically associated with low-lying, poorly drained areas, floodplains and riparian zones of streams and rivers, groundwater seepage areas, and the margins of ponds and reservoirs. A February 2018 desktop review of the proposed project area did not document any wetlands within the area proposed for demolition/deconstruction (Figure 3.6-1). A TVA Qualified Hydrologic Professional confirmed that no wetlands or other surface water features are present within the project boundary.

3.6.2 Environmental Consequences

3.6.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

Adoption of Alternative A2 would not adversely affect wetlands, as there are no wetlands present within the proposed project area (Figure 3.6-1).

Figure 3.6-1. Johnsonville Fossil Plant National Wetlands Inventory Map

3.6.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Under Alternative B, impacts to wetlands would be similar to those described above under Alternative A2.

3.6.2.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

Under Alternative C1, impacts to wetlands would be similar to those described above under Alternative A2.

3.6.2.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

Under Alternative C2, impacts to wetlands would be similar to those described above under Alternative A2.

3.6.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Under Alternative C3, impacts to wetlands would be similar to those described above under Alternative A2.

3.6.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Under Alternative C4, impacts to wetlands would be similar to those described above under Alternative A2.

3.6.2.7 Alternative D – No Action

Adoption of the No Action Alternative would not result in impacts to wetlands; no wetlands are present within the property boundaries and the property would remain in its current condition.

3.7 Aquatic Ecology

3.7.1 Affected Environment

The TVA JOF is located in Humphreys County, Tennessee, in the Western Highland Rim subregion of the greater Interior Plateau ecoregion (Griffith et al. 2009). The proposed project footprint lies within the Tennessee River 10-digit Hydrologic Unit Code (HUC) watershed 0604000504. In order to meet requirements of EPA Agreements, TVA retired JOF Units 1-10.

The Western Highland Rim of the Interior Plateau is characterized by dissected, rolling terrain of open hills, with elevations of 400-1000 feet. Soils in this region tend to be acidic, cherty, and moderate in fertility (Griffith et al. 2009). Streams in this region are relatively clear with moderate gradients, with substrates consisting primarily of course chert gravel and sand with some bedrock. Much of the region is heavily forested, with some agriculture in the stream and river valleys. A January 2018 desktop review of the proposed project area did not document any streams or water features. A TVA Qualified Hydrologic Professional confirmed that there are no surface water features within the project boundary. The JOF facility is located on the eastern shore (right descending bank) of Kentucky Reservoir at TRM 100. The reach of the Tennessee River adjacent to JOF has been altered from its former free-flowing character by the presence of Kentucky Dam, located approximately 76 river miles downstream of JOF, and Pickwick Dam, located approximately 107 river miles upstream. 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 Ecological Health Monitoring Program (formerly Vital Signs Monitoring Program). Ecological health monitoring activities focus on (1) physical/chemical characteristics of waters (2)

physical/chemical characteristics of sediments; (3) benthic macroinvertebrate community sampling; and (4) fish assemblage sampling (Dycus and Baker 2001).

Benthic macroinvertebrates are included in aquatic monitoring programs because of their importance to the aquatic food chain and because they have limited capability of movement, thereby preventing them from avoiding undesirable conditions. Sampling and data analysis are based on seven parameters that include species diversity, presence of selected taxa that are indicative of good water quality, occurrence of long-lived organisms, total abundance of all organisms except those indicative of poor water quality, proportion of total abundance comprised by pollution-tolerant oligochaetes, proportion of total abundance comprised by the two most abundant taxa, and proportion of samples with no organisms present. Reservoir Benthic Index data collected upstream and downstream of JOF in 2001 to 2017 are presented in Table 3.7-1. Compared to stations at other TVA run-of-the-river reservoirs, monitoring sites on Kentucky Reservoir have consistently rated “Fair” to “Excellent”, with “Excellent” ratings at TRM 85, the site closest to JOF and the proposed project area, since 2001.

Table 3.7-1. Benthic community ratings identified based on the Ecological Health Monitoring Program (formerly Vital Signs) Data in Kentucky Reservoir at TRM 23, 85 & 200 (2001-2017).

Station	Site	2001	2003	2005	2007	2009	2011	2013	2015	2017
Inflow	TRM 200	Fair	Good	Good	Excellent	Fair	Good	Poor	Good	Excellent
Transition	TRM 85	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
Forebay	TRM 23	Excellent	Excellent	Good	Good	Good	Excellent	Good	Excellent	Good

TVA initiated a study in 2001 to evaluate fish communities in areas immediately upstream and downstream of JOF using Reservoir Fish Assemblage Index multi-metric evaluation techniques. Electrofishing and gill netting sampling stations correspond to those described for benthic macroinvertebrate sampling (TVA 2011). Fishes are included in aquatic monitoring programs because they are important to the aquatic food chain and because they have a relatively long life cycle, which allows them to reflect conditions over time. Fishes are also important to the public for aesthetic, recreational, and commercial reasons. Monitoring results for each sampling station are analyzed to arrive at an Ecological Health rating, which is based primarily on fish community structure and function. Also considered in the rating is the percentage of the sample represented by omnivores and insectivores, overall number of fish collected, and the occurrence of fish with anomalies such as diseases, lesions, parasites, deformities, etc. (McDonough and Hickman 1999). The Reservoir Ecological Health fish community monitoring results are shown in Table 3.7-2. Overall results indicate that the Kentucky fish assemblage has been consistently “good” from 2001 to 2017, with the exception of the “excellent” score at the inflow in 2011 (TVA 2011).

Overall, the results report healthy fish and benthic communities downstream of the JOF thermal discharge and indicate that the heated JOF effluent has not adversely impacted these communities (Warden 1981, TVA 1974).

Table 3.7-2. Kentucky Reservoir fish assemblage index ratings, based on Reservoir Ecological Health Monitoring Program (formerly Vital Signs) Data at TRM 206, 105, 97, 85 & 23.

Station	Site (TRM)	2001	2003	2005	2007	2009	2010	2011	2013	2015	2017
Inflow	206	Good	Good	Good	Good	Good	-	Excellent	Good	Good	Good
Upstream of JOF	105	Good	Good	Good	Good	-	Good	Good	-	-	-
Downstream of JOF	97	Good	Good	Good	Good	-	Good	Good	-	-	-
Transition	85	Good	Good	Good	Good	Good	-	Good	Good	Good	Good
Forebay	23	Good	Good	Good	Good	Fair	-	Good	Good	Good	Good

3.7.2 Environmental Consequences

3.7.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

Under Alternative A2, no work would be required within the Kentucky Reservoir on the Tennessee River and no streams were identified on the property proposed for deconstruction. Therefore, impacts to aquatic resources are not anticipated and there would be no measurable impacts to the aquatic ecology of the Kentucky Reservoir on the Tennessee River.

3.7.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

No impacts to aquatic resources are expected to occur with the adoption of this alternative.

3.7.2.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

No impacts to aquatic resources are expected to occur with the adoption of this alternative.

3.7.2.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

No impacts to aquatic resources are expected to occur with the adoption of this alternative.

3.7.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

No impacts to aquatic resources are expected to occur with the adoption of this alternative.

3.7.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

No impacts to aquatic resources are expected to occur with the adoption of this alternative.

3.7.2.7 Alternative D – No Action

Under the No Action alternative, TVA would not perform any deconstruction or other disposition activities at JOF. If the facility is left in the "as-is" condition, it likely would present a higher risk than Alternatives A2, B, and C1 through C4 for the potential to contaminate soil and groundwater as systems and structures degrade. No immediate impacts to aquatic resources are expected to occur with the adoption of this alternative. However, over time, the risk for adverse impacts to aquatic resources within Kentucky Reservoir would increase as structures degrade.

3.8 Wildlife

3.8.1 Affected Environment

The areas of proposed action at JOF are heavily disturbed and few are vegetated. Only small areas of early successional vegetation currently exist in the JOF Deconstruction Project Area, most of which occurs in the laydown areas.

Mowed herbaceous fields offer little suitable habitat for rare wildlife species, but can be used by many common species. Birds that utilize these grassy areas include the Canada goose, eastern meadowlark, grasshopper sparrow, killdeer, European starling, and red-tailed hawk. Mammals that can be found in these grassy areas include the common mole, coyote, woodchuck, least shrew, white-footed mouse, and white-tailed deer. Common reptiles found in this habitat in western Tennessee include the black racer, black rat snake, eastern kingsnake, and eastern garter snake.

Some wildlife are known to use man-made structures opportunistically. Common mammals, birds, and reptiles have been observed using parts of buildings abandoned or used infrequently by humans. Several species of bats commonly found in this region may roost in dark or quiet areas of these abandoned buildings. Species of bat known to use human structures include the big brown bat, eastern red bat, southeastern bat, and tricolored bat (Harvey 1992). Migratory birds may also roost in buildings or areas of buildings used infrequently.

Review of the TVA Regional Natural Heritage database on January 19, 2018, resulted in no records of caves within 3 miles of the project footprint. No new caves were found during field reviews on February 14, 2018. No other unique terrestrial habitat is known from within 3 miles of the project area.

Review of the USFWS's Information for Planning and Consultation database (https://ecos.fws.gov/ipac/) resulted in identification of twelve migratory birds of conservation concern that have the potential to be impacted by the proposed actions: blue-winged warbler, cerulean warbler, eastern whip-poor-will, golden eagle, Kentucky warbler, Le Conte's sparrow, lesser yellow legs, prairie warbler, red-headed woodpecker, rusty blackbird, semi-palmated sandpiper, and wood thrush. None of these species are likely to inhabit or use these buildings and structures or the early successional habitat of the laydown areas. Two records of colonial wading bird colonies exist within 3 miles, with the nearest viable record approximately 1 mile from the project footprint. One record of an osprey nest was previously recorded approximately 2.7 miles from the project footprint. Field reviews in July 2018 observed seven additional active osprey nests on lighting structures around the coal yard area. No aggregations of migratory birds or colonial wading bird colonies were documented within the project footprint during field reviews on February 14, 2018.

3.8.2 Environmental Consequences

3.8.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

Under this alternative, no buildings would be demolished and no herbaceous habitat would be removed. Buildings and structures would remain standing, which would allow for continued foraging and nesting use by wildlife. Terrestrial animals and their habitats would not be affected under this alternative.

3.8.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

The primary objective of Alternative B is the same as Alternative A2 plus further reducing future maintenance costs and risks by removing most outlying structures including the coal handling facilities. Laydown areas would be used.

Any wildlife (primarily common, habituated species) found in the project footprint would be permanently displaced. Direct effects to common wildlife may occur to some individuals that may be immobile during the time of project activities (i.e. juveniles or eggs). This could be the case if project activities took place during breeding/nesting seasons. However, the actions are not likely to affect populations of species common to the area, as use of these buildings by wildlife is opportunistic and similar industrial buildings and structures exist in the surrounding landscape.

Based on the small amount of fragmented habitat and the significant amount of disturbance in the areas immediately adjacent to the proposed actions, populations of migratory birds are not likely to inhabit the proposed action area. No active heronries are known within 660 feet of the proposed actions, so none would be impacted by the proposed actions. Migratory bird populations are not likely to be impacted by the proposed actions.

Osprey nests observed on the lighting structures around the coal yard would be removed when lighting structures are demolished. A commitment has been made that no nests would be removed while they are occupied and active (typically March-July). With this commitment, no direct effects to nesting osprey would occur. However, these particular nesting locations would no longer be available when osprey return to nest in future years. Displaced osprey would be forced to find alternative nesting locations in future years. Due to the variety of alternative nesting locations in the area (trees, buoys, mooring cells, lighting towers, transmission structures), and the commitment above, these birds would not be adversely impacted by removal of these seven identified nests.

3.8.2.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

Impacts to wildlife under this alternative would be similar to those under Alternative B. However, under this alternative, wildlife that inhabit early successional herbaceous habitats are expected to return following soil and seed installation. More of this type of habitat would exist following the proposed activities under this alternative.

3.8.2.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

Impacts to wildlife under this alternative would be similar to those under Alternative B. However, under this alternative, wildlife that inhabit early successional herbaceous habitats are expected to return following soil and seed installation. More of this type of habitat would exist following the proposed activities under this alternative.

3.8.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Impacts to wildlife under this alternative would be similar to those under Alternative B. However, under this alternative, wildlife that inhabit early successional herbaceous habitats are expected to return following soil and seed installation. More of this type of habitat would exist following proposed activities under this alternative.

3.8.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Impacts to wildlife under this alternative would be similar to those under Alternative B. However, under this alternative, wildlife that inhabit early successional herbaceous habitats are expected to return following soil and seed installation. More of this type of habitat would exist following proposed activities under this alternative.

3.8.2.7 Alternative D – No Action

Under the No Action alternative, building demolition and construction would not occur in association with this project, and soil and vegetation on the site would remain in their current state. Thus, terrestrial animals and their habitats would not be affected under this alternative.

3.9 Vegetation

3.9.1 Affected Environment

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

3.9.2 Environmental Consequences

3.9.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

Adoption of each of the action alternatives would result in the deconstruction, to some extent, of portions of the JOF. The affected areas do not contain intact native plant communities, and adoption of this alternative would not change that situation. Impacts to vegetation may be permanent, but the vegetation found on site is composed of common, non-native weeds and early successional plants that have no conservation value. Adoption of Alternative A2 would not negatively impact vegetation of the region.

3.9.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Under Alternative B, impacts to vegetation would be similar to those described above under Alternative A2.

1.1.1.1 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

Under Alternative C1, impacts to vegetation would be similar to those described above under Alternative A2.

3.9.2.3 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

Under Alternative C2, impacts to vegetation would be similar to those described above under Alternative A2.

3.9.2.4 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Under Alternative C3, impacts to vegetation would be similar to those described above under Alternative A2.

3.9.2.5 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Under Alternative C4, impacts to vegetation would be similar to those described above under Alternative A2.

3.9.2.6 Alternative D – No Action

Adoption of the No Action Alternative would not result in impacts to the terrestrial ecology of the region. Property within with potential affected area has no conservation value and adoption of the No Action Alternative would not change the situation; the property would remain in its current condition and no work would occur. The few vegetated areas on the parcel would continue to be dominated by common, non-native and early successional species indicative of disturbed habitats. Any changes occurring in the vegetation onsite would be the result of other natural or anthropogenic factors and would not be the result of the No Action Alternative.

3.10 Threatened and Endangered Species

3.10.1 Aquatic – Threatened and Endangered Species

3.10.1.1 Affected Environment

The Endangered Species Act provides broad protection for aquatic species that are listed as threatened or endangered in the U.S. or elsewhere. The Endangered Species Act outlines procedures for federal agencies to follow when taking actions that may jeopardize federally listed species or their designated critical habitat. The policy of Congress is that federal agencies must seek to conserve endangered and threatened species and use their authorities in furtherance of the Endangered Species Act's purposes.

The State of Tennessee provides protection for species considered threatened, endangered, or deemed in need of management within the state other than those federally listed under the Endangered Species Act. The listings are handled by the TDEC; additionally, the Tennessee Natural Heritage Program and TVA both maintain databases of aquatic animal species that are considered threatened, endangered, special concern, or tracked in Tennessee.

A review of the TVA Regional Natural Heritage database and the USFWS Environmental Conservation Online System for species of conservation concern potentially present within the project area was conducted in February 2018 (Table 3.10-1). Listed aquatic animal species documented as occurring within the Tennessee River 10-digit HUC watershed (HUC 0604000504) and within a 10-mile radius of the proposed project area (See Table 3.10-1) in Humphreys County, Tennessee, include:

- Four federally listed mussel species (pink mucket, slabside pearlymussel, smooth rabbitsfoot, and spectaclecase). These species are known to occur only in the Kentucky Reservoir (mainstem of the Tennessee River) and in the Duck River in Humphreys County.
- One Federally listed threatened species (pygmy madtom) is reported from the Duck River in Humphreys County.
- Four additional federally listed endangered species (clubshell, orange-foot pimpleback, ring pink and rough pigtoe) are either historical or extirpated records and no longer considered extant in this portion of the Kentucky Reservoir on the Tennessee River.
- No federally designated critical habitat for these species is present within Humphreys County, Tennessee.

Table 3.10-1. Species of Conservation Concern[1]

Common Name	Scientific Name	Status[2]	
		Federal	State (Rank[3])
Fish			
Coppercheek darter	*Etheostoma aquali*	-	THR (S2S3)
Golden darter	*Etheostoma denoncourti*	-	RARE (S2)
Highfin carpsucker	*Carpiodes velifer*	-	D (S2S3)
Pygmy madtom	*Noturus stanauli*	LE	END (S1)
Saddled madtom	*Noturus fasciatus*	-	THR (S2)
Slenderhead darter	*Percina phoxocephala*	-	D (S3)
Mussels			
Clubshell	*Pleurobema clava*	LE	END (SH)
Orange-foot pimpleback	*Plethobasus cooperianus*	LE	END (S1)
Pink mucket	*Lampsilis abrupta*	LE	END (S2)
Purple lilliput	*Toxolasma lividus*	-	RARE (S1S2)
Ring pink	*Obovaria retusa*	LE	END (S1)
Slabside pearlymussel	*Pleuronaia dolabelloides*	LE	RARE (S2)
Smooth rabbitsfoot	*Quadrula cylindrica*	LT	RARE (S3)
Spectaclecase	*Cumberlandia monodonta*	LE	RARE (S2S3)

[1] Documented in Humphreys County, Tennessee, and/ or within 10 miles of the JOF project area; Source: TVA Natural Heritage Database, accessed February 2018; USFWS Environmental Conservation Online System on-line database, accessed February 2018.

[2] Status Codes: END = Endangered; LE = Listed Endangered; THR = Threatened; LT = Listed Threatened; RARE = Rare, Not State Listed; D = Deemed in Need of Management

[3] Status Ranks: S1 = Extremely rare and critically imperiled; S2 = Very rare and imperiled; S3 = Vulnerable; SH = Historic in Tennessee; S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2)

The four federally listed mussel species that are considered extant in this portion of the Kentucky Reservoir on the Tennessee River (pink mucket, slabside pearlymussel, smooth rabbitsfoot, and spectaclecase) were not observed in the most recent surveys adjacent to JOF (Third Rock Consultants 2010).

The pygmy madtom is an extremely rare fish which only occurs in limited reaches of the lower Duck River in this portion of the Tennessee River system and does not occur in the Kentucky Reservoir (mainstem of the Tennessee River) adjacent to JOF (Etnier and Starnes 1993).

As with the federally listed species, none of the state-listed species reported from Humphreys County (coppercheek darter, golden darter, highfin carpsucker, saddled madtom, slenderhead darter, and purple lilliput) are known from the project area. A February 2018 desktop review of the proposed project area did not document any streams or water features within the project footprint, and the adjacent Kentucky Reservoir does not provide suitable habitat for these species. This determination was confirmed by a TVA Qualified Hydrologic Professional.

3.10.1.2 Environmental Consequences

3.10.1.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

Because no state or federally listed aquatic species are known from within the project footprint or the Kentucky Reservoir adjacent to JOF, there would be no direct or indirect effects to federal or state-listed endangered or threatened aquatic species or critical habitats by TVA project-related actions.

3.10.1.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Because no state or federally listed aquatic species are known from within the project footprint or the Kentucky Reservoir adjacent to JOF, there would be no direct or indirect effects to federal or state-listed endangered or threatened aquatic species or critical habitats by TVA project-related actions.

3.10.1.2.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

Because no state or federally listed aquatic species are known from within the project footprint or the Kentucky Reservoir adjacent to JOF, there would be no direct or indirect effects to federal or state-listed endangered or threatened aquatic species or critical habitats by TVA project-related actions.

3.10.1.2.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

Because no state or federally listed aquatic species are known from within the project footprint or the Kentucky Reservoir adjacent to JOF, there would be no direct or indirect effects to federal or state-listed endangered or threatened aquatic species or critical habitats by TVA project-related actions.

3.10.1.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Because no state or federally listed aquatic species are known from within the project footprint or the Kentucky Reservoir adjacent to JOF, there would be no direct or indirect effects to federal or state-listed endangered or threatened aquatic species or critical habitats by TVA project-related actions.

3.10.1.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Because no state or federally listed aquatic species are known from within the project footprint or the Kentucky Reservoir adjacent to JOF, there would be no direct or indirect effects to federal or state-listed endangered or threatened aquatic species or critical habitats by TVA project-related actions.

3.10.1.2.7 Alternative D – No Action

Under the No Action alternative, TVA would not perform any deconstruction or other disposition activities at JOF. If the facility is left in the "as-is" condition, it likely would present a higher risk than Alternatives A2, B, and C1 through C4 for the potential to contaminate soil and groundwater as systems and structures degrade. However, because no state or federally listed aquatic species are known from within the project footprint or the Kentucky Reservoir adjacent to JOF, there would be no direct or indirect effects to federal or state-listed endangered or threatened aquatic species or critical habitats by TVA project-related actions.

3.10.2 Terrestrial Ecology– Threatened and Endangered Species

3.10.2.1 Affected Environment

A review of the TVA Regional Natural Heritage database on January 19, 2018, resulted in records for five state-listed species (alligator snapping turtle, little blue heron, little brown bat, 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 from Humphreys County, Tennessee. Records exist for the gray bat in Humphreys County, though the exact location is unknown. The USFWS also has determined that the federally listed Indiana bat and northern long-eared bat (NLEB) have the potential to occur in Humphreys County, though no records are known to date (Table 3-10-2).

Table 3-10-2. Federal Listed Terrestrial Animal Species located within Humphreys County, Tennessee, and other species of conservation concern documented within 3 miles of Johnsonville Fossil Plant

Common Name	Scientific Name	Federal Status[2]	State Status[2] (Rank[3])
Birds			
Bald eagle[4]	*Haliaeetus leucocephalus*	DM	D(S3)
Little blue heron	*Egretta caerulea*	-	D(S2B,S3N)
Piping plover	*Charadrius melodus*	LT	-(-)
Mammals			
Gray bat[6]	*Myotis grisescens*	LE	E(S2)
Indiana bat[5]	*Myotis sodalis*	LE	E(S1)
Little brown bat	*Myotis lucifugus*	-	-(S3)
Northern long-eared bat[5]	*Myotis septentrionalis*	LT	-(S1S2)
Reptiles			
Alligator snapping turtle	*Macrochelys temminckii*	-	D(S2S3)
Northern pine snake	*Pituophis melanoleucus melanoleucus*	-	T(S3)
Western pygmy rattlesnake	*Sistrurus miliarius streckeri*	-	T(S2S3)

[1] Source: TVA Regional Natural Heritage Database, extracted 1/19/2018; USFWS Information for Planning and Conservation (https://ecos.fws.gov/ipac/), accessed 1/19/2018. The Tennessee Bat Working Group species occurrence maps (http://www.tnbwg.org/index.html), accessed 3/5/2018.

[2] Status Codes: D= Deemed in need of management; DM = Delisted but monitored; E = Endangered; LE = Listed Endangered; LT = Listed Threatened.

[3] State Ranks: S#B = Breeding rank; S#N = Non-breeding rank; S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable.

[4] Federally listed or protected species known from Humphreys County, Tennessee but not from within 3 miles of the project footprint.

[5] Federally listed species whose range includes Humphreys County, Tennessee, though no records are known from this county.

[6] Federally listed species with records from Humphreys County, Tennessee, but whose exact location is unknown.

The alligator snapping turtle is an almost entirely aquatic turtle -- only nesting females are known to leave the water. Alligator snapping turtles use large, deep bodies of water such as lakes, rivers, and deep sloughs. They are often found among submerged logs and root snags in areas with muddy substrate (Behler and King 1979, Buhlman et al 2008). The closest record of

an alligator snapping turtle is approximately 1.7 miles away. Suitable habitat for alligator snapping turtle does not occur in the project action areas. Habitat for the alligator snapping turtle does exist adjacent to the project footprint in the Kentucky Reservoir on the Tennessee River.

The little blue heron is a rare nesting species in Tennessee, though migrants can sometimes be found throughout the state during summer months. They can be found in colonies with other herons in West Tennessee. Little blue herons are slow, methodical feeders in freshwater ponds, lakes, marshes, and coastal wetlands (National Geographic 2002). They feed on small fish, amphibians, and aquatic invertebrates. The closest record of a little blue heron is approximately 2.1 miles away from the project footprint. During a field review on February 14, 2018, suitable foraging and nesting habitat was found along shorelines of the JOF property; however, no suitable habitat was found in the action areas.

The little brown bat uses a wide range of habitats and often uses human-made structures, caves, and hollow trees for resting and maternity sites. Foraging occurs over water, along the margins of lakes and streams, or in woodlands near water. The little brown bat hibernates in caves and mines. Maternity colonies commonly are in warm sites in buildings and other structures; also infrequently in hollow trees. Microclimate conditions suitable for raising young are relatively narrow, and the availability of suitable maternity sites may limit the species' abundance and distribution (Campbell 2015). The closest record of a little brown bat is approximately 3.0 miles from the project footprint. Foraging habitat for the little brown bat exists on JOF property in wooded areas; however, none of this habitat would be impacted by the proposed actions. During field review on February 14, 2018, the buildings proposed for demolition were identified as suitable roosting habitat for the little brown bat.

The northern pine snake is found in flat, sandy, pine barrens, sandhills, and dry mountain ridges, most often in or near pine woods. It can also use scrub habitat and agricultural fields. Northern pine snakes are considered secretive because of the amount of time they spend underground in burrows (Conant and Collins 1998). The closest record of a pine snake is approximately 2.6 miles from the project footprint. During a field review on February 14, 2018, no suitable habitat for the northern pine snake was found within the action areas.

The western pygmy rattlesnake occurs in a variety of habitats, but it is generally found where water is nearby such as in river floodplains, swamps, marshes, and wet prairies. The species is less common in rocky upland type habitats in pine forests. Diet consists of amphibians, reptiles, and small mammals (Conant and Collins 1998). The closest record is approximately 2.6 miles from the project footprint. During a field review on February 14, 2018, no suitable habitat for the western pygmy rattlesnake was found within the action areas.

The bald eagle is protected under the Bald and Golden Eagle Protection Act (USFWS 2013). This species is associated with larger mature trees capable of supporting its massive nests. These are usually found near larger waterways where the eagles forage (Turcotte and Watts 1999). The nearest bald eagle nesting record is approximately 4.6 miles away from the project footprint. No bald eagles or their nests were observed in or within 660 feet of the project footprint during a field review performed on February 14, 2018. Bald eagle foraging habitat exists adjacent to the action areas in the Kentucky Reservoir on the Tennessee River.

The gray bat inhabits caves throughout the year, migrating among different caves across seasons (Brady et al. 1982, Tuttle 1976). During summer, gray bats disperse from colonies at dusk to forage for insects over streams, rivers and reservoirs (Harvey 1992). The closest known

record of a gray bat is approximately 6.3 miles from the project footprint. No known cave records exist within 3 miles of the project footprint. No caves were observed in the project footprint during the field review on February 14, 2018. Drinking water and foraging habitat for the gray bat exists over the Kentucky Reservoir on the Tennessee River adjacent to the project footprint. During the field review, the buildings proposed for demolition were identified as suitable roosting habitat for gray bat.

The Indiana bat hibernates in caves during winter and inhabits forest areas around these caves for swarming (mating) in the fall and staging in the spring, prior to migration to summer habitat. During summer, Indiana bats roost under exfoliating bark, and within cracks and crevices of trees in mature forests with an open understory often near sources of water. Indiana bats are known to change roost trees frequently throughout the season, yet still maintain site fidelity, returning to the same summer roosting areas in subsequent years (Pruitt and TeWinkel 2007, Kurta et al. 2002, USFWS 2017). The closest known record of an Indiana bat is approximately 13 miles from the project footprint in Benton County, Tennessee. No known cave records exist within 3 miles of the project footprint. No new caves were found during the field review on February 14, 2018. Drinking water for the Indiana bat exists in the reservoir adjacent to the project footprint. Minimal foraging habitat for the Indiana bat also exists above tree canopies and along forested edges on the JOF property, though none of this forest would be impacted by proposed actions. During the field review, the buildings proposed for demolition were identified as suitable roosting habitat for the Indiana bat.

The NLEB predominantly overwinters in large hibernacula such as caves, abandoned mines, and cave-like structures. During the fall and spring they utilize entrances of caves and the surrounding forested areas for swarming and staging. In the summer, the NLEB roosts individually or in colonies beneath exfoliating bark or in crevices of both live and dead trees. Roost selection by the NLEB is similar to Indiana bat; however, it is thought that the NLEB is more opportunistic in roost site selection. This species is also known to roost in abandoned buildings and under bridges. NLEBs emerge at dusk to forage below the canopy of mature forests on hillsides and roads, and occasionally over forest clearings and along riparian areas (Harvey et al. 2011; USFWS 2014; USFWS 2017). The closest known record of an NLEB is approximately 17 miles from the project footprint in Perry County, Tennessee. No known cave records exist within 3 miles of the project footprint. No new caves were found within the project footprint during the field review on February 14, 2018. Drinking water for the NLEB exists in the reservoir that is adjacent to the project footprint. Minimal foraging habitat for the NLEB also exists under forested canopies on the JOF property, though none of this forest would be impacted by proposed actions. During the field review, the buildings proposed for demolition were identified as suitable roosting habitat for the NLEB.

The piping plover forages on exposed sand flats, mudflats, sandy beaches, stream shorelines, and ephemeral ponds (USFWS 2003). The populations of the piping plover that can be found in the Tennessee Valley Region are rare fall and spring migrants (Robinson 1990, Henry 2012). The closest record of a piping plover occurs approximately 0.6 mile from the project footprint. Suitable habitat for the piping plover occurs along shorelines of JOF property; however, no suitable habitat was found in the action areas. Additionally, during a field review on February 14, 2018, no piping plovers were seen within the action area.

3.10.2.2 Environmental Consequences

3.10.2.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

Under Alternative A2, there would be no effect on the listed terrestrial animal species in Table 3.10-2. No suitable habitat exists within the action areas for the alligator snapping turtle, bald eagle, pine snake, little blue heron, piping plover, or western pygmy rattlesnake. However, foraging and nesting habitats for the little blue heron and piping plover exist along the shorelines of the Kentucky Reservoir on the Tennessee River, and bald eagle foraging habitat and alligator snapping turtle habitat also exist in the reservoir. BMPs would be used near the reservoir such that habitat in and along the reservoir would not be impacted by the proposed activities under this alternative.

Under this alternative, no buildings would be removed. Therefore, no roosting habitat for the gray bat, Indiana bat, little brown bat, or NLEB would be affected. No suitable foraging habitat for these species exists within the action areas. Proposed actions would have no effect on the gray bat, Indiana bat, little brown bat, or NLEB under this alternative.

3.10.2.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Under this alternative, only the four bat species from Table 3.10-2 have potential habitat within the action areas. No suitable habitat exists for the alligator snapping turtle, bald eagle, pine snake, little blue heron, piping plover, or western pygmy rattlesnake within the action areas. Foraging and nesting habitat for little blue heron and piping plover exists along the shorelines of the Kentucky Reservoir on the Tennessee River. Bald eagle foraging habitat and alligator snapping turtle habitat also exists in the Tennessee River. BMPs would be used near the reservoir such that habitat in and along the reservoir would not be impacted by the proposed activities under this alternative.

During a field review on February 14, 2018, buildings proposed for demolition were identified as potentially suitable roosting habitat for the gray bat, Indiana bat, little brown bat, and NLEB. However, no bats and no evidence of prior bat use (i.e. guano, staining) were found within any of the buildings. No foraging habitat exists within the project footprint.

A number of activities associated with the proposed action were addressed in TVA's programmatic consultation with the U.S. Fish and Wildlife Service on routine actions and federally listed bats in accordance with ESA Section 7(a)(2) and completed in April, 2018. For those activities with potential to affect bats, TVA committed to implementing specific conservation measures. These activities and associated conservation measures are identified in Appendix B.

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 ESA consultation reporting. The project currently plans to remove suitable habitat between October 15 and March 31. If timing of removal changes and removal of suitable summer roosting habitat occurs when bats may be present on the landscape, a funding contribution towards future conservation and recovery efforts for federally listed bats would be carried out.

3.10.2.2.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

Impacts to the listed terrestrial animal species in Table 3.10-2 would be the same as under Alternative B.

3.10.2.2.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

Impacts to the listed terrestrial animal species in Table 3.10-2 would be the same as under Alternative B.

3.10.2.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Impacts to the listed terrestrial animal species in Table 3.10-2 would be the same as under Alternative B.

3.10.2.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Impacts to the listed terrestrial animal species in Table 3.10-2 would be the same as under Alternative B.

3.10.2.2.7 Alternative D – No Action

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

3.10.3 Plants – Threatened and Endangered Species

3.10.3.1 Affected Environment

Review of the TVA Natural Heritage Database indicates that five state-listed and no federally listed plant species are known from within a five-mile vicinity of the project area (Table 3.10-3). No federally listed plants have been previously reported from Humphreys County, Tennessee where the project would be located. A desktop review of the JOF plant site indicates that no habitat for federal or state-listed plant species occurs in the areas where work would occur. No designated critical habitat for plants occurs in the project area.

Table 3.10-3. Plant species of conservation concern previously reported from within five miles of the Johnsonville Fossil Plant Decontamination and Deconstruction project area.[1]

Common Name	Scientific Name	Federal Status[2]	State Status[2]	State Rank[3]
Plants				
River Bulrush	*Bolboschoenus fluviatilis*	–	SPCO	S1
Walter's Barnyard Grass	*Echinochloa walteri*	–	SPCO	S1
Hairy Umbrella-sedge	*Fuirena squarrosa*	–	SPCO	S1
Smaller Mud-plantain	*Heteranthera limosa*	–	THR	S1S2
Lamance Iris	*Iris brevicaulis*	–	END	S1

[1] Source: TVA Natural Heritage Database, queried February 2018

[2] Status Codes: END = Listed Endangered; SPCO = Listed Special Concern; THR = Listed Threatened

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

3.10.3.2 Environmental Consequences

3.10.3.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

Construction, operation, and maintenance on the JOF plant site have resulted in significant disturbance that makes the parcel incapable of supporting threatened or endangered plant species. Adoption of this alternative would result in some additional disturbance on the JOF site, but the action would not affect federal or state-listed plants because those species are not present there.

3.10.3.2.1 Alternative B – Selective Demolition

Under Alternative B, impacts to plants would be similar to those described above under Alternative A2.

3.10.3.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Under Alternative C1, impacts to plants would be similar to those described above under Alternative A2.

3.10.3.2.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

Under Alternative C1, impacts to plants would be similar to those described above under Alternative A2.

3.10.3.2.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

Under Alternative C2, impacts to plants would be similar to those described above under Alternative A2.

3.10.3.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Under Alternative C3, impacts to plants would be similar to those described above under Alternative A2.

3.10.3.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Under Alternative C4, impacts to plants would be similar to those described above under Alternative A2.

3.10.3.2.7 Alternative D – No Action

Construction, operation, and maintenance on the JOF plant site have resulted in significant disturbance that makes the parcel incapable of supporting threatened and endangered plant species. Adoption of this alternative would result in some additional disturbance on the JOF site, but the action would not affect federal or state-listed plants because those species are not present there.

3.11 Air Quality and Climate Change

3.11.1 Affected Environment

The Clean Air Act regulates the emission of air pollutants and, through its implementing regulations, establishes National Ambient Air Quality Standards (NAAQS) for several "criteria" pollutants that are designed to protect the public health and welfare with an ample margin of

safety. The criteria pollutants are ozone, particulate matter, carbon monoxide, nitrogen oxide, sulfur dioxide, and lead. Specified geographic areas are designated as attainment, nonattainment or unclassifiable for specific NAAQS. Areas with ambient concentrations of criteria pollutants exceeding the NAAQS are designated as nonattainment areas, and new emissions sources to be located in or near these areas are subject to more stringent air permitting requirements. JOF is located in Humphreys County, Tennessee, which is in attainment with all NAAQS (EPA 2018).

There were previously 10 coal-fired generating units at JOF. As of December 31, 2017, TVA has permanently shut down and retired all of these units. Other permitted air emissions sources remain at the facility, and will remain operational under all alternatives. These include 20 dual-fuel simple cycle CT units. Facilities associated with the CT units, and which will also remain operational, include a water treatment building and R.O. trailers, diesel fire pump house, fuel oil unloading facility, three switchyards (69-kV, 161-kV and 500-kV), and a Booster Fan Building.

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

Greenhouse gases are compounds found naturally within the earth's atmosphere. These compounds trap and convert sunlight into infrared heat. In this way, greenhouse gases act as insulation in the stratosphere and contribute to the maintenance of global temperatures. As the levels of greenhouse gases increase at ground level, the result is an increase in temperature on earth, commonly known as global warming. The climate change associated with global warming is predicted to produce negative economic and social consequences across the globe through changes in weather (e.g., more intense hurricanes, greater risk of forest fires, flooding). The primary greenhouse gas emitted by electric utilities is carbon dioxide, produced by the combustion of coal and other fossil fuels. Other greenhouse gases include hydrofluorocarbons used in refrigeration equipment, sulfur hexafluoride used as a gaseous dielectric medium for high-voltage (1-kV and above) circuit breakers, switchgears, and other electrical equipment, and methane. These gases can be released to the atmosphere through seal leaks, especially from older equipment. These gases can also be released during equipment manufacturing, installation, servicing, and disposal (EPA 2017).

3.11.2 Environmental Consequences

3.11.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

Under Alternative A2, existing buildings, structures, and facilities would remain in place and would be monitored for environmental and safety hazards, and bulkheads would be installed in the intake and discharge tunnels. Except for emissions from worker vehicles, there would be no direct emissions of air pollutants or greenhouse gases, as no demolition would take place.

Over the long-term, indirect adverse impacts to air quality could occur due to the release of petroleum fuels, volatile organic compounds (VOCs), hydrofluorocarbon, or other contaminants from equipment or contaminated areas. Sulfur hexafluoride could be released from electrical

equipment. The deterioration of hazardous materials not removed from the facility such as asbestos, lead paint and dust also could result in the release of contaminants to the air. If such releases occur, they would be limited to the amount of gas in a specific container, and would be expected to be negligible; therefore, overall impacts to air quality and climate change as a result of Alternative A2 would be minor.

3.11.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Under Alternative B, short-term, direct contaminant and greenhouse gas emissions would occur due to the generation of fugitive dust and use of vehicles and equipment in the demolition process.

Fugitive dust emissions from demolition activities are typically deposited on the property where the structures being demolished are located. The potential drift distance of particles is governed by the initial injection height of the particle, the terminal settling velocity of the particle, and the degree of atmospheric turbulence. Theoretical drift distance, as a function of particle diameter and mean wind speed, has been computed by the EPA for fugitive dust emissions. For a typical mean wind speed of 16 kilometers per hour (10 miles per hour) particles larger than about 100 micrometers (μm) are likely to settle out within 6 to 9 meters (20 to 30 feet) from the point of emission. Particles that are 30 to 100 μm in diameter are likely to settle within a few hundred feet from the point of emission. Smaller particles, particularly PM_{10}, and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) have much slower gravitational settling velocities and are much more likely to have their settling rate retarded by atmospheric turbulence, and thus be transported offsite (EPA 2006).

Site preparation and vehicular traffic over paved and unpaved roads at the site would also result in the emission of fugitive dust PM_{10} during active deconstruction or demolition debris removal. The largest fraction (greater than 95 percent by weight) of fugitive dust emissions would be deposited within the demolition site boundaries. The remaining fraction of the dust would be subject to transport beyond the property boundary.

In addition to fugitive dust and vehicle emissions, there would also be a small risk of a release of pollutants and/or greenhouse gases associated with handling and removal of refrigeration and electrical equipment.

The amount of fugitive dust and equipment and vehicle emissions would depend on the amount of demolition performed, but would be temporary, and would cease once the demolition was completed. However, demolition and removal of pollutants from refrigeration and electrical equipment would be conducted in accordance with any applicable environmental and safety regulations, limiting the potential for releases of air pollutants and greenhouse gases during the demolition process. The demolition contractor would be required to remove ash from the facility proposed for deconstruction prior to demolition of that facility and implement dust control measures during demolition to prevent the spread of dust, dirt, and debris. These methods include wetting equipment and demolition areas, covering waste or debris piles, using covered containers to haul waste and debris, and wetting unpaved vehicle access routes during hauling. Wet suppression can reduce fugitive dust emissions from roadways and unpaved areas. In accordance with site pollution prevention and spill plans, TVA requires onsite contractors to maintain engines and equipment in good working order.

It is expected that the selective demolition would focus on removing any structures or equipment that could present a safety or environmental threat in the future. Therefore, in the long term, the

potential for the ongoing release of air emissions and GHGs would be lower than that for Alternative A2, because fewer potential contamination sources would remain onsite. Therefore, overall impacts to air quality and climate change as a result of Alternative B would be minor.

3.11.2.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

Under Alternatives C1 through C4, all of the ancillary structures associated with Alternative B would be removed, as well as roads, parking lots, and foundations. Environmental issues would be abated, and basements, trenches, and pits would be backfilled to 3 feet below grade. All disturbed areas would be covered with topsoil and seeded.

The air quality impacts of these demolition activities, except for air emissions associated with removal of the stack, would be the same under Alternatives C1 through C4. Direct emissions of fugitive dusts would be generated by demolition activities, and short-term, direct air emissions would occur as a result of the use of equipment and vehicles. The magnitude of those emissions would be larger than those for Alternative B, because a greater amount of demolition and site restoration would occur. The potential for an inadvertent release of air pollutants or greenhouse gases during demolition is expected to be approximately the same as for Alternative B. This is because it is expected that the selective demolition associated with Alternative B would focus on removal of any known safety or environmental hazards, and therefore, there would be no additional safety or environmental hazards removed under the Alternative C options that would not be removed under Alternative B. Therefore, overall impacts to air quality and climate change as a result of Alternative C1 would be minor.

Under Alternative C1, there would be no air quality impacts associated with the stack. The stack would not be removed, so there would be no air emissions associated with its demolition.

3.11.2.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

Under Alternative C2, air quality impacts of all demolition activities except for air emissions associated with removal of the stack would be the same as under Alternative C1.

Under Alternative C2, there would be an intense, short-term release of fugitive dust associated with the removal of the stack by dropping it with explosives. Fugitive dust would be released in an uncontrolled manner, and would likely be released within a span of minutes or hours, after which emissions would cease. Emissions associated with equipment and vehicles used to remove the resulting debris would also occur. These emissions may continue for days or weeks, but would then cease. Due to the use of explosives, impacts to air quality during the removal of the stack would be larger than Alternatives A2, B, C1, and C3. Impacts would still be minor, due to the distance of JOF to residential areas and the fact that dust emissions settle relatively close to their source.

3.11.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Under Alternative C3, air quality impacts of all demolition activities except for air emissions associated with removal of the stack would be the same as under Alternatives C1 and C2.

Under Alternative C3, emissions of fugitive dust associated with removal of the stack by hand methods would be minimal. There would be no intense, short-term emissions associated with uncontrolled dropping of the stack. Emissions would occur from the use of hand-held power tools, equipment used to transport debris to waiting trucks, trucks used to haul debris away, and worker vehicles. The duration of these emissions would be longer than for Alternative C2,

because the length of time required to accomplish demolition would be greater. Overall, impacts to air quality and climate change as a result of Alternative C3 would be minor.

3.11.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Under Alternative C4, air quality impacts of all demolition activities except for air emissions associated with removal of the stack would be the same as under Alternatives C1, C2, and C3.

Under Alternative C4, emissions of fugitive dust associated with removal of the stack by hybrid methods would be higher than those of Alternative C3, but lower than those associated with Alternative C2. There may be multiple episodes of short-term emissions associated with uncontrolled dropping of portions of the stack, but none of these would be as intense as the full dropping of the stack under Alternative C2. Emissions would also occur from the use of hand-held power tools, equipment used to transport debris to waiting trucks, trucks used to haul debris away, and worker vehicles. The duration of these emissions is expected to be longer than for Alternative C2, but shorter than for Alternative C3. Overall impacts to air quality and climate change would be minor, due to the distance of JOF to residential areas and the fact that dust emissions settle relatively close to their source.

3.11.2.7 Alternative D – No Action

Under the No Action Alternative, TVA would not perform any deconstruction or other disposition activities and the site would remain in its current condition. The only active source of emissions that would remain in the immediate vicinity of the JOF would be from the 20 dual-fuel simple cycle CT units at the JCT facility and the adjacent Chemours plant. Over the long-term, indirect adverse impacts to air quality could occur due to the release of petroleum fuels, VOCs, hydrofluorocarbons, or other contaminants from leftover equipment or contaminated areas within the JOF site. Sulfur Hexafluoride could be released from electrical equipment. The deterioration of hazardous materials not removed from the facility such as asbestos, lead paint and dust also could result in the release of contaminants to the air. If such releases occur, they would be limited to the amount of gas in a specific container, and would be expected to be negligible. Overall, impacts to air quality and climate change as a result of Alternative D would be minor.

3.12 Hazardous Materials and Solid and Hazardous Waste

In August of 2017, Arcadis completed a hazardous materials (HazMat) survey of the project area for TVA; information from this HazMat Survey will be used for development of technical specifications for decommissioning and for a demolition bid package. The HazMat Survey focused primarily on building materials that might have been constructed using asbestos, lead paint, PCB bulk products, and inorganic metals along with Resource Conservation and Recovery Act (RCRA) characteristic organic compounds. In addition, materials that were potentially impacted by facility operations were also assessed as part of this survey. These materials may require abatement, proper disposal, or decontamination prior to demolition (Arcadis 2017).

The HazMat survey recorded quantities and locations of hazardous materials; focusing primarily upon areas of the plant scheduled for demolition. In addition to bulk sample collection and analysis, the HazMat Survey used historical documentation to estimate HazMat quantities for inaccessible materials. Additional sampling of inaccessible materials, such as liquids or residual solids in sumps, tanks, or storage containers, may be required prior to demolition activities.

The following materials are known to be present at JOF:

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

ACM are located throughout the site. In addition to use as a thermal system insulator in the powerhouse, asbestos is present in a variety of materials throughout the site. Estimated ACM and assumed ACM on the Site, including insulation, caulking, heat shielding, and plaster, are summarized in Table 3.12-1 (Arcadis 2017).

In addition to ACM, the HazMat Survey also noted 329 individual aboveground storage tanks including tanks, transformers, circuit breakers, and motors. TVA personnel are actively deactivating, draining, and decommissioning the majority of these reservoirs. In addition, mobile containers, drums, and totes throughout the Site are being actively disposed by TVA personnel (Arcadis 2017).

Universal waste and potentially regulated materials were also inventoried in the HazMat Survey. An estimated summary of these materials as determined by the August 2017 HazMat Survey is presented in Table 3.12-2. In addition, various useful consumer commodities not included in this table, would cease being useful and become waste to be collected and disposed during the demolition process. Because TVA personnel are actively deactivating and decommissioning sections of structures on the Site, Table 3.12-2 is an August 2017 estimate of the universal waste and potentially regulated materials at the Site (Arcadis 2017).

Table 3.12-1. Estimated ACM at JOF Site

ACM	Estimated Quantity	Unit
TSI – Pipe and Fitting Insulation	275,000	LF
TSI – Duct Insulation	775,000	SF
TSI – Boiler Breaching and Insulation	245,000	SF
TSI – Tank Insulation	100,000	SF
TSI – Asbestos Heat Shielding	12,000	SF
Miscellaneous – Electrical and Transformer Cabinets and Enclosures	70,000	SF
Miscellaneous – Asbestos-Wrapped Electric Cables	40,300	LF
Miscellaneous – Asbestos Cement Cable Trays	42,800	SF
Miscellaneous – Galbestos[a] Siding	450,000	SF
Miscellaneous – Caulk Associated with Metal Siding	463,000	SF
Miscellaneous – Flooring/Cove Base and Associated Mastics	15,000	SF
Miscellaneous – Roofing Material	24,400	SF
Miscellaneous – Caulks and Glazing Associated with Doors and Windows	1,200	LF
Surfacing – Asbestos Wall and Ceiling Plaster	78,200	SF

ACM = Asbestos-containing material
TSI = Thermal System Insulators
LF = Linear feet
SF = Square feet
[a] Galbestos siding is corrugated steel coated with an asphalt-asbestos material providing protection against corrosion.

Table 3.12-2. Estimated Quantity of Universal Waste and Potentially Regulated Items

Inventory	Estimated Quantity (each)
Metal Halide Bulbs	2,181
Fluorescent Light Tubes	2,852
Fluorescent Light Ballasts	1,658
Mercury Switches	178
Batteries	97
Oil-Containing Equipment	706
Oil-Containing In-Line Filters	103
Fire Extinguishers	337
Smoke Detectors	85
Emergency Exit Signs	85
Large Air Conditioning Units	16
Window-Size Air Conditioning Units	124

PCB-containing equipment at the site was also tabulated in the HazMat Survey. Forty-one units with a maximum of 5,873 gallons of PCB-contaminated oil were tabulated in the HazMat Survey. In addition, historic records indicate over 34,000 linear feet of electrical cables may contain PCBs. TVA is actively removing PCB equipment and anticipates removing all PCB transformers prior to demolition contractor mobilization at the site (Arcadis 2017).

Radiation screening for TENORM materials focused upon equipment surfaces, pipes, drains, refractory brick, and residual ash. Screens of nonfunctioning Powerhouse Boiler Units 6 and 7 were assumed to be representative of Units 1-6 and Units 7-10, respectively. Background throughout the facility was measured at 5 microRem per hour (μR/hr) and screening levels for Units 6 and 7 ranged from 2 to 25 μR/hr; less than the State of Tennessee screening criteria of 50 μR/hr. The mass activity, or concentration, of the waste stream was estimated from 2 samples each from bottom ash, fly ash, and refractory brick. Three of these samples exceeded the State of Tennessee disposal criteria of 5 picocuries per gram (pCi/g) of combined Radium-226 (Ra-226) and Ra-228, ranging from 3.78 to 6.65 pCi/g with both refractory brick samples measuring 6.17 pCi/g. Excluding the refractory brick, the preliminary average of ash residual mass activity is 4.60 pCi/g, less than the State of Tennessee disposal criteria of 5 pCi/g (Arcadis 2017).

In addition to the radiation screening, the two refractory brick samples were also analyzed for total RCRA metals. High levels of arsenic, chromium, lead, and selenium were detected. A more representative average may be determined from additional samples (Arcadis 2017).

3.12.1 Environmental Consequences

With the exception of Alternative D, the No Action alternative, TVA would remove hazardous materials to secure the facility prior to implementation of any action taken to demolish structures under the Alternative actions. While most painted steel material would be recycled as scrap, loose and flaking paint chips, which may contain high levels of PCBs or RCRA metals, including lead, must be managed as a separate waste stream; thus requiring Toxicity Characteristic Leaching Procedure metal analysis to determine proper disposal options. Hazardous materials that would be addressed prior to demolition include ACMs, lead-containing materials, TENORM, and other hazardous materials identified throughout the survey area. Specific oil stains or areas that may contain materials of concern would be addressed prior to demolition as well. As previously mentioned, radiation screening of the Powerhouse waste stream revealed, excluding the refractory brick, the average residual mass activity is less than the State of Tennessee disposal criteria; thus the likely waste stream is not anticipated to be subject to regulatory licensing. Conversely, the two refractory brick samples measured activity exceeding disposal criteria for TENORM and exhibited high levels of arsenic, chromium, lead, and selenium; thus a more representative average as determined from additional samples along with radiation screening and leachate analysis may be needed to determine the best use and proper disposal of refractory brick from the Site.

Along with TVA best management practices, all materials determined to be waste will be evaluated (e.g. waste determinations) and managed (e.g. inspections, container requirements, permitted transport) in accordance with applicable federal and state rules including TDEC Solid and Hazardous Waste Rules and Regulations as described in TDEC Division of Solid Waste Management Rule 0400 Chapters 11 and 12, respectively. Prior to demolition activities, hazardous materials would require special removal, handling, and disposal by appropriately trained and licensed personnel and contractors (Arcadis 2017).

3.12.1.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

Under Alternative A2, hazardous materials and waste not associated with structural materials would be promptly removed from the facility. Potential contaminant sources that are incorporated into the facility structure would remain in the decommissioned facility. There would be a potential risk for hazardous waste to be discharged and/or released into the environment under this alternative, as potential contaminants would remain in place. This risk would be minimized through periodic inspections identifying potential and damaged materials, which would be removed.

Removed materials would be transported either by truck or by rail to a landfill or other approved disposal facility operated by a company under TVA contract. Hazardous waste, PCB, ACM, and universal waste require specific handling, labeling, and disposal protocols. Disposal of any hazardous material removed would be done at facilities specifically permitted to receive such waste. Asbestos and ACM would be removed by a certified contractor and disposed of at a facility designed to receive asbestos and ACM. Thus, direct impacts would be minor due to the limited potential for hazardous waste to be discharged and/or released into the environment under this alternative.

While bulk hazardous materials would be removed from JOF as they deteriorate, material that is incorporated into the remaining structures, such as lead-based paint on metal structures, wiring, and plumbing (copper and lead), may not be removed. Over time, any environmental and safety issues resulting from the degradation of these remaining materials would be addressed when such issues are identified. These indirect impacts would be minor due to the limited potential for hazardous waste to be discharged and/or released into the environment under this alternative. Overall, the impacts to hazardous materials and solid waste under Alternative A2 would be minor.

3.12.1.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Direct impacts would be minor due to the limited potential for hazardous waste to be discharged and/or released into the environment under this alternative. Contaminated demolition debris and hazardous wastes would be hauled either by truck or by rail to a landfill designed to receive such waste and operated by a company under TVA contract. Possible short-term impacts to the local environment through the release of fugitive dust during demolition and while removing material to the landfill would be minimized through mitigation measures, including dust suppression and environmental controls. Due to the temporary nature of the operations and the use of permitted disposal facilities, along with trained and experienced contractors and personnel, environmental impacts from waste handling and disposal are not anticipated. Degradation over time of the remaining structures and material that is incorporated into those remaining structures may cause minor indirect environmental impacts similar to those described under Alternative A2; therefore, the overall impacts to hazardous materials and solid waste under Alternative B would be minor.

3.12.1.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

Similar to Alternatives A2 and B, under Alternative C1, the direct and indirect environmental impacts to hazardous materials and solid waste would be minor.

3.12.1.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

Similar to Alternatives A2 and B, under Alternative C2, the direct and indirect environmental impacts to hazardous materials and solid waste would be minor.

3.12.1.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Similar to Alternatives A2 and B, under Alternative C3, the direct and indirect environmental impacts to hazardous materials and solid waste would be minor.

3.12.1.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Similar to Alternatives A2 and B, under Alternative C4, the direct and indirect environmental impacts to hazardous materials and solid waste would be minor.

3.12.1.7 Alternative D – No Action

Under the No Action Alternative, the potential risk to contaminate soil and groundwater as systems and structures degrade would be higher than Alternatives A2, B, or C1 through C4. Peeling lead-based paint, failing concrete, buckling floor tiles, and deteriorating asbestos and ACM are examples of the onsite hazard risk. There would also be issues with the long-term functionality of sump pumps, which are maintained to remove water from floor drains. If these sump pumps are allowed to become inoperative, water would build up in the sumps, become stagnant, and leach potentially contaminated water into the groundwater.

Concerns regarding trespassing and vandalism would also be higher than with the other alternatives. The presumed presence of materials that could be salvageable might attract thieves. Unauthorized persons at the site could presumably be exposed to potential contaminants or physical injury. Although TVA personnel are removing all PCB transformers as well as deactivating, draining, and decommissioning the majority of aboveground storage reservoirs and disposing of mobile containers, drums, and totes as part of the closure process, materials present in the remaining structures (including lead-based paint, wiring, and plumbing) would remain. Over time, degradation of hazardous materials on the JOF site could result in potential releases to the environment (e.g., through leaching to soils, surface water, or groundwater), and would be likely to have moderate long-term impacts. Overall, impacts from hazardous and solid waste are anticipated to be moderate under Alternative D.

3.13 Transportation

3.13.1 Affected Environment

The JOF site is served by highway, railway, and waterway modes of transportation. US Route 70/State Highway 1 is the primary arterial roadway serving the JOF site (see Figure 3.13-1). Due to the deactivation of the power generating facility, existing traffic generated by JOF is expected to be 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) (TVA 2015b).

There are three points of access to JOF from US-70. The eastern-most access is a service interchange to County Road 929 (DuPont Access Road). This interchange has a diamond configuration on the westbound ramps and a directional ramp/cloverleaf serving the eastbound ramps. This is the primary employee entrance to JOF. Approximately 1,725 feet west of Highway 929 is an at-grade intersection at North Street. The western access is 0.85 miles west of North Street and consists of an at-grade intersection on the south side of US-70, which

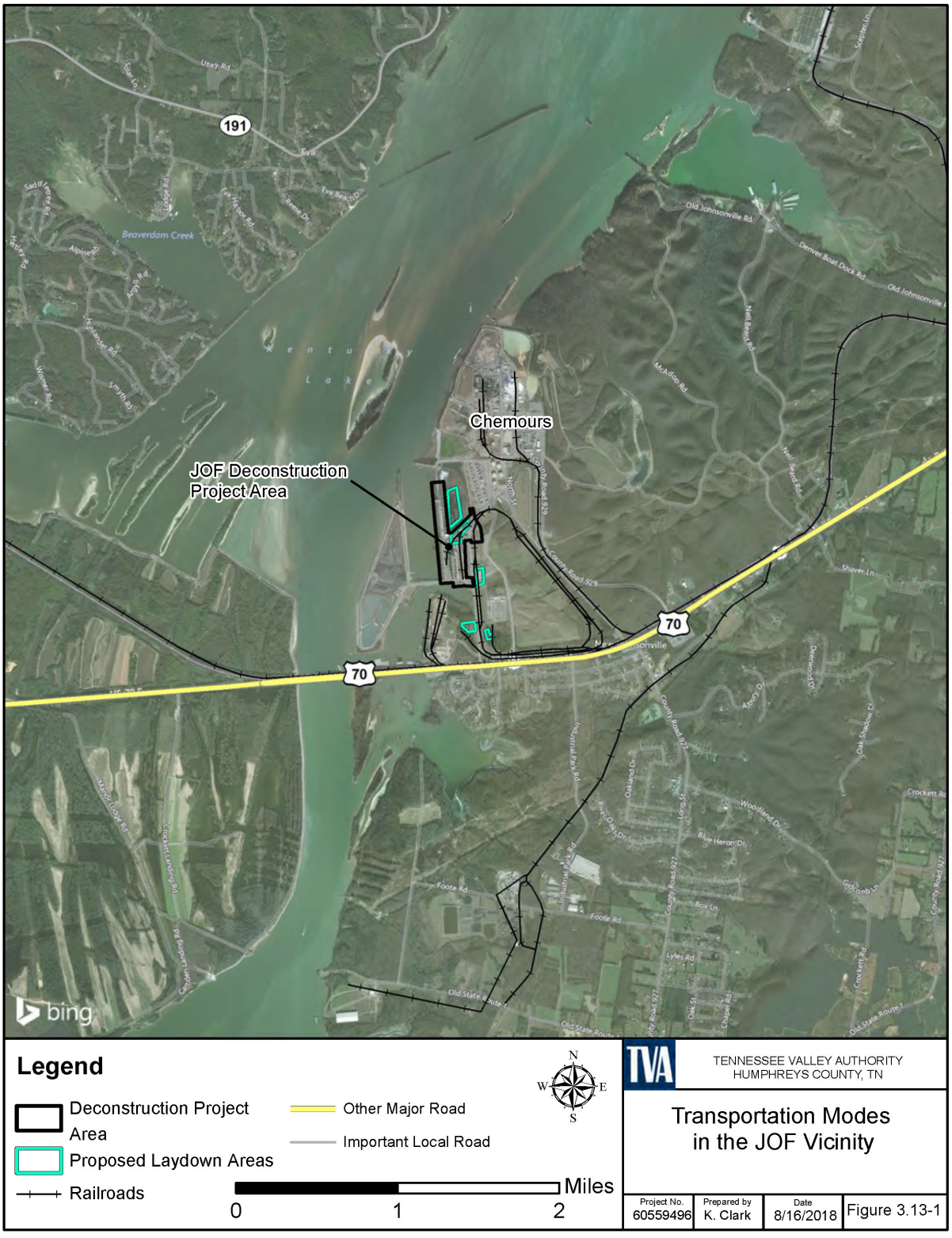


Figure 3.13-1. Transportation Modes in the JOF Vicinity

serves a driveway that curves back to the north and crosses over US-70 and the rail road tracks into the JOF site (TVA 2015b).

The 2012 and 2017 Average Annual Daily Traffic (AADT) counts for key roadways that serve JOF are presented in Table 3.13-1.

Table 3.13-1. Primary Routes with 2012 and Average Annual Daily Traffic Counts

Roadway	2012 Average Daily Vehicle Use (AADT)	2017 Average Daily Vehicle Use (AADT)
US-70/State Highway 1 east of JOF	7,346	7,670
County Road 929	1,845	1,372
US-70/State Highway 1 west of JOF	6,332	5,587

Sources: TVA 2015b, and TDOT 2018a, TDOT 2018b.

Assessment of traffic effects for projects is based on the transportation planning and engineering concept of level of service (LOS). LOS is a qualitative measure that describes operational conditions within a traffic stream and their perception by drivers and/or passengers. Six levels of service, A through F, define the full range of driving conditions from best to worst, in that order. These levels of service qualitatively measure the effect of such factors as travel time, speed, cost, comfort, safety, and maneuvering freedom. The LOS and capacity are the measurements of the ability of an intersection or a roadway to accommodate design traffic volumes. LOS-E is considered the lowest acceptable LOS (TVA 2016a). LOS data was not available for the New Johnsonville, Tennessee area. According to the AADT counts in 2012 and 2017, traffic numbers are declining in the vicinity of JOF, indicating an LOS which can accommodate more vehicles than are currently present.

Railroads

The CSX Railroad operates a main line between Memphis and Nashville, Tennessee, that runs roughly parallel to US-70 near the JOF site (CSX 2018). JOF is no longer directly connected to the rail line, but was at one time, and historically there was a rail unloading facility. Today, the adjacent Chemours plant is connected to this rail line (see Figure 3.13-1). One of the access points to JOF consists of a raised driveway which crosses over US-70 and the CSX rail road tracks.

Barge

The JOF unloading area is located along a small channel off of the Kentucky Reservoir and has two unloading cranes and an area to unload barge fuel oil. Like other TVA coal-fired plants with access to the Tennessee River system, JOF received coal deliveries by barge (TVA 1990). When in operation, beginning in approximately the late 1970s, coal was delivered to JOF exclusively by barge.

3.13.2 Environmental Consequences

3.13.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

Under Alternative A2, structures would remain in place but potential contaminants would be removed and transported either by truck, rail, or barge to an offsite hazardous waste landfill or alternate approved disposal facility. Truck traffic volumes to and from the facility could increase temporarily for a short duration. These vehicles may include dump trucks, cranes, pickup trucks

and personal vehicles driven by employees or contractors. Traffic and transportation routes would not be significantly impacted. As the number of specific decontamination activities would not be significant, and large amounts of material would not be moved, the numbers of vehicles on the roads should be similar to those that existed when JOF was operational. It is not anticipated that LOS in the vicinity would be impacted.

3.13.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Alternative B consists of removing most of the outlying structures including the coal ramps. Due to the actual demolition activities, larger numbers of heavy equipment and vehicles would be anticipated than under Alternative A2. Road traffic on US-70 and other roads in the vicinity could experience minor delays due to the transportation of heavy equipment to and from the site, and due to the hauling of debris. Barges could be used for hauling construction equipment and/or debris. Given the hauling capability of individual barges, the frequency of barge traffic in the area, and the expected waste quantities, impacts to the river transportation network would not be anticipated as a result of the proposed actions.

Overall, as the existing roadways are not heavily used, as traffic impacts could be mitigated, by timing of entry and exit to the facility, and possible busing of workers if necessary, and as demolition activities would be temporary impacts to traffic and transportation would not be significant.

3.13.2.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

Alternative C1 could result in up to several hundred tons of scrap metal that would need to be hauled from the facility either by truck or by rail. Demolition debris would be used for fill material of the basements at the facility with any excess hauled to an offsite landfill either by truck or by rail. Material could also be hauled to an offsite hazardous waste landfill. Truck traffic volumes in the vicinity could increase temporarily during demolition, having a minor impact on the LOS for roads in that area. Should barges be utilized, and as described for Alternative B, adverse impacts would not be anticipated.

Heavy construction traffic associated with the JOF deconstruction activities could create congestion along US-70 and other roadways. Impacts to transportation associated with Alternative C1 would be anticipated to be temporary and minor and could be mitigated, if necessary, as described under Alternative B.

3.13.2.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

Under Alternative C2, impacts to transportation would be similar to those described under Alternative C1.

Under Alternative C2, the stack would be demolished wholly or partially via explosives, the use of which would necessitate increased security measures that would affect transportation in the immediate vicinity of the project site. During the blasting event, select roadways at JOF would be closed for safety and to facilitate site security. Traffic closures would vary from approximately 3 hours before and up to 3 hours after the blast. The closure would not likely affect a large number of local residents due to the sparse population in the area. The demolition contractor would create a detailed plan for road closures that would be distributed to affected parties, including emergency personnel. Therefore, impacts associated with any potential road closures would be temporary and minor.

No barge or boat traffic would be allowed in the immediate area during the event. Due to the temporary nature of demolition operations, no impacts to rail and navigational traffic are expected

3.13.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Under Alternative C3, impacts to transportation would be similar to those described under Alternative C1.

3.13.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Under Alternative C4, impacts to transportation would be similar to those described under Alternative C2.

3.13.2.7 Alternative D – No Action

Under the No Action Alternative, TVA would not perform any deconstruction or other disposition activities. Consequently, JOF Units 1-10 would be left in place in their current condition; therefore; there would be no effect on the transportation infrastructure and no impact in the current uses of the facility.

3.14 Visual Resources

3.14.1 Affected Environment

Visual resources are the visual characteristics of a place, and would include both natural and man-made attributes. Visual resources are important as they can determine how an observer experiences a particular location. For example, an agricultural setting would illicit very different feelings in an observer than a manufacturing plant or an industrial area. Visual resources are very important to people living in the area, people going through an area and in the context of historical and culturally significant settings. The experience of a historically significant building can be severely altered if the surrounding visual character is changed. A viewshed is defined as the environment that can be seen from a certain vantage point, a viewpoint is the vantage point from where the visual character is seen.

JOF is located near the town of New Johnsonville in Humphreys County, Tennessee, along an impounded section of the Tennessee River, the Kentucky Reservoir (upstream of the Kentucky Dam in Gilbertson). The regional landscape is characterized by hills and valleys, with the lower elevations located at the various rivers and creeks in the area. The terrain immediately surrounding JOF is flat, with rising hills at approximately 0.5 miles to the east, 1.5 miles to the south, and 3 miles to the west and north. The area along the river is gently rolling with an average elevation of 400 feet in the vicinity of the plant. To the east of the plant, hills rise from the river valley to elevations of approximately 600 feet. Elevations in the surrounding area rise to between 450 and 600 feet in an irregular pattern. There are many creeks and streams contributing to the Tennessee River, causing a crenulated aspect to the landscape. The higher terrain areas are more heavily forested than the lower elevations along the river valley, which appear to be largely used for agriculture, with several small cities and towns.

Land use in the vicinity is predominantly undeveloped or rural with single family residences interspersed with open fields of pasture or crops and forested areas. Commercial and industrial uses are primarily located along US-70 located to the south of JOF. There is a large industrial area immediately northeast of JOF which includes a number of large industrial operations,

including the Chemours facility. To the west of the river the dominant land use is undeveloped or agricultural, with the city of Camden approximately 5 miles west.

Scenic visibility of a landscape may be described in terms of three distance contexts: (1) foreground, (2) middleground and (3) background. In the foreground, an area within 0.5 miles of the observer, individual details of specific objects are important and easily distinguished. In the middleground, from 0.5 to 4 miles from the observer, object characteristics are 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 middleground area was investigated as viewpoints within 0.5 miles of JOF stack and powerhouse are generally industrial or on the JOF property. Visual and aesthetic impacts associated with a particular action may occur as a result of the introduction or removal of a feature that is not consistent with the existing viewshed (TVA 2016b).

Potentially impacted receptors include residences, churches, schools, and other features from which the plant might be observed. Within one mile of the site, the majority of the residences are located south of the site along US-70, with a smaller number located on the west side of the river. Between one and two miles from JOF is a similar distribution of residences to the south and southeast of the plant. There are no residences located east of JOF, nor within a mile to the north, west and southwest. The closest residences across the river from JOF are approximately three miles away. There are three developed recreation areas within one mile of the plant: New Johnsonville Public boat ramp (0.5 miles south of plant), Anchor Inn and Marina (0.5 miles south of plant), and CL Edwards Memorial Park (0.75 miles south of plant). C L Edwards Memorial Park includes baseball fields, softball fields, tennis courts, soccer fields and restrooms (confirmed by field study). The nearest church is 1.75 miles east of JOF (NEPAssist 2018).

The existing JOF stacks, buildings, and associated high voltage transmission lines are the dominant feature of the landscape within the foreground. The majority of the foreground area is contained within the site limits with no private residences or public roads. To the west of the site, across the river, existing vegetation along the Tennessee River limits views of the site from many locations. To the south of the site, along US-70, the views are similarly obscured due to a wooded area and rows of trees along the road. Recreational users of the river have clear views of the plant within the foreground and middleground distance (0.5 to 4 miles) though these are somewhat limited by Ash Pond 2 west of the plant.

Within the middleground distances, views are limited due to intervening vegetation and topography. At these distances, only the upper portions of the stack and occasionally the powerhouse are visible when not obscured by vegetation. On the east side of the river, the stacks are visible from various points along the local roads where open fields are adjacent to the roads or from higher elevations. On the west side of the river, the middleground distance views are limited to completely open areas with relatively flat topography and limited structures. From these locations, the plant is not significantly visible due to the intervening vegetation.

Visual resources were evaluated based on physical characteristics of the area, including topography, aerial photography, site inspection, vegetation, existing land uses, and distance from the project location. A viewshed map for the project study area was prepared using 30-meter resolution U.S. Geological Survey (USGS) digital elevation model data obtained from the USGS. To account for screening from vegetation, a base vegetation layer was created from the USGS 2011 National Land Cover Dataset. Vegetation height was used to calculate the amount of screening between JOF and a potential observer. Using Esri ArcGIS® software with the

Spatial Analyst extension, a visibility analysis was run assuming a viewer height of 6 feet, a maximum stack height of 600 feet, and a plant layout map showing large structures which may also be visible. It is important to note that screening provided by buildings or small, forested areas such as yard trees or wind breaks are not included and may provide additional screening.

Figure C-1 in Appendix C is the viewshed map of the project area showing locations from which the JOF deconstruction project may be visible. This map identifies the areas from which all or portions of the stack and powerhouse may be seen. A more detailed description of the process used to prepare the viewshed map is included in Appendix C.

Appendix C also contains the representative photographs of JOF from the surrounding area, taken at locations considered to be potentially impacted receptors. At five of the nine photograph locations, the existing flue gas stack is barely visible in the distance. One photograph location (Location 9) was inaccessible due to flooding and area closure and one other photograph location (Location 8) had an obscured view of the site. The stacks were not visible from Location 8 or the surrounding general vicinity due to topography and vegetation. In most views, only the stack is visible, just slightly raised above the tree line. Locations 4 and 5 are the only locations from where the JOF powerhouse is also visible. Due to the plant's location along the river and the distance between it and most observers along public roads, the plant does not visually intrude upon the rural aspects of the scenery. Additional screening is provided by the intervening vegetation. As there are very few structures and vantage points in the foreground are that are not screened by vegetation, the only observers that would generally have a direct view of the plant would be recreational users of the Tennessee River and vehicular travelers on US-70. Appendix C also contains renderings of what the view would look like if the JOF were deconstructed.

3.14.2 Environmental Consequences

3.14.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

The adoption of Alternative A2 would mean that the JOF structures and powerhouse would remain in place with no impact to the existing visual environment. Minor impacts could occur over time if the buildings begin to deteriorate. These impacts would be mitigated by the general maintenance measures to address safety-related issues and would be minor. Minor indirect impacts may occur during the removal of hazardous substances process due to potential increased heavy equipment and traffic in the surrounding area. These impacts would be temporary and insignificant.

3.14.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Minor visual impacts may occur during the demolition of the outlying facilities, especially the coal handling facilities. Although only the stack is visible from most vantage points in the area, cranes and other tall and colorful equipment may be visible at JOF during demolition activities. Observers from the Tennessee River would most likely be able to see the deconstruction equipment operating at the coal handling facilities as these are tall and near the river. However, due to the intervening vegetation and topography, these impacts would only affect a few observers in the vicinity of the plant and JOF employees and contractors. As potential visual disturbances would only be visible to a few people and due to the temporary nature of the activities, visual impacts during demolition of the outlying facilities would be considered insignificant.

After the selective demolition, no impacts to visual resources are anticipated. As the stack is generally the only visible part of JOF from the surrounding area, and this would remain standing under this alternative, no discernible changes to the viewshed would occur from the majority of vantage points. Appendix C contains photographs of the existing conditions at eight locations surrounding the JOF, and interpretations of these views once the JOF stack has been removed.

3.14.2.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

Under the Alternative C options, impacts to visual resources during deconstruction activities would be similar to those under Alternative B, but slightly larger as more structures would be demolished. Therefore, more heavy equipment would be onsite and the project would have a longer duration. Additionally, due to the larger areas that demolition activities would occur in, there is a potential for more observation point to the process. This slightly larger visual impact is not anticipated to be significant to observers in the vicinity, as most of the JOF is already screened from view at middleground observation points. The only potential observers would be those using the Tennessee River for recreational activities. For this small number of observers, minor impacts due to heavy equipment at JOF would be temporary and insignificant due to the distance and intervening topography.

Alternative C1 is the only C sub-alternative that would not remove the JOF stack. Therefore, as the stack is the only portion of the plant visible from most locations, there would be no significant impact to visual resources under Alternative C1. From some vantage points, the removal of the powerhouse would constitute a beneficial, but minor visual impact due to the removal of an industrial object from a generally rural viewscape. As the powerhouse cannot be seen from most locations, the existing conditions photographs in Appendix C convey the general viewscape in the middleground which would be seen after Alternative C1 is complete, as the stack would not be removed. For locations 4 and 5, the interpretation photographs also show the removal of the powerhouse.

3.14.2.4 Alternative C2 – Demolish to Grade ("Brownfield"), Drop Removal of Stack

Removal of the JOF stack under alternatives C2, C3, and C4 would enhance the visual environment of both the fore- and middleground distances. As the stack is currently only seen as a small protrusion from most view points in the area, the change to the visual character would be minor and insignificant, although beneficial. The stack and powerhouse are visible as a major visual intrusion from only a few locations, along US-70 and from the Tennessee River. The removal of the stack would represent a substantial change for the viewers in a relatively small area, so the overall impacts of these demolition alternatives would be beneficial, but minor due to the limited number of observers. The interpreted photographs in Appendix C show what the identified photograph locations would look like with both the stack and the powerhouse removed.

Removal of the stack and the associated removal of the obstruction lighting on the stack would result in a slight change in night-time views of JOF. TVA would notify the Federal Aviation Administration and follow all local, state, and federal guidelines regarding removal of the obstruction lighting. Impacts associated with the removal of the obstruction lighting on the stack would, therefore, be minor.

3.14.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Impacts under Alternative C3 would be similar to those described under Alternative C2.

3.14.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Impacts under Alternative C 4 would be similar to those described under Alternative C2.

3.14.2.7 Alternative D – No Action

Under the no action alternative, impacts to visual resources would be similar to those under Alternative A2. No construction or deconstruction activities would occur. As hazardous materials removal and general maintenance would not occur under this alternative, initially visual impacts would be less than those under Alternative A2. Indirect impacts due to the deterioration of the structures over time would occur, and be larger than under Alternative A2 as maintenance of structures would not occur over time.

3.15 Natural Areas and Parks

3.15.1 Affected Environment

Natural areas include managed areas such as Wildlife Management Areas, National Wildlife Refuges and Habitat Protection Areas, ecologically significant sites, and Nationwide Rivers Inventory streams. This section addresses natural areas that are on, immediately adjacent to (within 0.5 miles), or within the region of the project area (within a 5-mile radius) (Figure 3.15-1).

A review of the TVA Natural Heritage database indicates that no natural areas are present within the proposed project site. However, one site is located adjacent to the project site:

- Johnsonville State Historic Area: This site is 0.03 miles northeast of the project footprint. Serving as a day-use park named for former President Andrew Johnson, this 1,075-acre park is located in Humphreys County. 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 Lake.

Additional natural areas within five miles of the project site include:

- Camden State Wildlife Management Area: This site is located 0.53 miles west of the project footprint. It provides hunting opportunities (big/small game, turkey, and waterfowl). Cropland and bottomland hardwood forests are intertwined within the 3,692 acres of the Camden Wildlife Management Area. Some grassy fields are present and likely provide good habitat for sparrows. River front access with boat ramps provides views of expanses of water.
- Ashworth Property: This site is located 1.1 miles east of the project footprint and is private property under a conservation easement by the Land Trust for Tennessee.
- Nathan Bedford Forrest State Park: This site is located 2.1 miles north of the project footprint. Fishing is prominent in this park and is a popular destination for recreational anglers fishing 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. More than 20 miles of hiking trails offer short jaunts or longer treks.
- Tribble Woods TVA Habitat Protection Area: This site is located 2.1 miles south of the project footprint and is managed as a habitat protection area targeting the protection of a population of short–stemmed iris (*Iris brevicaulis*), a stated–listed plant species. The iris population on this parcel occurs in the forested floodplain and requires little, if any, active management.

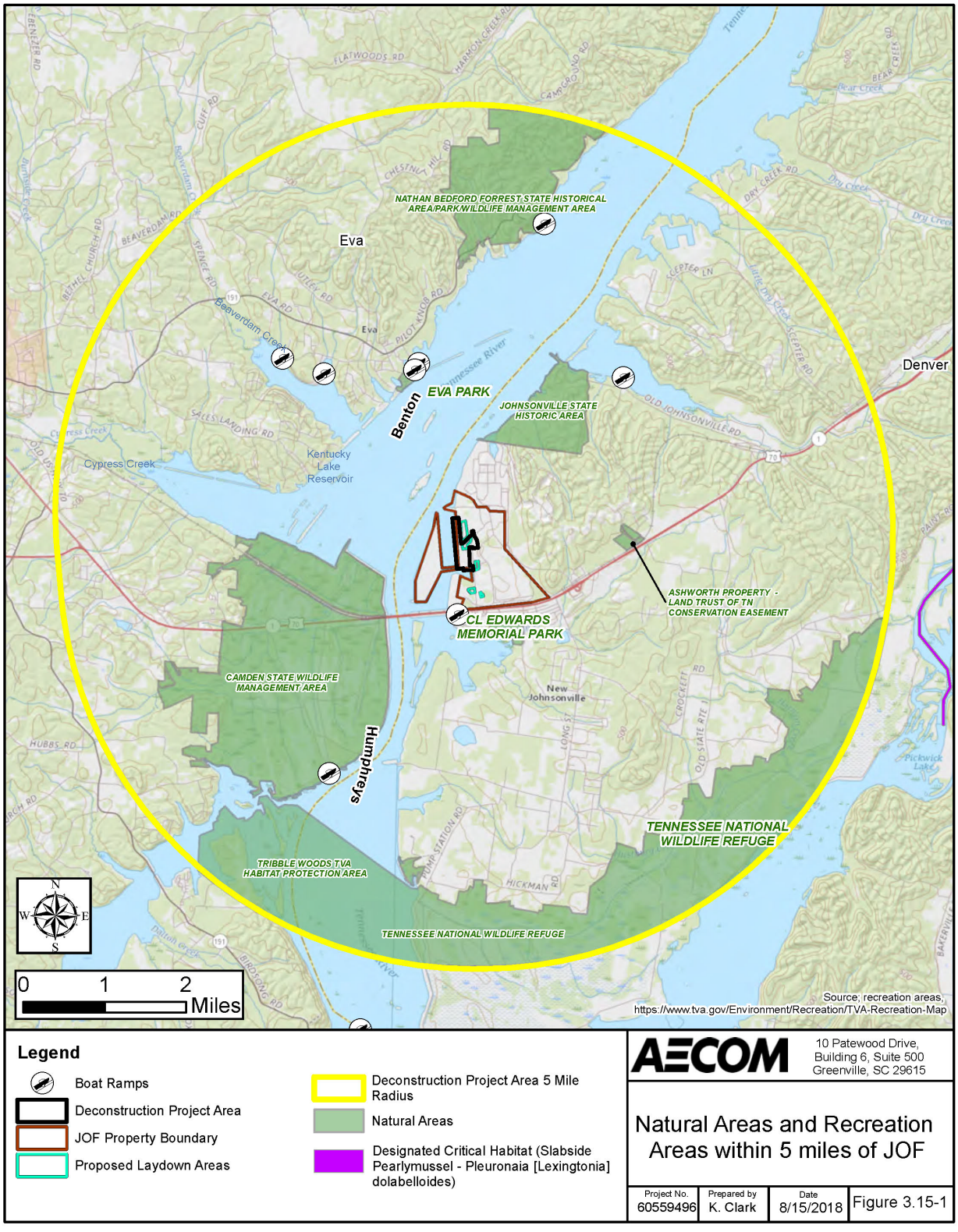


Figure 3.15-1. Natural Areas and Recreation Areas within 5 miles of JOF

- Tennessee National Wildlife Refuge: This site is located 2.2 miles south of the project footprint. Thanks 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 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.
- Designated Critical Habitat (Slabside Pearlymussel - *Pleuronaia (=Lexingtonia) dolabelloides*): This site is located 4.6 miles east of the project footprint. This area of habitat in the Duck River is deemed by the USFWS to be essential to the Slabside Pearlymussel's conservation.
- Designated Critical Habitat (Fluted Kidneyshell - *Ptychobranchus subtentum*): This site is located 4.6 miles east of the project footprint. This area of habitat in the Duck River is deemed by the USFWS to be essential to the Fluted Kidneyshell's conservation.

3.15.2 Environmental Consequences

3.15.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

Because no significant impact would occur due to project related work, adoption of Alternative A2 would not significantly affect any natural areas immediately adjacent to the project area. Because the distance from the project site to natural areas in the vicinity (within 5 miles) is sufficient (0.53 miles – 4.6 miles), the proposed JOF decontamination and deconstruction actions are not anticipated to impact these natural areas.

3.15.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Under Alternative B, impacts to natural areas would be similar to those described above under Alternative A2.

3.15.2.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

Under Alternative C1, impacts to natural areas would be similar to those described above under Alternative A2.

3.15.2.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

Under Alternative C2, impacts to natural areas would be similar to those described above under Alternative A2.

3.15.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Under Alternative C3, impacts to natural areas would be similar to those described above under Alternative A2.

3.15.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Under Alternative C4, impacts to natural areas would be similar to those described above under Alternative A2.

3.15.2.7 Alternative D – No Action

Under the No Action Alternative, the area within the proposed project area and vicinity would remain in its current condition. As a result, adoption of the No Action Alternative would not affect natural areas because no project related activities would transpire. While natural ecological processes and anthropogenic disturbances would continue, changes would not result from the proposed project.

3.16 Recreation

3.16.1 Affected Environment

JOF is located on the right descending bank of Kentucky Reservoir at TRM 100. Recreation activities in this area of the reservoir and adjacent shoreline include boat fishing, general pleasure boating, swimming, picnicking, camping, and hiking. While there are no boat launching or shoreline fishing facilities on the plant property, plant cooling water discharge attracted boat fishing in the rectangular shaped inlet adjacent to the plant when the plant was operating. Since the plant shut down, boat fishing in this basin has decreased although some boating activity continues to occur in these waters. Figure 3.15-1 depicts the boat ramps in the vicinity of JOF.

There are three developed recreation areas within one mile of the plant. These are listed below:

- New Johnsonville Public boat ramp (0.5 miles south of the plant powerhouse, immediately across US-70 from the property line)
- Anchor Inn and Marina (0.5 miles south of plant powerhouse, immediately across US-70 from the property line)
- CL Edwards Memorial Park (0.75 miles south of plant, 0.14 miles south of the property line)

Other developed recreation areas located between 1 and 5 miles of the plant include Pebble Island Marina, Battle of Johnsonville Park, Nathan Bedford Forrest State Park, Eva Park, and Beaver Dam Marina.

3.16.2 Environmental Consequences

3.16.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

Because of the distance between the plant and developed recreation areas, this alternative would have no significant impact on the use of these areas. Project work could cause some temporary minor shifts in recreational boating activity in the waters immediately adjacent to the plant but any impacts should be minor and insignificant. Indirect impacts, such as difficulties in entering and exiting recreational areas may occur due to increased traffic during hazardous materials removal. Increased traffic would be temporary and would likely resemble traffic patterns that were present when the plant was operational. These impacts would be minor due to the temporary nature and the general existing traffic patterns on US 70 and in the general vicinity.

3.16.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Impacts to recreational activities would be similar to those under Alternative A2. However, due to the additional demolition of ancillary structures, these impacts would have a longer duration,

and could be more severe. Noise from the demolition could disturb fish in the immediate area, which may cause anglers to fish at another location. Indirectly, anglers may choose another boat ramp to launch from if fishing becomes difficult in this area. Additionally, as under Alternative A2, indirect impacts due to changes in traffic may occur, and would last longer than under Alternative A2.

3.16.2.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

For Alternative C1, impacts to recreational activities would be similar to Alternative B. Because deconstruction would be more substantial, impacts on boating activity in the waters immediately adjacent to the project might be slightly greater, but would remain insignificant.

3.16.2.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

Under Alternative C2, impacts to recreational activities would be similar to those described above under Alternative C1.

3.16.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Under Alternative C3, impacts to recreational activities would be similar to those described above under Alternative C1.

3.16.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Under Alternative C4, impacts to recreational activities would be similar to those described above under Alternative C1.

3.16.2.7 Alternative D – No Action

Under this alternative, the project would not be initiated and there would be no impacts on developed recreation areas in the vicinity of JOF. Boating activity in the waters immediately adjacent to the plant would be unaffected.

3.17 Cultural and Historic Resources

3.17.1 Affected Environment

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.

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. 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 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. The Tennessee State Historic Preservation Officer (SHPO) agreed (letter dated February 23, 2015). Based on this previous consultation, JOF is ineligible for inclusion in the NRHP.

Part of the area affected by the JOF Decontamination and Deconstruction project extends into the Coal Yard, and was discussed in a January 25, 2018 letter to the Tennessee SHPO (Appendix D). 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, TVA's original plant grading plan from 1949, current satellite imagery, and previous archaeological investigations (Cable 1999, Ezell 2000, Kerr 1996, McKee 2001). 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) 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 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. On February 14, 2018, the SHPO concurred with this finding (Appendix D).

TVA conducted a survey of the proposed laydown areas and location for a new guard shack in October 2018 and found no historic properties within these areas. On November 14, 2018 the SHPO concurred with this finding (Appendix D). On December 7, 2018, The United Keetowah Band of Cherokee Indians in Oklahoma and the Cherokee Nation also concurred with TVA's findings of no adverse effect.

3.17.2 Environmental Consequence

3.17.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

As there are no archaeological sites located in the APE, JOF is ineligible for inclusion in the NRHP, and there are no above-ground historic properties in the APE, TVA finds that the proposed undertaking would not affect any historic properties. TVA consulted with SHPO and the following federally-recognized Indian tribes under 36 Code of Federal Regulations Part 800.4(d)(1) and § 800.3(f)(2) regarding TVA's finding of no effect on historic properties: Absentee Shawnee Tribe of Oklahoma, Cherokee Nation, Chickasaw Nation, Coushatta Tribe of Louisiana, Eastern Band of Cherokee Indians, Eastern Shawnee Tribe of Oklahoma, Kialegee Tribal Town, Muscogee (Creek) Nation, Shawnee Tribe, Thlopthlocco Tribal Town, and the United Keetoowah Band of Cherokee Indians in Oklahoma. SHPO agreed with TVA's finding of no effect. No tribe objected or identified resources of interest in the APE.

3.17.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Under Alternative B, impacts to cultural and historic resources would be similar to those described above under Alternative A2.

3.17.2.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

Under Alternative C1, impacts to cultural and historic resources would be similar to those described above under Alternative A2.

3.17.2.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

Under Alternative C2, impacts to cultural and historic resources would be similar to those described above under Alternative A2.

3.17.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Under Alternative C3, impacts to cultural and historic resources would be similar to those described above under Alternative A2.

3.17.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Under Alternative C4, impacts to cultural and historic resources would be similar to those described above under Alternative A2.

3.17.2.7 Alternative D – No Action

Under the No Action Alternative, the area within the proposed project area and vicinity would remain in its current condition. As a result, adoption of the No Action Alternative would not affect any cultural and historic resources because no project related activities would transpire. While natural ecological processes and anthropogenic disturbances would continue, changes would not result from the proposed project.

3.18 Utilities and Service Systems

3.18.1 Affected Environment

Current utilities and service systems at JOF include drinking water, process wastewater and cooling water, sanitary wastewater, electrical, fiber optics, compressed air, and natural gas. The JCT facility along with the water treatment building and R.O. trailers, demineralized water tanks, booster fan building, and the electrical switchyards will stay and remain active through all alternatives. Because all utilities would remain in place for No Action Alternative D, Table 3.18-1 lists the disposition of the service systems under each action alternative (TVA 2018d).

Table 3.18-1. Impact to Service Systems by Action Alternative

Service System	Alternative A2	Alternative B	Alternative C1	Alternatives C2, C3, and C4
Powerhouse Units 1 through 10	Stay	Stay	Demo	Demo
Crusher Building	Stay	Demo	Demo	Demo
Office Wing	Stay	Demo	Demo	Demo
Diesel Fueling Island	Stay	Demo	Demo	Demo
Ash Disposal Piping	Stay	Demo	Demo	Demo
Old Water Treatment Plant and Sump	Stay	Demo	Demo	Demo
Tank Farm	Stay	Demo	Demo	Demo
Coal Barge Unloaders (Concrete Structure Remains)	Stay	Selective Demo	Selective Demo	Selective Demo

Table 3.18-1. Impact to Service Systems by Action Alternative

Service System	Alternative A2	Alternative B	Alternative C1	Alternatives C2, C3, and C4
Aboveground Coal Conveyors	Stay	Demo	Demo	Demo
Coal conveyor Tunnels and Transfer Pits (to 3 feet below final grade)	Stay	Demo	Demo	Demo
Dock Service Building	Stay	Demo	Demo	Demo
Electrical Control Building	Stay	Demo	Demo	Demo
Hydrogen Trailer Ports A and B	Stay	Demo	Demo	Demo
Rotary Car Dumper	Stay	Demo	Demo	Demo
Warehouse and Storage Area Near JCT Facility (JCT Facility, Storage, and Warehouse Remain)	Stay	Demo	Demo	Demo
Wash Pad Facility	Stay	Demo	Demo	Demo
Red Storage Barn	Stay	Demo	Demo	Demo
Sanitary Sewer Connections from Demolished Facilities	Stay	Demo	Demo	Demo
Select Plant Roads and Parking Lots	Stay	Demo	Demo	Demo
Select Street Lights	Stay	Demo	Demo	Demo
600-foot tall flue gas stack (lighting)	Stay	Stay	Stay	Demo
Emergency Notification System (poles, sirens, windsocks and hardware)	Stay	Selective Stay	Selective Stay	Selective Stay
Main Sewer Network (connected to Johnsonville Municipal Waste)	Active	Active	Active	Active
Water Treatment Building and R.O. Trailers	Active	Active	Active	Active
Booster Fan Building	Active	Active	Active	Active
Demineralized Water Tanks	Active	Active	Active	Active
Combustion Turbine Facility	Active	Active	Active	Active
Combustion Turbine Storage Building	Active	Active	Active	Active
Guard House	Active	Active	Demo / Rebuild	Demo / Rebuild
Fuel Oil Truck Unloading Facility for the JCT Facility	Active	Active	Active	Active
Switch Houses	Active	Active	Active	Active
69-kV switchyard with associated oil piping and pits	Active	Active	Active	Active
161-kV switchyard with associated oil piping and pits	Active	Active	Active	Active
500-kV switchyard with associated oil piping and pits	Active	Active	Active	Active

3.18.2 Environmental Consequences

3.18.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

The direct impacts of Alternative A2 on utilities and service systems would be minor. Under Alternatives C1 through C4, only safety necessitated utilities, such as lighting, security, and fire protection would remain active in addition to the active utilities shown at the end of Table 3.18-1. The execution of new projects to supply raw river water would create a moderate localized impact to the facility. Because the facility would be de-energized and closed in its current state, many utilities would not be maintained and would degrade over time; resulting in the potential contamination of soil and groundwater. Similarly, indirect impacts would be minor due to localized replacement activities for the water pumps coupled with reduced demand from the cold, dark, and dry facility.

3.18.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Overall, the direct and indirect impacts of Alternative B on utilities and service systems would be minor and primarily beneficial. The execution of new projects to supply raw river water would create a moderate localized impact to the facility. Utilities would be capped and left in place during demolition of the outlying facilities to 3 feet below ground. Because the remaining parts of the facility would be de-energized, Alternative B would moderately reduce the demand for utilities.

3.18.2.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

The execution of new projects to supply raw river water would create a moderate localized impact to the facility. Utilities would be capped and left in place during demolition of facilities to 3 feet below final grade. Continued safety lighting for the remaining 600-foot tall flue gas stack would remain operational, but would create no new impact to utilities. Alternative C1 would moderately reduce the demand for utilities; therefore, the overall impact of Alternative C1 on utilities and service systems would be minor and beneficial.

3.18.2.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

The execution of new projects to supply raw river water would create a moderate localized impact to the facility. Utilities would be capped and left in place during demolition of facilities to 3 feet below ground. Only safety-necessitated utilities, including lighting, security, and fire protection, would be active. Alternative C2 would moderately reduce the demand for utilities; therefore, the overall impact of Alternative C2 on utilities and service systems would be minor and beneficial.

3.18.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Under Alternative C3, impacts to utilities and service systems would be similar to those described above under Alternative C2.

3.18.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Under Alternative C4, impacts to utilities and service systems would be similar to those described above under Alternative C2.

3.18.2.7 Alternative D – No Action

Under the No Action Alternative D, the facility, including the 600-foot tall flue gas stack, would remain in place to degrade from its current condition. With the exception of the active utilities shown at the end of Table 3.18-1, only utilities necessitated by safety, such as lighting, security, and fire protection, would be active on the JOF site.

If the facility remains in the "as-is" condition, it would likely present a higher risk than Alternatives A2, B, and C1 through C4, as utilities would not be maintained and would degrade over time, resulting in the potential to contaminate soil and groundwater as described previously. Impacts related to Alternative D would occur over the long-term and are expected to be minor.

3.19 Safety

3.19.1 Affected Environment

The area surrounding JOF consists of widely spaced industrial properties in a rural setting along the Tennessee River. Population in the immediate area (within approximately 1.25 miles of the plant) is very sparse, with only a few dwellings in the vicinity. The closest population center is New Johnsonville approximately 1.3 miles southeast of the JOF site.

There are three points of access to JOF from US-70/State Highway 1. The eastern-most access is a service interchange to State Highway 929 (DuPont Access Road). This interchange has a diamond configuration on the westbound ramps and a directional ramp/cloverleaf serving the eastbound ramps. This is the primary employee entrance to JOF. Approximately 1,725 feet west of Highway 929 is an at-grade intersection at North Street. The western access is 0.85 miles west of North Street and consists of an at-grade intersection on the south side of US-70, which serves a driveway that curves back to the north and crosses over US-70 into the JOF site. JOF is surrounded by chain link security fence, with the entrance gates guarded.

3.19.2 Environmental Consequences

TVA would maintain security at the facility under all alternatives, but at a greater level with Alternatives A2, B, and D than Alternatives C1 through C4 due to remaining structures (i.e., Alternatives C1 through C4 would have fewer facilities and structures to monitor; requiring fewer personnel). Fencing and security personnel would remain for all alternatives. TVA would also periodically assess the condition of remaining site facilities as they deteriorate (TVA 2018d).

3.19.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

Hazardous materials associated with the remaining structures would be susceptible to increased deterioration and damage without ongoing controls. Materials could degrade; become subject to surface water erosion, wind erosion, or biological disturbance; or become leachable into the groundwater. Over time, lead from paint, metals in wiring and pipe, and oil from retired equipment could find its way to soil and groundwater and potentially contaminate drinking water sources.

Maintenance activities associated with the systems and facilities that would remain active could present opportunity for injury to maintenance and security staff. In addition, trespassing (by foot or by boat) and vandalism may become a concern at a closed facility with salvageable materials. Unauthorized persons at the site could presumably be exposed to potential contaminants or to physical injury. However, security measures (i.e., fencing and security

personnel) would remain in place to protect workers and TVA property, as well as to dissuade trespassers. These safety and security measures along with ongoing environmental maintenance activities would minimize possible safety effects to the general public and potential safety impacts are expected to be minor.

3.19.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

Under Alternative B, outlying structures and facilities would be deconstructed to a depth of 3 feet below final grade. Demolition activities would last approximately 15 to 18 months with most of the work occurring during the day on weekdays. However, demolition activities could also occur at night or on weekends, if necessary. All hazardous materials associated with buildings and structures would be removed and disposed of, and the structures demolished. Removal and disposal of materials from the demolished facilities (including hazardous wastes) would result in a reduced risk to soil and groundwater as contaminants would be removed from the site. However, any facilities and structures that remain may create an increasingly unsafe environment for operations and maintenance personnel. In addition, the flue stack would require removal when it becomes unstable to remain aloft.

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

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

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

Use of BMPs, safety procedures, and security measures along with ongoing environmental maintenance activities would minimize possible safety effects. Potential safety impacts under Alternative B are expected to be minor.

3.19.2.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

Under Alternative C1, TVA would remove all unneeded structures, roads, and parking lots, but would leave the 600-ft flue gas stack intact. Due to the temporary and intermittent nature of demolition, the site's rural location, and the distance to nearest receptors (greater than 1 mile), the potential direct and indirect impacts on safety for the general public and workers would be similar to those described under Alternative A2 and Alternative B. Due to the increased number

of structures removed, onsite and traffic safety impacts could be slightly higher than Alternatives A2 and B.

3.19.2.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

Under Alternative C2, TVA would remove all unneeded structures, roads, and parking lots, including the explosive demolition of the stack. Due to the temporary and intermittent nature of demolition, the site's rural location, and the distance to nearest receptors (greater than 1 mile), the potential direct and indirect impacts on safety for the general public would be similar to those described under Alternative C1. Safety precautions would be employed to prevent the general public from accessing explosives and detonators; thus minimizing increases in public risk due to the use of explosives. Minor increases in risk to worker safety would occur under this alternative due to the use of explosives.

Under this Alternative, stack removal would be accomplished via explosives. Prior to the demolition, the area would be prepared, and a circular fall exclusion zone equal to 1.5 times the height of the facility would be established. A fall exclusion zone area would also be established and would provide a sufficient safety buffer for debris and dust control around the area as well as a control zone for any unlikely change in the intended fall direction. During the blast event, no personnel would be allowed in the fall exclusion zone. All worker activity would comply with federal and state safety regulations, including donning appropriate personal protective equipment, maintaining equipment in good working order, and adequate training for work performed, which minimizes safety risks.

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

With explosive safety and security BMPs in place, impacts to safety would be similar to those under Alternative C1.

3.19.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Under Alternative C3, TVA would remove all unneeded structures, roads, and parking lots, including controlled removal of the stack. Due to the temporary and intermittent nature of demolition, the site's rural location, and the distance to nearest receptors (greater than 1 mile), the potential direct and indirect impacts on safety for the general public would be similar to those described under Alternative C1.

3.19.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Under Alternative C4, TVA would remove all unneeded structures, roads, and parking lots, including removal of the 600-ft tall flue gas stack using a hybrid method. Due to the temporary and intermittent nature of demolition, the site's rural location, and the distance to nearest receptors (greater than 1 mile), the potential direct and indirect impacts on safety for the general public would be similar to those described under Alternative C2.

3.19.2.7 Alternative D – No Action

Under the No Action Alternative, TVA would not perform any deconstruction or other disposition activities at the JOF. If the facility remains in the "as-is" condition, it likely would present a higher safety risk than Alternatives A2, B, and C for the potential to contaminate soil and groundwater as systems and structures degrade. In addition, the risk of trespassing and injury to trespassers would likely increase due to a perception that salvageable materials are present on the site as well as the increased level of environmental contaminants. TVA would maintain security at the facility under all alternatives, but at a high level with Alternative D due to remaining structures. Fencing and security personnel would remain and TVA would also periodically assess the condition of remaining site facilities as they deteriorate. Due to the site location and the sparse population, effects on safety to the general public are expected to be minor.

3.20 Socioeconomics and Environmental Justice

3.20.1 Affected Environment

JOF is located in Humphreys County in Tennessee, specifically in the city of New Johnsonville, approximately 5 miles southwest of the Town of Denver, and 65 miles west of Nashville. The nearest cities are Waverly (the county seat located 12 miles northeast) and Camden (approximately six miles northwest). The county is not part of any Combined Statistical Area (CSA), but is adjacent to counties that comprise the Nashville-Davidson-Murfreesboro CSA. Nashville is 68 miles east (UTN 2013).

3.20.1.1 Socioeconomics

The 2016 estimated population of New Johnsonville and Humphreys County are 1,936 and 18,216 respectively (USCB 2016a) Population increased 17.1 and 15.3 percent in the city and county respectively, between 1990 and 2010. This is a slower rate of growth compared to the state (34.3 percent) and national (28.1 percent) levels for the same period.

As projected by the State of Tennessee, by the year 2030, the population of New Johnsonville would increase 5.0 percent, while Humphreys County would decrease 1.7 percent to about 18,214 (UTN 2017a). Projected growth in the city and county is significantly less than the projected state and national population growth. Population trends and projections are presented in Table 3.20-1.

In 2016, total employment in New Johnsonville was estimated to be 694 people. The most common employment sectors were Manufacturing (30.5 percent), Healthcare & Social Assistance (11.5 percent), and Public Administration (11.4 percent) (Data USA 2018). Humphreys County had an estimated total employment of 8,715 jobs in 2016, as indicated in Table 3.20-2. Manufacturing provided the greatest number of jobs (15.8 percent), above both the state level of 9.1 percent and the national level of 6.8 percent. Approximately 14.8 percent of county workers were employed by the government, more than the state share of 11.3 percent and the national share of 12.5 percent. Retail trade (10.7 percent) was slightly higher than the state and national shares. Employment in construction (6.0 percent) was slightly higher than the state and national levels of 5.2 percent (BEA 2017a; BEA 2017b and BEA 2017c).

In 2017, approximately 378 people were unemployed in Humphreys County, yielding an annual average unemployment rate of 4.3 percent. This represents a decrease from the 2016 unemployment rate of 6.0 percent. Humphreys County's 2017 unemployment rate is higher than Tennessee's rate of 3.7 percent and the national rate of 4.4 percent (BLS 2017, BLS 2018a, BLS 2018b).

Per capita personal income in Humphreys County in 2016 was $36,179, which is a 0.4 percent increase from 2015. It is 73.5 percent of the national average of $49,246 and less than the state average of $43,326 (BEA 2017d; BEA 2017e and BEA 2017f).

Table 3.20-1. 1990–2030 Population Data

Area	1990	2000	2010	2016 Estimated[1]	Projection 2030	Percent Change 1990-2010	Percent Change 2010-2030
New Johnsonville, TN	1,653	1,905	1,951	1,936	2,049	17.1%	5.0%
Humphreys County	15,795	17,929	18,538	18,216	18,215	15.3%	-1.7%
Tennessee	4,877,185	5,689,283	6,346,105	6,548,009	7,390,535	34.3%	16.5%
United States	248,709,873	281,421,906	308,745,538	318,558,162	359,402,000	28.1%	16.4%

Sources: USCB 1990, USCB 2000, USCB 2010, USCB 2013, USCB 2014, USCB 2016a, UTN 2017a, UTN 2017b.
[1] 2012-2016 five-year estimate.

Table 3.20-2. 2016 Employment Data

	Humphreys County	Tennessee	United States
Total Employment	8,715	3,940,474	193,668,400
Industry	**Percentage of Employment**		
Farm	6.8%	1.8%	1.4%
Construction	6.0%	5.2%	5.2%
Manufacturing	15.8%	9.1%	6.8%
Retail Trade	10.7%	10.6%	10.0%
Health Care and Social Assistance	(D)	10.7%	11.3%
Accommodation and Food Services	7.3%	7.8%	7.4%
Services (other)	7.2%	6.3%	5.9%
Government	14.8%	11.3%	12.5%

(D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

Source: BEA 2017a, BEA 2017b, BEA 2017c

3.20.1.2 Environmental Justice

EO 12898 directs federal agencies to identify and address, as appropriate, potential disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. While TVA is not subject to this EO, TVA typically assesses environmental justice impacts in its NEPA reviews. The Council on Environmental Quality (CEQ) has provided guidance for addressing environmental justice in *Environmental Justice: Guidance under the National Environmental Policy Act* (CEQ 1997).

In identifying minority and low-income populations, the following CEQ definitions of minority individuals and populations and low-income populations were used:

- *Minority individuals.* Individuals who identify themselves as members of the following population groups: American Indian or Alaskan Native, Asian, Native Hawaiian or Other Pacific Islander, Black, Hispanic, or two or more races.
- *Minority populations.* Minority populations are identified where (1) the minority population of an affected area exceeds 50 percent or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. For the purposes of this analysis, "meaningfully greater" is defined as greater than 20 percent of the minority population percentage in the general population of the county.
- *Low-income populations.* Low-income populations in an affected area are identified with the annual statistical poverty thresholds from the Census Bureau's Current Population Reports, Series P-60, on Income and Poverty. In this analysis, low-income populations are identified where (1) the population of an affected area exceeds 50 percent low-income based on the Census data or (2) the percentage of low-income population in the affected area is greater than 20 percent of the low-income population percentage in county.

According to CEQ guidance, U.S. Census data are typically used to determine minority and low-income population percentages in the affected area of a project in order to conduct a quantitative assessment of potential environmental justice impacts. The geographic unit used in the analysis to identify any environmental justice communities of concern is the census block group. For the purposes of this analysis, a census block group constitutes an environmental justice community if it contains 50 percent or more aggregate minority or low-income population (the "Fifty Percent" analysis), or 20 percent or more aggregate minority or low-income population than the county average in which the block group is located (the "meaningfully greater" analysis).

The project site is located in New Johnsonville, in Census Tract 1305 Block Group 1. Census Tract 1305, Block Group 2 is located adjacent to JOF to the south. Census Tract 1302, Block Group 2, is located adjacent to JOF to the north. These three areas are identified as the potentially affected area for environmental justice.

Minority Populations

Table 3.20-3 presents the results of the minority population analysis for the area of interest. Information regarding the racial composition was derived from the 2012-2016 American Community Survey 5-Year Estimates. The proportion of minority individuals has also been compared to the State (Tennessee) and National levels.

According to 2016 estimates, minorities constituted 10.4 and 7.4 percent of the total population of New Johnsonville and Humphreys County respectively. Census Tract 1305, Block Group 1 which contains the JOF had an aggregate minority population of 10.1 percent, higher than the county as whole. Adjacent block groups to the north and south had aggregate minority populations of 5.9 and 8.6 percent respectively. The block group minority levels are below the state average of 27.3 percent and less than the national average of 40.3 percent. The block groups neither exceed an aggregate minority population of 50 percent nor are "meaningfully greater" (greater than 20 percent) of the minority population percentage in the general population of the county. Therefore, residents of the block groups in the potentially affected area for the JOF are not considered minority populations.

Table 3.20-3. 2016 Minority Population Data

Area	Total Population	Minority Population	Percent Minority Population
Block Group 1, Census Tract 1305	543	55	10.1%
Block Group 2, Census Tract 1302	1,298	76	5.9%
Block Group 2, Census Tract 1305	996	86	8.6%
New Johnsonville, TN	1,936	201	10.4%
Humphreys County	18,216	1,344	7.4%
Tennessee	6,548,009	1,786,486	27.3%
United States	318,558,162	128,398,984	40.3%

Source: USCB 2016b.
Note: 2012-2016 American Community Survey 5-Year Estimates.

Low-income Populations

The analysis for low-income populations in the area of interest followed the CEQ guidance for identifying low-income populations. Table 3.20-4 shows the percentage of low-income individuals residing in the area of interest. Information was derived from the 2012-2016 American Community Survey 5-Year Estimates.

In 2016, the estimated portion of the population in New Johnsonville and Humphreys County with income below the poverty level is 13.3 and 18.5 percent, respectively. Census Tract 1305, Block Group 1 which contains the JOF had a low income population of 12 percent, lower than the county as whole. The adjacent block groups to the north (Block Group 2, Census Tract 1302) had a low income population of 25.9 percent, less than 9 percent higher than the county or state level. The adjacent block group to the south had a low-income population of 11.6 percent. The block group populations neither exceed 50 percent low-income nor are "meaningfully greater" (greater than 20 percent) of the population percentage in the general population of the county. Therefore, residents of the block groups in the area of interest surrounding the JOF site are not considered low-income populations.

Table 3.20-4. 2016 Poverty Level Data

Area	Total Population[1]	Persons Below Poverty Level	Percent of Persons Below Poverty Level
Block Group 1, Census Tract 1305	543	65	12.0%
Block Group 2, Census Tract 1302	1,298	336	25.9%
Block Group 2, Census Tract 1305	996	116	11.6%
New Johnsonville, TN	1,928	257	13.3%
Humphreys County, Tennessee	17,899	3,308	18.5%
Tennessee	6,386,751	1,100,169	17.2%
United States	310,629,645	46,932,225	15.1%

Source: USCB 2016c.
Note: 2010-2014 American Community Survey 5-Year Estimates.
[1] Population for whom poverty status is determined.

3.20.2 Environmental Consequences

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

The environmental justice impact analysis addresses potential disproportionately high and adverse human health or environmental effects of an action on minority and low-income populations. Residents of the block groups in the potentially affected area are not considered minority or low-income populations. Therefore, no disproportionate impacts to disadvantaged populations are expected to occur as a result of implementation of any of the project alternatives.

3.20.2.1 Alternative A2 – Assess, Close, and Secure Site. Close all CCW tunnels. Implement Operations and Maintenance Program to Maintain Structures and Equipment

Thirteen workers would be required to perform the necessary operations and all maintenance activities at JOF once the facility has been decommissioned. Personnel from other TVA facilities may be used, as necessary, to assist with performing operations and maintenance activities. Overall, employment of the maintenance workforce and routine capital expenditures needed to support Alternative A2 would have a minor beneficial impact on the local economy. Changes to population levels in the area as a result of implementing Alternative A2 are not expected. No disproportionate impacts to environmental justice populations are expected to occur as a result of implementation of this alternative.

3.20.2.2 Alternative B – Selective Demolition of Outlying Facilities including the Coal Handling Facilities

The direct impact to the economy associated with demolition activities would be short-term and beneficial to the local economy. Short-term economic impacts include a temporary increase in employment. It is likely some of the demolition workforce would be from local or regional sources. The majority of the indirect employment and income impacts would be from expenditure of the wages earned by the workforce involved in demolition activities, as well as the local workforce used to provide materials and services. Materials, equipment, and services may be purchased locally in the Humphreys County area, as well as in adjacent counties. Overall, socioeconomic impacts from Alternative B are anticipated to be positive and short-term, although minor relative to the total economy of the county. No disproportionate impacts to environmental justice populations are expected to occur as a result of implementation of this alternative.

3.20.2.3 Alternative C1 – Demolish to Grade ("Brownfield"), Stack Remains

Overall, socioeconomic impacts from Alternative C1 are anticipated to be positive and short-term, although minor relative to the total economy of the county. Short-term direct economic impacts include a temporary increase in employment. It is likely some of the demolition workforce would be from local or regional sources. The majority of the indirect employment and income impacts would be from expenditure of the wages earned by the workforce involved in demolition activities, as well as the local workforce used to provide materials and services. Materials, equipment, and services may be purchased locally in the Humphreys County area, as well as in adjacent counties. The need for a small workforce to perform routine operations and maintenance activities would be eliminated under this alternative. No disproportionate impacts to environmental justice populations are expected to occur as a result of implementation of this alternative.

3.20.2.4 Alternative C2– Demolish to Grade ("Brownfield"), Drop Removal of Stack

Socioeconomic impacts associated with Alternative C2 would be the same as those described for Alternative C1. No disproportionate impacts to environmental justice populations are expected to occur as a result of implementation of this alternative.

3.20.2.5 Alternative C3 – Demolish to Grade ("Brownfield"), Controlled Removal of Stack

Socioeconomic impacts associated with Alternative C3 would be the same as those described for Alternative C1. No disproportionate impacts to environmental justice populations are expected to occur as a result of implementation of this alternative.

3.20.2.6 Alternative C4 – Hybrid Demolish to Grade ("Brownfield"), Controlled Removal of Stack to Specific Height, then Drop Removal

Socioeconomic impacts associated with Alternative C4 would be the same as those described for Alternative C1. No disproportionate impacts to environmental justice populations are expected to occur as a result of implementation of this alternative.

3.20.2.7 Alternative D – No Action

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

3.21 Cumulative Impacts

Cumulative impacts are defined in the Regulations for Implementing the Procedural Provisions of the NEPA (CEQ 1997) as follows:

> "Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

Past actions that have already occurred and present actions are integrated into the existing baseline conditions discussed above. Table 3.21-1 summarizes and the following section analyses the reasonably foreseeable future actions on COF and in the immediate vicinity of the plant. Projects planned elsewhere in the community are not likely to have a cumulative impact on the demolition project as they would be a considerable distance from the project area.

Continuing Operations

The JCT will continue operations at this site. The JCT will continue to receive water from the water treatment building, which will utilize the existing intake structure. The water treatment building and R.O. trailers, demineralized water tanks, diesel fire pump house, fuel oil unloading facility, 69-kV, 161-kV and 500-kV switchyards, and the Booster Fan Building will remain in service indefinitely regardless of the plant retirement/deconstruction option carried out at JOF.

New Heat Recovery Steam Generator

TVA supplies steam to the Chemours manufacturing facility adjacent to the fossil plant. Upon closure of JOF, TVA will continue to supply treated water or steam from the new HRSG at the JCT site to Chemours for their manufacturing purposes. To facilitate this process, the water treatment building will be in service indefinitely.

Ash Pond 2 Closure

JOF's Ash Pond 2 is considered an "active impoundment" under EPA's CCR Rule. Closure of Ash Pond 2 would also require that the sump discharge be re-routed to another location. TVA proposes to close active Ash Pond 2 at JOF using an approved closure methodology, either in place or by removal. Currently, TVA is considering three potential alternatives for closure including: 1) Capping the ash area with one of three options: a composite flexible membrane liner and 24-inches of cover soil, a 24-inch compacted clay layer and 12-inches of cover soil, or an engineered turf and sand fill; 2) Removing and disposing of the CCR offsite at either a landfill or at a beneficial reuse facility; or 3) taking no action. TVA is currently conducting a NEPA environmental impacts analysis with regard to the closure of Ash Pond 2. The associated environmental assessment is expected in 2019.

Process Flow Redirect

Closure of Ash Pond 2 requires that all process flows cease being directed to Ash Pond 2. EPA recently released a final rule providing an extension of the deadline to initiate closure for units depending on the results of the location demonstrations that are due to be completed in October 2018, as well as groundwater monitoring results. TVA has completed the location demonstrations. Based on those results, flows to Ash Impoundment 2 must cease by October 2020. As JOF has been decommissioned, the majority of flows from the fossil plant have ceased with the exception of sump flows. Under this proposed project, TVA could extend piping from JCT and JOF across Ash Pond 2 and install a junction box for mixing the flows prior to discharge directly through Outfall 001. Should TVA pursue this process flow project, TVA would conduct a NEPA environmental impact analysis to consider potential environmental impacts.

Coal Yard and Coal Yard Runoff Pond Closure, Process Water Basin, and Borrow Area

As the JOF coal-fired generating units have been retired, the coal yard and coal yard runoff pond at JOF can be closed. In addition, TVA needs to manage storm water and non-coal combustion residual process water from the JCT facility. TVA is also considering developing a borrow site on nearby property owned by TVA to provide fill material to support the closure of the coal yard and coal yard runoff pond and other possible future projects at JOF including decommissioning of the coal plant. The closure of the coal yard includes four possible alternatives: (A) No Action, (B) Coal Yard Consolidation and Cap Closure (consolidating a the south side of the coal yard, including the underlying ash, into the north side and then capping the north side), (C) Coal Yard Full Cap Closure (closure and capping of the coal yard in the existing footprint), and (D) Coal Yard Remove Material and Close (removal of all coal yard material and underlying ash). Under Alternatives B, C, and D, useable coal may be sorted and hauled to TVA's Cumberland Fossil Plant. Also under Alternatives B, C, and D, non-fuel material from the surface of the coal yard would be hauled to the West Camden Sanitary Landfill in Camden, Tennessee. All three action alternatives also include the construction of a non-CCR process water basin at one of three potential sites: 1) the coal yard footprint, 2) the coal yard runoff pond footprint, or 3) the north rail loop. TVA is currently conducting a NEPA environmental impact analysis with regard to the Coal Yard and Coal Yard Runoff Pond Closure, Process Water Basin, and Borrow area. The environmental assessment is expected in 2018.

Re-routing of raw water and electrical systems

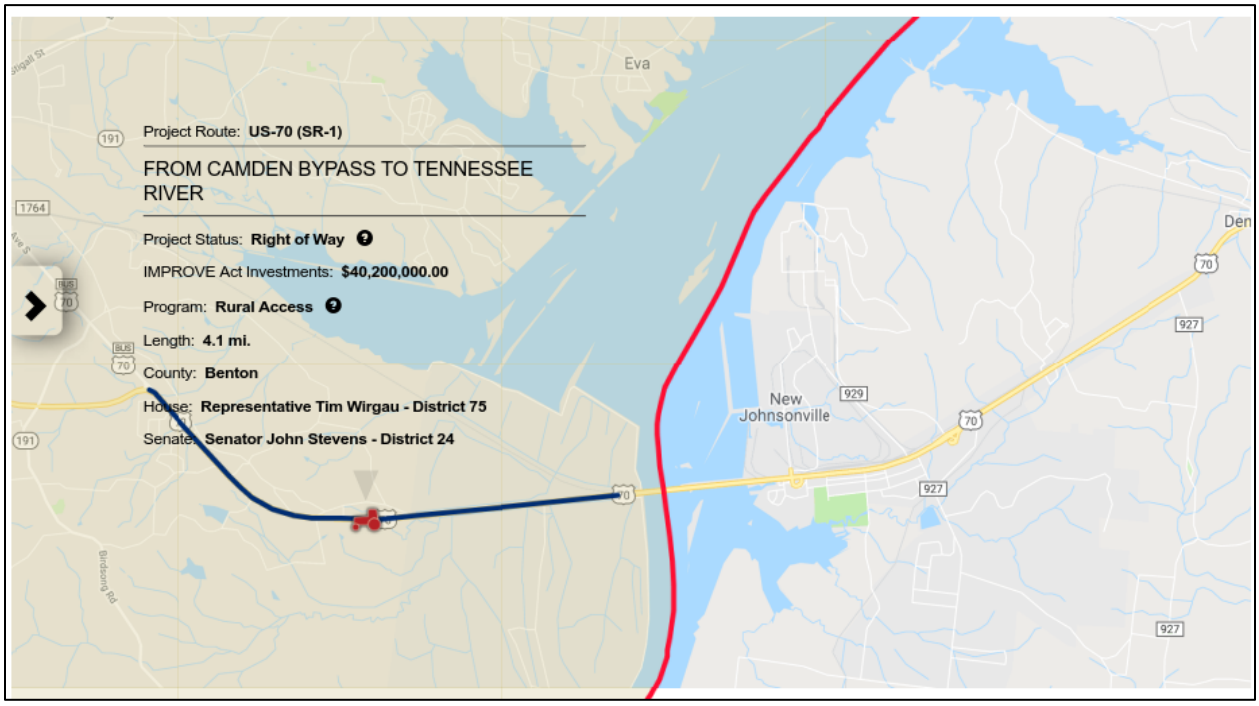
Currently, the JCT facility, the Water Treatment Building and R.O. Trailers, and the switchyards fire prevention systems are supplied by the intakes which supply water to the powerhouse. These lines will have to be rerouted during the deconstruction process. Plans for the rerouting include new pumps which will be located at the existing intakes. Water for the fire prevention systems will be piped to the JCT facility, the Water Treatment Building, and the switchyards using new pipelines which will by-pass the powerhouse and associated facilities. Additionally, the JCT will need a new source of emergency power, a new electrical line will be constructed to link the JCT to a permanent emergency power source. Additional minor electrical re-routes would also be necessary to provide power to the streetlights, security systems, switchyards and other associated ancillary structures.

Tennessee Department of Transportation project

The DOT has plans to upgrade US-70 in Benton County, across the river from JOF. The project is currently in the right of way acquisition stage. This rural access project will upgrade US-70 from the Camden bypass to the Tennessee River. Figure 3.21-1 shows the location of these upgrades (TDOT 2018c).

Table 3.21-1. Summary of Present or Reasonably Foreseeable Future Actions in the Vicinity of the Proposed Project

Actions Description	Description	Timing
Continuing Operations	JCT, Water Treatment Building and R.O. Trailers, fire pump house, switchyards, fuel oil unloading facility.	Present/Future
New HRSG	Supplies steam to Chemours.	Present/Future
Ash Pond 2 Closure	Closure of Ash Pond 2 which contains Coal Combustion Residuals in the form of Fly Ash and Bottom Ash. Methods being considered include closure-in-place and closure-by-removal to either a landfill or for beneficial reuse in addition to the No Action Alternative.	Future
Process Flow Redirect	Install a junction box and extend piping from the JCT and JOF across Ash Impoundment 2 to reroute process flows.	Future
Coal Yard and Coal Yard Runoff Pond Closure, Process Water Basin, and Borrow Area	Closure of the coal yard (either in place by consolidation or within the current footprint) or by removal. Construction and operation of a new non-CCR process water basin in one of three locations. Development and use of a new borrow area.	Future
Re-routing of raw water and electrical systems	Reroutes of systems to continue supplying raw water and electrical power to systems remaining active at the property.	Future
US-70 upgrade	TDOT plans to upgrade US-70 from the Camden Bypass to the Tennessee River	Future



Source: TDOT 2018c

Figure 3.21-1. Location of the TDOT Planned Upgrades to US-70

The following sections address the potential cumulative impacts associated with proposed project. No cumulative impacts would be anticipated with respect to floodplains, wetlands, aquatic ecology, wildlife, vegetation, threatened and endangered species, natural areas and parks, recreation, cultural and historic properties, and socioeconomics and environmental justice in association with the proposed actions.

3.21.1 Land Use and Prime Farmland

Cumulative impacts to Prime Farmland are not anticipated as all of the potential projects are located in already developed, industrial land.

Cumulative impacts to land use are possible with respect to all the onsite projects at JOF. All of the potential cumulative projects would lead to the deconstruction of facilities at JOF, potentially making the site available for other uses. If the site were to be redeveloped as anything other than an industrial facility, land use would change appropriately. However, as future development of the site cannot be predicted, specific impacts cannot readily be assessed.

3.21.2 Noise and Vibration

There could be cumulative impacts to noise levels at JOF due to the other onsite projects. The closure of Ash Pond 2, the Coal Yard and the Coal Yard runoff impoundment would generate construction noise similar to the deconstruction activities. The re-routing of the water and electrical lines would also generate some construction related noise. The closure activities would occur after the JOF has been deconstructed, regardless of the alternative chosen. The re-routing of the water and electrical lines would occur prior to the deconstruction activities in order to continue to provide these services to the JCT and Chemours. New noise sources after

the re-routing of the water and electrical lines would come from the three new raw water pumps and the two fire protection pumps located inside the pump house on the intake deck. These new noise sources would not be significant enough to contribute to cumulative impacts to noise. Therefore, noise levels would not increase cumulatively due to concurrent activities (volume-wise), but would only increase in duration. All of these activities would take place at least 0.5 miles from the nearest residence and although noise levels at JOF may increase cumulatively, the increase would not be perceived by the general public. Additionally, JOF is located in a heavily industrial area, so noise levels in the area are already high in comparison to a residential area. Overall cumulative impacts to noise are possible, but would be insignificant due to the distance to the nearest receptors.

3.21.3 Geology and Groundwater

As discussed in Section 3.3.1, TVA conducts groundwater monitoring at two closed, capped ash disposal areas on the JOF property. Monitoring at the DuPont Road Dredged Ash Disposal Area is conducted in accordance with a TDEC-approved Groundwater Detection Monitoring Program Plan. Monitoring at the South Rail Loop Ash Disposal Area is conducted in accordance with a TDEC-approved facility closure/post-closure plan (TVA 2018a; TVA 2018b).

At the DuPont Road Dredged Ash Disposal Area, sampling since 1990 has indicated increasing concentrations of chloride, calcium, sodium, and magnesium in a background well. In addition, 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 MCL at background well B13, and in a duplicate sample of well B12. These results are attributed to possible releases from DuPont disposal cells located upgradient of the JOF facility. There have been no other exceedances of MCLs or UPLs since 2004. At the South Rail Loop Ash Disposal Area, concentrations of nickel and zinc exceed their background-based UPL, indicating potential groundwater impacts from that facility (TVA 2018b). Groundwater is not used as a potable water supply at JOF, and the proximity of the groundwater to Kentucky Lake indicates that there are no impacts to drinking water sources.

Releases of contaminants to groundwater as a result of any of the JOF alternatives would contribute to this cumulative impact to groundwater quality. As discussed in Section 3.3.2, demolition activities associated with Alternatives B, C1, C2, C3, or C4 have the potential to impact groundwater quality through the release of contaminated materials. However, this potential is expected to be low, would be minimized through implementation of BMPs, and would not combine with impacted groundwater from other sources to the extent that it would threaten drinking water sources.

The JOF alternatives also have the potential to impact groundwater quality over the long-term through the release of hazardous materials from equipment and facilities remaining onsite. The potential for this would be highest under Alternative D, in which the greatest amount of materials would remain onsite, and in which those materials would not be subject to inspection and maintenance. Even under Alternative D, the amount of hazardous materials onsite is expected to be minimal compared to that present in the ash disposal areas and DuPont disposal cells, and releases would not combine with impacted groundwater from other sources to the extent that it would threaten drinking water sources.

3.21.4 Surface Water

There is a potential for cumulative impacts to surface water quality if the facility is not properly maintained and if hazardous waste and other potential pollutants to surface waters are not removed from the site or properly stored and maintained. The intake and discharge tunnels

have the potential to impact surface water quality if not properly maintained or removed. Mitigation measures would be implemented as needed to ensure the discharges from the site would have no significant impacts on the receiving stream water quality.

3.21.5 Air Quality and Climate Change

Under all alternatives, ongoing emissions would continue from other projects in the area, including emissions from local vehicles and the JCT natural gas units. Although air emissions associated with JOF Alternative A2 would be minimal, air emissions associated with the JOF demolition activities under Alternatives B, C1, C2, C3, or C4 would result in an increase in local emissions of greenhouse gases and fugitive dust. The cumulative effect of the JOF emissions, when combined with the ongoing emissions from local vehicles and JCT, would cause minor, temporary impacts to air quality in the area.

In addition to ongoing emissions from vehicles and the JCT, local emissions of greenhouse gases and fugitive dust may occur if construction activities such as closure of Ash Pond 2, the Coal Yard, and the Coal Yard Runoff Pond were to occur. Similar to the demolition of the JOF, these emissions would be temporary. It is likely that fugitive dust emissions associated with these construction activities would be mitigated through the use of best management practices, such as water suppression for dust control and regular inspections and maintenance of construction vehicles, in a manner similar to that to be used for the demolition of the JOF. Even if construction of all projects were to coincide with demolition of the JOF under Alternatives B, C1, C2, C3, or C4, the combined emissions from all projects would still be expected to be minor and temporary.

3.21.6 Hazardous Materials and Solid and Hazardous Waste

Continuing operations at the JCT facility, including use of water from the Water Treatment Building and R.O. Trailers, will provide little impact to hazardous materials and waste. In addition to the Water Treatment Building and R.O. Trailers, other JOF facilities remaining in service including the diesel fire pump house, the fuel oil unloading facility, the booster fan building, and the 69-kV, 161-kV and 500-kV switchyards will have also have little impact to waste. Similarly, continued operation of the new HRSG at the JCT facility site supplying steam to the Chemours manufacturing facility along with continued operations of the Chemours manufacturing facility adjacent to JOF will have little impact to waste. The anticipated cumulative impact from these ongoing activities is expected to be minor.

In addition, deconstruction of the JOF will require possible modification to the NPDES outfall permit and modifications to the raw water system. Continuing operations at the JCT facility along with continued use of the Water Treatment Building and R.O. Trailers and fire prevention systems requires the NPDES outfall to remain in operation; deconstruction activities may necessitate modifications to the permit. In addition, deconstruction activities at JOF will necessitate rerouting of the raw water and electrical systems supplying the Water Treatment Building and R.O. Trailers and the fire prevention systems. Plans include new pumps at the raw water intake location, new pipes, and new electrical bypassing the powerhouse to supply the Water Treatment Building and R.O. Trailers, the switchyards, and the fire prevention systems. Additional electrical re-routes will be required to provide power to streetlights, security systems, and other ancillary structures. Impact to waste from these planned activities is anticipated to be small and the cumulative impact is expected to be minor (TVA 2016c).

Planned activities in the immediate vicinity, including coal yard remediation and coal yard runoff pond closure, are not anticipated to contribute large impacts to waste. Across the river from JOF, TDOT planned activities to upgrade of US-70 from the Camden bypass to the Tennessee

River in Benton County will provide little impact to waste. The cumulative impact from these planned activities is anticipated to be minor (TDOT 2018c).

3.21.7 Transportation

Several of the TVA onsite current-and-future projects could contribute to cumulative impacts on transportation. These projects include the Ash Pond Closure, the Coal Yard Removal / Improvements, and the Coal Yard Pond Closure. If these projects occur simultaneously, impacts to transportation patterns in the vicinity of JOF could occur. If the Ash Pond is to be closed by removal, these impacts could be significant. The number of trucks transporting debris from the demolition, added to the number of trucks required to remove CCR from Ash Pond 2 and the deconstruction of the coal yard and associated structures could result in a very large number of trucks entering and exiting the facility on a daily basis. This could lead to significant congestion along US-70 and other roads leading to disposal areas. If debris, ash and coal would be transported offsite by barge, these impacts would be smaller.

Additionally, local roads could be compounded if any of these onsite projects were to occur at the same time. TVA would mitigate congestion with a traffic plan, as needed. Possibilities include staging of trucks, spacing logistics, or timing truck traffic to occur during lighter traffic hours (such as not in the morning or afternoon commute hours). With these mitigations, cumulative impacts to transportation would be minimal.

The proposed upgrades to US-70 across the river may also contribute to cumulative impacts to transportation due to congestion. If trucks were transporting debris, ash and coal west on US-70 to disposal areas, and the road were under construction, significant congestion could result. Should construction on US-70 create an issue, TVA would evaluate other potential routes to and from JOF.

3.21.8 Visual Resources

Cumulative impacts to visual resources are possible under all the alternatives. Although there are no projects in the general area outside of JOF that would contribute to cumulative impacts, ongoing and planned activities at JOF could contribute. The closure of Ash Pond 2, the onsite landfill, and the coal yard facilities could cause cumulative visual impacts as they are located in close proximity to the stack and powerhouse. If these projects were to be concurrent, there may be more heavy equipment on site at the same time. This could lead to a larger visual disturbance due to additional demolition-related objects in the viewscape. However, as most of JOF is not visible from the surrounding area, these increases in site activity would only be visible to those participating in recreation activities on the Tennessee River and to plant employees and contractors. All four projects would be temporary in nature and the visual resources should be improved once the plant has been deconstructed and Ash Pond 2, the onsite landfill, and coal yard have been closed.

Over the long term, post-deconstruction activities, depending on the deconstruction alternative chosen, the slight visual disturbance of the flue gas stack may have been removed, as well as the powerhouse visible from US-70 and the Tennessee River. In combination with the closure of the Ash Pond 2, landfill, and coal yard, including final vegetative cover, the visual aspects of JOF and the vicinity would be improved, although to a minor extent. As the stack, powerhouse, Ash Pond 2, landfill, and coal yard are generally not visible but from a few vantage points, any cumulative impacts to visual resources would be considered beneficial but insignificant.

3.21.9 Utilities and Service Systems

Continuing operations at the JCT facility, including use of water from the Water Treatment Building and R.O. Trailers, will provide little impact to utilities. In addition to the Water Treatment Building and R.O. Trailers, other JOF facilities remaining in service including the diesel fire pump house, the fuel oil unloading facility, the booster fan building, and the 69-kV, 161-kV and 500-kV switchyards will have also have little impact to utilities. Similarly, continued operation of the new HRSG at the JCT facility site supplying steam to the Chemours manufacturing facility along with continued operations of the Chemours manufacturing facility adjacent to JOF will have moderate impact to utilities. Coupled with the reduced demand from the de-energized JOF facility, the anticipated cumulative impact from these ongoing activities is expected to be minor.

In addition, deconstruction of the JOF will require possible modification to the NPDES outfall permit and modifications to the raw water system. Continuing operations at the JCT facility along with continued use of the Water Treatment Building and R.O. Trailers and fire prevention systems requires the NPDES outfall to remain in operation; deconstruction activities may necessitate modifications to the permit. In addition, deconstruction activities at JOF will necessitate rerouting of the raw water and electrical systems supplying the Water Treatment Building and R.O. Trailers and the fire prevention systems. Plans include new pumps at the raw water intake location, new pipes, and new electrical bypassing the powerhouse to supply the Water Treatment Building and R.O. Trailers, the switchyards, and the fire prevention systems. Additional electrical re-routes will be required to provide power to streetlights, security systems, and other ancillary structures. Impact to utilities from these planned replacement activities is anticipated to be small and the cumulative impact is expected to be minor (TVA 2016c).

Planned activities in the immediate vicinity, including coal yard remediation and coal yard runoff pond closure, are not anticipated to contribute large impacts to utilities. Similarly, across the river from JOF, TDOT planned activities to upgrade of US 70 from the Camden bypass to the Tennessee River in Benton County will provide little impact to utilities. The cumulative impact from these planned activities is anticipated to be minor (TDOT 2018c).

3.21.10 Safety

Continuing operations at the JCT facility, along with its continued use of water from the Water Treatment Building and R.O. Trailers, will provide little impact to safety. In addition to the Water Treatment Building and R.O. Trailers, other JOF facilities remaining in service including the diesel fire pump house, the fuel oil unloading facility, the booster fan building, and the 69-kV, 161-kV and 500-kV switchyards will have little impact to safety. Similarly, continued operation of the new HRSG at the JCT facility site supplying steam to the Chemours manufacturing facility along with continued operations of the Chemours manufacturing facility adjacent to JOF will have little impact to safety. The anticipated cumulative impact from these ongoing activities is expected to be minor.

In addition, deconstruction of the JOF will require possible modification to the NPDES outfall permit and modifications to the raw water system. Continuing operations at the JCT facility along with continued use of the Water Treatment Building and R.O. Trailers and fire prevention systems requires the NPDES outfall to remain in operation; deconstruction activities may necessitate modifications to the permit. In addition, deconstruction activities at JOF will necessitate rerouting of the raw water and electrical systems supplying the Water Treatment Building and R.O. Trailers and the fire prevention systems. Plans include new pumps at the raw water intake location, new pipes, and new electrical bypassing the powerhouse to supply the Water Treatment Building and R.O. Trailers, the switchyards, and the fire prevention systems. Additional electrical re-routes will be required to provide power to streetlights, security systems,

and other ancillary structures. Impact to safety from these planned activities is anticipated to be small and the cumulative impact is expected to be minor (TVA 2016c).

Planned activities in the immediate vicinity, including coal yard remediation and coal yard runoff pond closure, are not anticipated to contribute large impacts to safety. Across the river from JOF, TDOT planned activities to upgrade of US-70 from the Camden bypass to the Tennessee River in Benton County will provide little impact to safety. The cumulative impact from these planned activities is anticipated to be minor (TDOT 2018c).

3.22 Unavoidable Adverse Environmental Impacts

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

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

The inactive portions of JOF would be retired and deconstructed to a brownfield site. In the long term, the site could become very productive if various industries were to be established, thereby producing employment opportunities and tax revenue and enhancing long-term productivity of the site.

3.24 Irreversible and Irretrievable Commitments of Resources

An irreversible or irretrievable commitment of resources would occur when resources would be consumed, committed, or lost because of the project. The commitment of resources would be irreversible if the project started a process (chemical, biological, or physical) that could not be stopped. Similarly, commitment of a resource would be considered irretrievable when the project would directly eliminate the resource, its productivity, or its utility for the life of the project and possibly beyond.

Retiring and deconstructing the inactive portions of JOF would not result in any irreversible or irretrievable commitments of resources.

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CHAPTER 4 - LIST OF PREPARERS

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Project Role: Project Management

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Erika Grace (AECOM)
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4.2 Other Contributors

Christopher Logan Barber (TVA)
Education: B.S. Wildlife Science, minor Forestry
Experience: 5 years conducting field biology, 1.5 years technical writing and compliance with NEPA and Endangered Species Act
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Anneliesa Barta (AECOM)
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Project Role: Land Use and Prime Farmland, Transportation

Bob Dover (AECOM)
Education: MS and BS, Geology
Experience: 30 years of professional environmental experience
Project Role: Air Quality and Climate Change, Geology and Groundwater

Elizabeth B. Hamrick (TVA)
Education: M.S., Wildlife and B.S., Biology
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Zoe Knesl (AECOM)
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Experience: 20 years
Project Role: Visual Resources and Noise

Robert Marker (TVA)
Education: B.S., Outdoor Recreation Resources Management
Experience: 40 years in outdoor recreation resources planning and management.
Project Role: Parks and Recreation

David Nestor (TVA)
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Laura Owens (AECOM)
Education: BS, Physics and Geology
Experience: 24 years
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Craig Phillips, PE (TVA)
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Kim Pilarski-Hall (TVA)
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Experience: 13 years of experience in water quality monitoring and compliance; 12 years in NEPA planning and environmental services
Project Role: Surface Water

Carrie C. Williamson, PE, CFM (TVA)
Education: M.S. and B.S., Civil Engineering
Experience: 5 year Floodplains, 3 years River Forecasting, 7 years compliance monitoring
Project Role: Floodplains

CHAPTER 5 - ENVIRONMENTAL ASSESSMENT RECIPIENTS

5.1 Federal Agencies

U.S. Army Corps of Engineers
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service

5.2 Federally Recognized Tribes

Absentee Shawnee Tribe of Oklahoma
Cherokee Nation
Chickasaw Nation
Coushatta Tribe of Louisiana
Eastern Band of Cherokee Indians
Eastern Shawnee Tribe of Oklahoma
Kialegee Tribal Town, Muscogee (Creek) Nation
Shawnee Tribe
Thlopthlocco Tribal Town
United Keetoowah Band of Cherokee Indians in Oklahoma

5.3 State Agencies

Humphries County Economic Development Council
Tennessee Department of Environment and Conservation
Tennessee Department of Transportation
Tennessee State Historic Preservation Officer
Tennessee Wildlife Resources Agency

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CHAPTER 6 - LITERATURE CITED

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Appendix A – Summary of Environmental Permits and Applicable Regulations

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Appendix A
Summary of Environmental Permits and Applicable Regulations

Tennessee is an "authorized" state. Because Tennessee state environmental law is at least as protective as Federal EPA regulations, Tennessee is authorized to administer state environmental law in lieu of most federal environmental laws.

Any entity wishing to construct an air contaminant source, or to modify an existing air contaminant source, is required to obtain a construction permit from the Tennessee Division of Air Pollution Control (APC) in accordance with the requirements of Tennessee Air Pollution Control Regulations. Specifically, APC Rule chapter 1200-03-09 contains the general requirements for construction permits with APC-PERM-G-02, the Construction Permit Application Completeness Checklist, providing further guidance. Modification of the existing Title V Permit must be done in accordance with the requirements of APC Rule chapter 1200-03-09.

Modification of the existing NPDES Permit for JOF (TN0005444) must be done through the TDEC Division of Water Pollution Control (WPC) in accordance with the requirements of the Clean Water Act; TDEC Rule Chapter 0400-40-01,03, 04, and 05; and the Tennessee Water Quality Control Act TCA 69-3-108(b)(1), (2), (3), (4), and (6).

Stormwater runoff from construction and demolition sites is regulated under the NPDES program with projects disturbing 1 acre of land or more requiring a NPDES Stormwater Construction Permit. The permit establishes the conditions under which discharge may occur along with monitoring and reporting requirements. Application for coverage under the Tennessee General NPDES Permit for Stormwater Discharge Associated with Construction Activity must be done through TDEC's Division of Water Resources in accordance with the requirements of TCA 69-3-108. Requirements include preparation and submittal of a Notice of Intent (NOI) for the General NPDES Permit for Stormwater Discharges from Construction Activities (TNR100000) along with a Stormwater Pollution Prevention Plan (SWPPP). A map of the site is included as part of the NOI. The SWPPP includes the development, implementation, and renovation of construction best management practices throughout all phases of a project.

The possible addition of a stormwater pond would require selection and implementation of standard erosion and sediment control measures in accordance with the *Tennessee Erosion and Sediment Control Handbook: A Stormwater Planning and Design Manual for Construction Activities* (TDEC 2012).

Under EO 13186, federal agencies are encouraged to implement conservative measures to avoid or minimize adverse impacts on migratory bird resources when conducting agency actions. Under this executive order, federal agencies taking actions that effect migratory birds are directed to develop a Memorandum of Understanding in addition to working with the U.S. Fish and Wildlife Service along with other federal agencies to promote the conservation of migratory bird populations.

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Appendix B – Effects of Proposed Actions and Implementation of Conservation Measures

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CHAPTER 5 – EFFECTS OF PROPOSED ACTIONS AND IMPLEMENTATION OF CONSERVATION MEASURES

5.1 Effects Analysis Overview

This chapter includes analysis of direct and indirect effects of proposed actions on listed species, as well as on interrelated and interdependent activities. Direct effects occur to an individual during implementation of an action. Effects that result from an action and occur later in time are indirect effects. Both direct and indirect effects must be caused by the action and be reasonably certain to occur. The only difference between direct and indirect effects is timeframe. An interrelated activity is part of, is associated with, or depends on the proposed action for its justification. An interdependent activity has no independent utility apart from the proposed action under consultation or is being carried out because of the proposed action.

By virtue of TVA's multifaceted mission, the 96 routine activities are a mix of interrelated and interdependent activities that serve to carry out the ten overarching routine actions. There is potential for unforeseen adverse impacts to occur as a result of some interrelated and interdependent activities. Attempting to identify these programmatically would be too speculative. Project-specific environmental reviews will allow for identification of potential adverse effects that may result from interrelated and interdependent activities (e.g., transfer of land from TVA to another landowner). If necessary, additional project-specific consultation would be carried out. The effects analysis focuses on the 96 activities defined in Section 3.2 (versus the ten overarching routine actions in Sections 3-3 through 3-12).

Stressors that could result from implementation of each activity are described in Section 5.2, along with the method of potential exposure (e.g., life stage, activity intensity, duration) of each bat species to stressors and possible bat response (e.g., startling, altered behavior, death). For each stressor, avoidance and minimization measures that TVA would implement are listed, followed by an overall determination of effect for each stressor. An analysis of effects for each of the 96 activities is detailed in Table 5-1 and includes a reference to the conservation measures applicable to each activity. The effects determination is based on implementation of conservation measures and resulting avoidance or minimization of exposure to stressors associated with each activity.

Section 5.3 describes additional conservation measures that TVA will continue to carry out, based on conservation goals and objectives that are broader than project-specific avoidance and minimization measures, and that are in intended to provide benefits to listed bats at the population or regional level.

Section 5.4 summarizes effects determinations by each bat species. Section 5.6 summarizes cumulative effects.

5.2 Stressors with Potential Direct or Indirect Effects to Bats and Minimization or Avoidance Conservation Measures

5.2.1 Noise/Vibration

Exposure of any of the four bat species to noise and vibration has potential to occur when machinery or heavy equipment is in use as part of an activity and the activity is taking place near an occupied roost during the day or near a foraging area or travel

corridor occupied by bats in flight at night (the latter is less likely due to the diurnal time frame of the majority of activities). Bats may respond to the stress of noise or vibration by altering their normal behavior patterns (e.g., frequency of arousal, sudden flushing from roost). This may result in potentially depleted energy stores, predation, or mortality. Any activity that occurs outside, involves human presence and/or use of some type of equipment has the potential to generate noise. Many of the proposed activities occur outside and thus have the potential to generate noise. A couple of activities, in particular, blasting and drilling, have the potential to also create vibration.

TVA would implement the following measures associated with noise/vibration:

- NV1 = Noise is expected to 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; bats thus are unlikely to be disturbed.

- NV2 = Drilling, blasting, or any other activity that involves continuous noise (i.e., longer than 24 hours) disturbances greater than 75 decibels measured on the A scale (e.g., loud machinery) within a 0.5 mile radius of documented winter and/or summer roosts (caves, trees, unconventional roosts) will be conducted when bats are absent from roost sites, recognizing that certain caves or other roosts are used year-round by bats.

- NV3 = Drilling or blasting within a 0.5 mile radius of documented cave (or unconventional) roosts will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of the roost site.

- NV4 = Drilling or blasting within 0.5 miles of a documented roost site (cave, tree, unconventional roost) that needs to occur when bats are present will first involve development of project-specific avoidance or minimization measures in coordination with the USFWS. The likelihood of this is highly infrequent.

While magnitude and duration of noise varies by activity, the majority of noise and vibration that occurs as a result of proposed activities is expected to be short-term and not significantly different from urban interface or natural events that bats are frequently exposed to when present on the landscape (e.g., boats, barges, trains, storms). Bats are unlikely to be adversely disturbed by additional but similar noise from TVA activities. With TVA's implementation of the above measures, adapted from NiSource (2013), noise or vibration associated with proposed activities are NLAA any of the bat species addressed in this BA.

5.2.2 Human Presence

Exposure of any of the four bat species to human presence has potential to occur when humans come in close proximity to an occupied roost site. Bats may respond to the stress of human presence (detected by smell, movement and/or noise) by altering their normal behavior patterns (e.g., frequency of arousal, sudden flushing from roost, avoidance of a flight path or foraging area). This may result in potentially depleted energy stores, predation, or mortality.

TVA would implement the following measures associated with human presence:

- HP1 = Site-specific cases in which potential impact of human presence is heightened (e.g., conducting environmental or cultural surveys within a roost site) will be closely coordinated with staff bat biologists to avoid or minimize impacts below any potential adverse effect. Any take from these activities would be covered by TVA's Section 10 permit.
- HP2 = Entry into roosts known to be occupied by federally listed bats will be communicated to the USFWS when impacts to bats may occur if not otherwise communicated (i.e., via annual monitoring reports per TVA's Section 10 permit). Any take from these activities would be covered by TVA's section 10 permit.

While the magnitude (i.e., number of people) and duration (i.e., length of time) of human presence will vary, the majority of human presence is expected to be short-term. Bats therefore are unlikely to be adversely disturbed. With TVA's implementation of HP1 and HP2, human presence associated with proposed activities is NLAA any of the bat species addressed in this BA.

5.2.3 Smoke/Heat/Fire

Exposure of any of the four bat species to smoke inhalation, heat, or fire while roosting in caves or trees has potential to occur when prescribed burns are conducted in close proximity to a roost site. Bats may respond to smoke, heat or fire by having difficulty breathing, flushing from roost sites, or sustaining burns. This may result in increased energy expenditure, harm or death. Use of fire and preparation of fire breaks may damage or destroy roost trees, which may result in increased energy use to locate new roost trees. Sediment generated by plowing of fire breaks may migrate to water sources, which may result in degrading water quality, and subsequent degraded drinking water and prey availability.

Conducting controlled burns on the landscape also has potential to create snags and forest openings, resulting in additional roost sites, improved foraging opportunities and overall increased habitat availability for Indiana bat or northern long-eared bat.

TVA would implement the following avoidance and minimization measures associated with smoke, fire or heat:

- SHF1 = Fire breaks are used to define and limit burn scope.
- SHF2 = Site-specific conditions (e.g., acres burned, transport wind speed, mixing heights) are considered to ensure smoke is limited and adequately dispersed away from caves so that smoke does not enter cave or cave-like structures.
- SHF3 = Acreage is divided into smaller units to keep the amount of smoke at any one time or location to a minimum and reduce risk for smoke to enter caves.
- SHF4 = Planned timing for prescribed burns minimally overlaps with time of potential occupancy by bats (See Table 3-3).). If burns need to be conducted during April and May, when there is some potential for bats to present on the landscape and more likely to enter torpor due to colder temperatures, burns will only be conducted if the air temperature is 55° or greater, and preferably 60° or greater.
- SHF5 = Fire breaks are plowed immediately prior to burning, are plowed as shallow as possible and are kept to minimum to minimize sediment.

- SHF6 = Tractor-constructed fire lines are established greater than 200 ft from cave entrances. Existing logging roads and skid trails are used where feasible to minimize ground disturbance and generation of loose sediment.
- SHF7 = Burning will only occur if site specific conditions (e.g. acres burned, transport wind speed, mixing heights) can be modified to ensure that smoke is adequately dispersed away from caves or cave-like structures. This applies to prescribed burns and burn piles of woody vegetation.
- SHF8 = Brush piles will be burned a minimum of 0.25 mile from documented, known, or obvious caves or cave entrances and otherwise in the center of newly established ROW when proximity to caves on private land is unknown.
- SHF9 = A 0.25 mile buffer of undisturbed forest will be maintained around documented or known gray bat maternity and hibernation colony sites, documented or known Virginia big-eared bat maternity, bachelor, or winter colony sites, Indiana bat hibernation sites, and northern long-eared bat hibernation sites. Undisturbed forest is important for gray bats to regulate temperatures at the mouth of the cave, and provide cover for bats as they emerge from the cave. Prohibited activities within this buffer include cutting of overstory vegetation, construction of roads, trails or wildlife openings, and prescribed burning. Exceptions may be made for maintenance of existing roads and existing ROW, or where it is determined that the activity is compatible with species conservation and recovery (e.g., removal of invasive species).

Smoke, heat, and fire associated with prescribed burns are NLAA any of the bats species addressed in this BA when these bats are roosting in caves. While implementation of the above measures will significantly reduce this, there is some potential that prescribed burns may adversely affect bats that may be roosting in trees at the time of the prescribed burn (i.e., a few burn plans span into March-April or September-October time frames, when there is potential for bats to be roosting in trees).

5.2.4 Tree Removal

Indiana bats and northern long-eared bats roost in trees outside of the winter season. Exposure of these two species to the effects of tree removal has the potential to occur when bats are roosting in trees during time of removal, or when bats return to a previously occupied tree (i.e., previously occupied either earlier in the same season or during a previous year) to find that the tree is no longer present. Bats may respond to the stress of roost tree removal by flushing during tree removal, falling out of the tree during tree removal (if startled or unable to fly at the time the tree is removed), being crushed during tree removal, or selecting a different tree if previously used tree is no longer present. This may result in depleted energy stores, possible mortality from injury or inability to fly, and additional use of energy to locate other roost trees.

Tree removal is a common, necessary and often unavoidable activity for actions addressed in this BA. Flexibility in tree removal across season and landscape varies across proposed actions due to other regulations, safety, and inclement weather conditions, as well as the large amount of acreage that needs to be managed over a short period of time (e.g., annual or 3-year cycle). For many activities, removal of suitable roost trees can occur during winter season (when Indiana bats or northern long-eared bats likely are not present on the landscape). For safety and liability reasons, hazard trees typically have to be addressed immediately, regardless of season. Removal of (or granting approval to remove) hazard trees is limited to trees with a defined target (e.g., threat to a TL, adjacent private property,

or human safety in a public use area). The need to remove trees during time of occupancy by Indiana bat and northern long-eared bat, including when non-volant juveniles are present on the landscape, has been minimized to the extent possible within the constraints of proposed actions over the course of the 20-year term (see Table 3-2).

TVA would implement the following avoidance and minimization measures for tree removal:

- 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 potentially suitable summer roost trees for Indiana bat and northern long-eared bat.
- TR2 = Removal of suitable summer roosting habitat within 0.5 mile of Priority 1/Priority 2 Indiana bat hibernacula, or 0.25 mile of Priority 3/Priority 4 Indiana bat hibernacula or any northern long-eared bat hibernacula will be prohibited, regardless of season, with very few exceptions (e.g., vegetation maintenance of TL ROW immediately adjacent to Norris Dam Cave, Campbell County, TN).
- TR3 = Removal of suitable summer roosting habitat within documented habitat (i.e., within 10 miles of documented Indiana bat hibernacula, within five miles of documented northern long-eared bat hibernacula, within 2.5 miles of documented Indiana bat summer roost trees, within five miles of Indiana bat capture sites, within one mile of documented northern long-eared bat summer roost trees, within three miles of northern long-eared bat capture sites) will be tracked, documented, and included in annual reporting.
- TR4 = Removal of suitable summer roosting habitat within potential habitat for Indiana bat or northern long-eared bat hibernacula will be tracked, documented, and included in annual reporting.
- TR5 = Removal of any trees within 150 ft of a documented Indiana bat or northern long-eared bat maternity summer roost tree during non-winter season, range-wide pup season or swarming season (if site is within known swarming habitat), will first require a site-specific review and assessment. If pups are present in trees to be removed (determined either by mist netting and assessment of adult females, or by visual assessment of trees following evening emergence counts), TVA will coordinate with the USFWS to determine how to minimize impacts to pups to the extent possible. This may include establishment of artificial roosts before loss of roost tree(s).
- TR6 = Removal of a documented Indiana bat or northern long-eared bat roost tree that is still suitable and that needs to occur during non-winter season, range-wide pup season, or swarming season (if site is within known swarming habitat) will first require a site-specific review and assessment. If pups are present in trees to be removed (determined either by mist netting and assessment of adult females, or by visual assessment of trees following evening emergence counts), TVA will coordinate with the USFWS to determine how to minimize impacts to pups to the extent possible. This may include establishment of artificial roosts before loss of roost tree(s).
- TR7 = Tree removal within 100 ft of existing transmission ROWs will be limited to hazard trees as defined in Section 3-2.

- TR8 = Requests for removal of hazard trees on or adjacent to TVA reservoir land are inspected by staff knowledgeable in identifying hazard trees per International Society of Arboriculture and TVA's checklist for hazard trees. Approval is limited to trees with a defined target.
- TR9 = Internal controls will be in place to further reduce potential for site-specific direct adverse effects to Indiana bat and northern long-eared bat associated with tree removal. This includes promoting presence/absence surveys (mist netting or emergence counts) that allows for positive detections but without resulting in increased constraints in cost and project schedule. Internal controls are intended to facilitate willingness and financial feasibility to conduct surveys amidst increasing budget constraints without the risk for increased financial penalty if Indiana bat or northern long-eared bat individuals are caught. This enables TVA to contribute to increased knowledge of bat presence on the landscape while continuing to carry out TVA's broad mission and responsibilities.

Implementation of the above measures will avoid or minimize direct adverse effects to Indiana bat and northern long-eared bat in most cases. There will be instances, however, when presence/ absence surveys cannot be conducted, tree removal needs to occur outside of winter (i.e., bats present on the landscape) and bats potentially are roosting in trees identified for removal. Tree removal therefore has potential to adversely affect Indiana bat and northern long-eared bat.

5.2.5 Alteration or removal of unconventional roosts (Bridges or Human Structures)

All four bat species are known to use unconventional roosts. Indiana bats and gray bats have been documented in bridges with suitable roost characteristics and Virginia big-eared bat and northern long-eared bat have been observed in old buildings with suitable roost characteristics. Exposure of these species to alteration of unconventional roost sites may occur when modification or demolition to a building or bridge occurs while bats are occupying the structure. Bats are more likely to be found in buildings, structures or sites that are close to suitable foraging habitat (e.g., woodlands, mature trees and hedgerows, water features).

Bats may respond to the stress of structural alteration or demolition by flushing during alteration or demolition, falling to the ground or floor during structure modification or demolition activities (if startled or unable to fly at the time of activity), or being crushed during the activity. This may result in depleted energy stores, possible mortality from injury or inability to fly, and additional use of energy to locate another roost site.

TVA will implement the following avoidance and minimization measures associated with alteration or removal of unconventional bat roosts:

- 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:
    - 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:
    - Location in relatively warm areas
    - Between 5 and 10 feet (1.5 and 3 meters) tall and 300 feet (100 meters) 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:
    - Domestic garages and 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.

- AR2 = Additional bat P/A surveys (e.g., emergence counts) conducted if warranted (i.e., when AR1 indicates that bats may be present).
- AR3 = Bridge survey protocols (per Appendix D in USFWS 2016c) will be implemented, either by permittee (e.g., state DOT biologists) or qualified personnel. If a bridge is being used as an unconventional roost, subsequent protocols will be implemented.
- AR4 = Removal of buildings with suitable roost characteristics within six miles of known or presumed occupied roosts for Virginia big-eared bat would occur between November 16 and March 31. Buildings may be removed other times of the year

once a bat biologist evaluates a buildings' potential to serve as roosting habitat and determines that this species is not present and/or is not using structure(s).

- AR5 = If evidence of bat use warrants seasonal modification or removal, TVA will strive to (and in most cases anticipates being able to) accommodate seasonal modification or removal. Risk to human safety, however, will take priority. For project-specific cases in which TVA is unable to accommodate seasonal modification or removal, and federally listed bat species are present, TVA will consult with the USFWS to determine the best approach in the context of the project-specific circumstance. This may include establishment of artificial roosts before demolition of structures with bats present.

Potential impacts from alteration or removal of unconventional roost structures associated with proposed activities are avoided or reduced with implementation of the above measures. Alteration or removal of unconventional roost structures is NLAA bats addressed in this BA.

5.2.6 Sedimentation/Spills/Pollutants/Contaminants

All four bat species rely on water sources for drinking water and (to some extent) prey availability. Inputs of sediment or other pollutants into water sources resulting from adjacent land use activities has the potential to alter water quality, which may in turn degrade drinking water and abundance or quality of available prey sources that require water for a portion of their life cycle (e.g., larval hatching and development in water bodies). Bats may be exposed to the adverse impacts of sedimentation and pollutants when activities with ground disturbance or use of chemicals (or fuels) are conducted near to or adjacent to water sources that these bats use for foraging and drinking. Bats also may be exposed to sediment or pollutants if either of these enter subterranean aquifers and alter the quality of cave roost sites in a way that renders the roost site less inhabitable. Bats may respond to these stressors by experiencing reduced health, reduced feeding success, death, or by seeking alternate sources for drinking, foraging and roosting, which may result in increased energy expenditures.

TVA would implement a variety of BMPs to avoid or reduce inputs of sediment into waterways and cave/cave-like entrances:

- SSPC1 = Transmission actions and activities will continue to Implement A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities (Appendix O). This focuses on control of sediment and pollutants, including herbicides. The following are key measures:
    - BMPs to minimize erosion and prevent/control water pollution in accordance with state-specific construction storm water permits. BMPS are designed to keep soil in place and aid in reducing risk of other pollutants reaching surface waters, wetlands and ground water. BMPs will undertake the following principles:
        - Plan clearing, grading, and construction to minimize area and duration of soil exposure.
        - Maintain existing vegetation wherever and whenever possible.
        - Minimize disturbance of natural contours and drains.

        - As much as practicable, operate on dry soils when they are least susceptible to structural damage and erosion.
        - Limit vehicular and equipment traffic in disturbed areas.
        - Keep equipment paths dispersed or designate single traffic flow paths with appropriate road BMPs to manage runoff.
        - Divert runoff away from disturbed areas.
        - Provide for dispersal of surface flow that carries sediment into undisturbed surface zones with high infiltration capacity and ground cover conditions.
        - Prepare drainage ways and outlets to handle concentrated/increased runoff.
        - Minimize length and steepness of slopes. Interrupt long slopes frequently.
        - Keep runoff velocities low and/or check flows.
        - Trap sediment on-site.
        - Inspect/maintain control measures regularly and after significant rain.
        - Re-vegetate and mulch disturbed areas as soon as practical.
    - Application of herbicide is in compliance with USEPA, state water quality standards, and state permits. Areas in which covered species are known to occur on existing transmission line ROW are depicted on referenced, applicable spreadsheets and include specific guidelines to follow for impact minimization or avoidance. During pre-job briefings, the ROW Forester will review the location of these resources with contractors and provide guidelines and expectations from TVA's BMP Manual (Appendix O). Herbicides labeled for aquatic use are utilized in and around wetlands, streams, and SMZs. Unless specifically labeled for aquatic use, measures are taken to keep herbicides from reaching streams whether by direct application or through runoff or flooding by surface water. Hand application of certain herbicides labeled for use within SMZs is used only selectively.
    - Specific guidelines regarding sensitive resources and buffer zones:
        - Extra precaution (wider buffers) within SMZs is taken to protect stream banks and water quality for streams, springs, sinkholes, and surrounding habitat.
        - BMPs are implemented to protect and enhance wetlands. Select use of equipment and seasonal clearing is conducted when needed for rare plants; construction activities are restricted in areas with identified rare plants.
        - Standard requirements exist to avoid adverse impacts to caves, protected animals, and unique and important habitat (e.g., protective buffers around caves, restricted herbicide use, seasonal clearing of suitable habitat).
- SSPC2 = Operations involving chemical or fuel storage or resupply and vehicle servicing will be handled outside of SMZs and in such a manner as to prevent these

items from reaching a watercourse. Earthen berms or other effective means are installed to protect the 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, and other litter will be collected and disposed of properly. Equipment servicing and chemical or fuel storage will be limited to locations greater than 300-ft from, sinkholes, fissures, or areas draining into known sinkholes, fissures, or other karst features.

- SSPC3 = Power plant actions and activities will continue to implement standard environmental practices. These include:
    - BMPs in accordance with regulations:
    - 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
    - SWPP 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
        - A storm water permit may be required at construction sites (>1 ac)
    - Each site has a Spill Prevention and Control Countermeasures (SPCC) Plan. Several hundred pieces of equipment often are managed at the same time on power generation properties; goal is to minimize fuel and chemical use.
- SSPC4 = Woody vegetation burn piles associated with transmission construction will be placed in the center of newly established ROWs to minimize wash into any nearby undocumented caves that might be on adjacent private property and thus outside the scope of field survey for confirmation. Brush piles will be burned a minimum of 0.25 miles from documented caves and otherwise in the center of newly established ROW when proximity to caves on private land is unknown.
- SSPC5 = Section 26a permits and contracts associated with solar projects, economic development projects or land use projects include standards and conditions that include standard BMPs for sediment and contaminants as well as measures to avoid or minimize impacts to sensitive species or other resources consistent with applicable laws and Executive Orders.
- SSPC6 = Herbicide use will be avoided within 200 ft of portals associated with caves, cave collapse areas, mines and sinkholes that are capable of supporting cave-associated species. Herbicides are not applied to surface water or wetlands unless specifically labeled for aquatic use. Filter and buffer strips will conform at least to federal and state regulations and any label requirements.

- SSPC7 = Clearing of vegetation within a 200-ft radius of documented caves will be limited to that conducted by hand or small machinery clearing only (e.g., chainsaws, bush-hog, mowers). This will protect potential recharge areas of cave streams and other karst features that are connected hydrologically to caves.

Potential impacts from sedimentation or other contaminants (chemicals, fuels) to the four bat species are avoided or reduced by implementation of the above measures. Sediment and contaminants are NLAA bats species addressed in this BA.

5.2.7 Lighting

Bat behavior may be affected by artificial lighting when traveling between roosting and foraging areas. Foraging in lighted areas may increase risk of predation or it may deter bats from flying in those areas. Bats that significantly alter their foraging patterns may increase their energy expenditures that result in reduced reproductive rates. This depends on the context (e.g., duration, location, extent, type) of the lighting (USFWS 2016c).

Artificial light attracts insects that are phototactic (drawn to light). Some insectivorous bats may be able to identify and exploit insect accumulations and insect clusters at artificial lights and thus may benefit from artificial lighting because resource predictability and high insect densities increase foraging efficiency. Insectivorous bats that hunt in open spaces above the canopy (open-space foragers) or along vegetation edges such as forest edges, tree lines or hedgerows (edge foragers) appear to be those most tolerant of artificial lighting. When foraging at street lights, open-space foragers typically fly above the lamps, diving into the light cone to catch insects, whereas edge foragers generally use echolocation calls (Rowse et al. 2016).

Studies suggest that bat response to artificial lighting is highly variable across species, and attributed to physiology (e.g., wing morphology, size, flight speed), foraging habitat (e.g., open, forest edge, dense vegetation), use of echolocation, and type, duration, and intensity of lighting (Rowse et al. 2016, USFWS 2016c).

TVA would implement a variety of BMPs to avoid or reduce inputs of sediment into waterways and cave/cave-like entrances:

TVA would implement a variety of BMPs to avoid or reduce impacts from artificial lighting:

- 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).

Potential impacts from artificial lighting to the four bat species are avoided or reduced by implementation of the above measures. Artificial lighting is NLAA bats species addressed in this BA.

5.2.8 Additional Avoidance and Minimization Measures

TVA would implement the following measures to avoid or minimize the stressors listed above.

- ED1 = Continue to implement a siting process for proposed actions by prospective economic development applicants. This includes the following measures:
    - Landscape-level review on front end to determine existing land use, property ownership, and presence of natural and cultural resources to site an action in a location that results in impact avoidance or minimization
    - Targeted use of sites that have been previously disturbed for use as economic development sites, laydown areas, substations, ROWs.
    - Screening of prospective economic development applicants that targets sites for which environmental due diligence has been completed
    - If potential impacts are identified, actions are modified to avoid impacts to the extent possible.
    - Project-specific habitat assessments are conducted as needed.
- SUR1 = When feasible for a site-specific project, conduct presence/absence summer bat surveys based on the following criteria:
    - Appropriate for projects not located in areas with documented bat occurrence
    - Implement current species-specific USFWS survey guidelines
    - Negative survey results valid for a minimum of two years, subject to new information on habitat suitability; bat-specific conservation measures not mandatory if negative survey results.
- SUR2 = Conduct habitat surveys of suitable cave, karst, or structure (e.g., building, bridge) within project boundaries based on the following criteria:
    - Survey can be conducted any time of year; results are valid for two years if a bridge or other non-natural structure.
    - Survey can include on-site visits and/or review of aerial photos, maps, mining records, forest inventories, or previous surveys.
    - Applies to caves, sinkholes, karst fissures, quarries, mine portals, bridges
    - Applies to ground openings greater than one ft in diameter (and where feasible and where human safety is not at risk).
    - Applies to underground passages that continue beyond dark zone and do not end within 40 ft of entrance.
    - Entrances that are flooded or prone to flooding (i.e., debris on ceiling), collapsed, or otherwise inaccessible to bats are excluded.
    - Ground openings that have occurred recently (i.e., within the past 12 months) or suddenly appear (e.g., sinkholes) due to creation or subsidence are excluded. However, document site with written description and photographs of opening for reporting purposes.

- SUR3 = Conduct seasonal bat presence/absence surveys in suitable cave/ karst/ structural habitat located within project boundaries based on the following criteria:
    - Implement species-specific or habitat-specific survey protocol based on the most current guidance provided by the USFWS.
    - If surveys fail to detect bats, conservation measures for this habitat type are not required.

5.3 Additional Conservation Measures

In addition to implementation of site-specific avoidance and minimization measures to avoid or minimize harm to individual gray, Indiana, northern long-eared, or Virginia big-eared bats, TVA would continue to carry out conservation measures at larger scales. These include population-level initiatives that promote recovery of one or more bat species (e.g., land acquisition, habitat improvement and protection) as well as mission-level holistic and strategic steps that strive to keep environmental stewardship in check with operational and economic goals (e.g., managing lands specifically for sensitive resources).

5.3.1 Population-level Conservation Measures for Recovery and Enhancement

- TVA will continue annual gray bat population census counts at select caves across the TVA region in coordination with other state, federal and non-governmental partners. TVA will continue to provide data annually to the USFWS.

Table 5-1. Monitoring Schedule for Gray Bat Caves on TVA-Managed Lands

Cave	State	Monitoring Frequency			
		Annual	Every Two Years	Every Three Years	To Be Determined
Hambrick's	AL	X			
Nickajack	TN	X			
Featherfoot	TN	X			
Norris Dam	TN	X			
Collier	AL	X			
Quarry	AL		X		
Gross-Skelton	AL			X	
Marble Bluff	TN			X	
Blythe Ferry	TN		X		
Crompton Creek	TN				X[1]
Pennington Cave	TN				X[1]

[1]Establishment of monitoring frequency is pending determination of roost type (i.e., maternity vs bachelor).

- TVA will continue to collaborate with partners to survey bridges as requested by partners with known or potential summer use (e.g., maternity colonies) by federally listed partners.
- TVA will develop and continue local/regional cooperative partnerships and support monitoring efforts to learn more about how bats are utilizing communities within the TVA region (e.g., spring migration radio tagging and tracking, location and assessment of roost trees).
- TVA will conduct bat monitoring following bat habitat enhancement projects and establishment of artificial roosts on TVA-managed lands to assess use of habitat and roosts by bats.
- TVA will monitor and maintain gates and signage at caves inhabited by protected bat species and determine the need for establishment of new gates, fences, or signage at other caves important to federally listed bats on TVA lands.
- Continue to serve as a member of state WNS planning committees (e.g., AL, TN). WNS planning efforts will continue to be supported by TVA staff. As information available about WNS is ever changing, current planning and management efforts will be reviewed and revised as appropriate.
- Continue to maintain a database of known locations (i.e., mist net captures, cave, bridge, and tree roosts, etc.) of gray bat, northern long-eared bat, Indiana bat and Virginia big-eared bat within the TVA region. This database will continue to be updated as new information becomes available and used to inform project-specific environmental reviews and BAs.
- Continue to manage invasive plants, including those protect high priority sites where plant invasions threaten rare species habitats (e.g., cave entrances):
    - Identify and prioritize distributions, rates and modes of population expansions, sources of introduction, and ecological significance of invasive species;
    - Identify and prioritize areas requiring invasive species control;
    - Eradicate known substantial seed sources of invasive plants;
    - Develop management alternatives, using native species, to prevent further introduction of non-native species;
    - Employ prescribed burning, manual removal, and chemical control as appropriate for managing invasive species.
- Bat habitat identification workshops will continue to be offered to TVA staff interested in assisting with conducting habitat assessments. TVA bat biologists will continue to maintain oversight in identification and determination of suitable habitat.

5.3.2 Mission-Driven Conservation Measures as part of Policies, Plans and Processes

TVA will continue to carry out its three-pronged mission (Section 1.2.1) of providing low-cost electricity, robust economic development and proactive environmental stewardship, striving to meet environmental standards (including conservation of federally listed species) across the board. TVA will continue to abide by its Environmental Policy (Section 1.2.2), enhancing land and water resources to provide multiple benefits in the TVA region and operating as a steward of the region's natural resources. TVA's IRP (Section 1.2.3) will

continue to direct TVA's generation of electricity to meet long-term energy needs of the TVA region while supporting TVA's mandates for environmental stewardship and minimizing environmental impacts from its operations. TVA will continue to work within the framework of its NRP (Section 1.2.4) to balance land use, human activity and conservation of resources to achieve the greatest public benefit. Seventy-eight percent (228,540 ac) of TVA-managed land is allocated for natural and sensitive resource management. Cave gating and protection, habitat improvement and enhancement, and management of Natural Areas important to rare species are focal areas within the NRP framework.

TVA will continue to implement its Land Policy (Section 1.2.5) which spells out exactly how TVA manages the reservoir system and surrounding lands to maximize and balance multipurpose objectives. Reservoir lands remaining under TVA's control are preserved in public ownership except in rare instances where public benefits would be so significant that transferring lands from TVA control to private ownership or another public entity is justified. TVA will continue to implement its SMP (Section 1.2.6) to protect shoreline and aquatic resources while allowing reasonable access to the water by adjacent residents or property owners. Residential development is limited to 38 percent of reservoir shoreline. TVA will continue to carry out a rigorous environmental review process (Section 1.2.7) at multiple levels to ensure compliance with the NEPA, ESA, and other environmental regulations.

While, these plans and policies do get revised from time to time, the underlying mission of environmental stewardship will remain.

Project Screening Form - TVA Bat Strategy *(05/08/2018)*

This form is to assist in determining alignment of proposed projects and any required measures to comply with TVA's ESA Section 7 programmatic consultation for routine actions and federally-listed bats[1]

Project Name: Johnsonville Fossil Plant Decontamination & Deconstruction - Environmental Assmt **Date**: 05/10/2018
Contact(s): Carol Freeman, Env; Eddie Mullinax, Proj Mgr **CEC#**: _____ **RLR#:** _____ **Project ID**: 32571

Project Location (City, County, State): Waverly, Humphreys, Tennessee

Project Description: Demolition and deconstruction of all remaining coal fired units at Johnsonville Fossil Plant. Environmental assessment (EA) of the future disposition of buildings and physical structures that are no longer needed for their original purpose of power generation. Activities below reflect all EA alternatives considered and not eliminated.

STEP 1) Select Appropriate TVA Action (or check here □ if none of the Actions below are applicable):

☐	**1**	Manage Biological Resources for Biodiversity and Public Use on TVA Reservoir Lands	☐	**6**	Maintain Existing Electric Transmission Assets
☐	**2**	Protect Cultural Resources on TVA-Retained Land	☐	**7**	Convey Property associated with Electric Transmission
☐	**3**	Manage Land Use and Disposal of TVA-Retained Land	☐	**8**	Expand or Construct New Electric Transmission Assets
☐	**4**	Manage Permitting under Section 26a of the TVA Act	☐	**9**	Promote Economic Development
☑	**5**	Operate, Maintain, Retire, Expand, Construct Power Plants	☐	**10**	Promote Mid-Scale Solar Generation

STEP 2) Select **all** activities from **Tables 1 and 2** (Column 1 only) included in proposed project. If you have an activity that is not listed below, describe here): _____

Table 1. Activities (CHECK ALL THAT APPLY) with No Effect on Federally Listed Bats. If none, check here: □

	#	ACTIVITY		#	ACTIVITY
□	**1**	Loans and/or grant awards	□	**12**	Sufferance agreement
□	**2**	Purchase of property	□	**13**	Engineering or environmental planning or studies
□	**3**	Purchase of equipment for industrial facilities	□	**14**	Harbor limits
□	**4**	Environmental education	□	**19**	Site-specific enhancements in streams and reservoirs for aquatic animals
□	**5**	Transfer of ROW easement or ROW equipment	□	**20**	Nesting platforms
□	**6**	Property and/or equipment transfer	□	**41**	Minor water-based structures
□	**7**	Easement on TVA property	□	**42**	Internal renovation or internal expansion of existing facility
□	**8**	Sale of TVA property	□	**43**	Replacement or removal of TL poles, or cutting of poles to 4-6 ft above ground
□	**9**	Lease of TVA property	□	**44**	Conductor and OHGW installation and replacement
□	**10**	Deed modification of TVA rights or TVA property	□	**49**	Non-navigable houseboats
□	**11**	Abandonment of TVA retained rights			

Table 2. Activities (CHECK ALL THAT APPLY) and Associated Conservation Measures. If none, check here: □

	#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
□	**15**	Windshield or ground surveys for archaeological resources	□ a. NV1 □ b. HP2	□ b. HP1
□	**16**	Drilling	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3 □ g. L1, L2	□ a NV3, NV4 / □ a1. NV2
□	**17**	Mechanical vegetation removal; does not include removal of trees or tree branches ≥ 3" in diameter.	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5	□ f. SSPC4, SSPC7
■	**18**	Erosion control – minor	■ a. NV1 ■ f. SPCC1, SSPC2, SSPC3, SSPC5	None
□	**21**	Herbicide use	□ d. SSPC1, SSPC2, SSPC3, SSPC5	□ d. SSPC6, SSPC7
□	**22**	Grubbing	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5	□ f. SSPC4
□	**23**	Prescribed burns, burn piles, or	□ c. SHF1, SHF4, SHF5	□ c. SHF2, SHF3, SHF6, SHF7,

	#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
		brush piles		SHF8, SHF9
□	24	Tree planting	□ a. NV1 □ f. SSCP1, SSPC2, SSPC3, SSPC5	None
□	25	Maintenance, improvement or construction of pedestrian or vehicular access corridors	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5	□ a1. NV2 □ f. SSPC7
□	26	Maintenance or construction of access control measures	□ a. NV1 □ b. HP2 □ f. SSPC1, SSPC2, SSPC3,SSPC5 □ g. L1, L2	□ a NV3, NV4 / □ a1. NV2 □ b. HP1 □ f. SSPC7
□	27	Restoration of sites following human use and abuse	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3	□ f. SSPC7
■	28	Removal of debris (e.g., dump sites, hazardous material, unauthorized structures)	■ a. NV1 ■ f. SSPC1, SSPC2, SSPC3	■ f. SSPC7
■	29	Acquisition and use of fill/borrow material	■ a. NV1 ■ f. SSPC1, SSPC2, SSPC3	■ f. SSPC7
□	30	Dredging and excavation; recessed harbor areas	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	None
□	31	Stream/wetland crossings	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5	□ f. SSPC7
□	32	Clean-up following storm damage	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3	□ f. SSPC4, SSPC7
□	33	Removal of hazardous trees or tree branches	□ a. NV1 □ d. TR7, TR8 □ f. SSPC1, SSPC2, SSPC3, SSPC5	□ d. TR1, TR2, TR3, TR4, TR5, TR6, TR9, □ f. SSPC4, SSPC7
□	34	Mechanical vegetation removal, includes trees or tree branches three inches or greater in diameter	□ a. NV1 □ d. TR7, TR8 □ f. SSPC1, SSPC2, SSPC3, SSPC5	□ d. TR1, TR2, TR3, TR4, TR5, TR6, TR9, □ f. SSPC4, SSPC7
■	35	Stabilization (major erosion control)	■ a. NV1 ■ f. SSPC1, SSPC2, SSPC3, SSPC5	■ f. SSPC4, SSPC7
■	36	Grading	■ a. NV1 ■ f. SSPC1, SSPC2, SSPC3, SSPC5 ■ g. L1, L2	■ f. SSPC4, SSPC7
□	37	Installation of soil improvements	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3 □ g. L1, L2	□ a1. NV2 □ f. SSPC7
□	38	Drainage installations (including for ponds)	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3 □ g. L1, L2	□ f. SSPC7
□	39	Berm development	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, □ g. L1, L2	None
□	40	Closed loop heat exchangers (heat pumps)	□ f. SSPC5	None
□	45	Stream monitoring equipment-placement, use	□ a. NV1	None
□	46	Floating boat slips within approved harbor limits	□ f. SSPC5	None
□	47	Conduit installation	□ a. NV1	□ a1. NV2
■	48	Laydown areas	■ a. NV1 ■ f. SSPC1, SSPC2, SSPC3, ■ g. L1, L2	None
□	50	Minor land-based structures	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5 □ g. L1, L2	None
□	51	Signage installation	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5	None
□	52	Floating buildings	□ a. NV1 □ f. SSPC2, SSPC3,SSPC5 □ g. L1, L2	□ a1. NV2
□	53	Mooring buoys or posts	□ a. NV1	

	#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
			□ f. SSPC2, SSPC3, SSPC5	None
□	54	Maintenance of water control structures (dewatering units, spillways, levees)	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	□ f. SSPC6, SSPC7
□	55	Solar panels	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	□ f. SSPC7
□	56	Culverts	□ a. NV1 □ f. SSPC1, SSPC3, SSPC5	None
□	57	Water intake - non-industrial	□ a. NV1 □ f. SSPC3, SSPC5	None
□	58	Wastewater outfalls	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	None
□	59	Marine fueling facilities	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5 □ g. L1, L2	None
□	60	Commercial water-use facilities (e.g., marinas)	□ a. NV1 □ f. SSPC2, SSPC5 □ g. L1, L2	None
□	61	Septic fields	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5	None
■	62	Blasting	■ a. NV1 ■ f. SSPC1, SSPC2, SSPC3, ■ g. L1, L2	■ a NV3, NV4 / □ a1. NV2
□	63	Foundation installation	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3	□ a1. NV2
□	64	Installation of steel structure, overhead bus, equipment, etc.	□ a. NV1 □ g. SSPC1, SSPC2, SSPC3	□ a1. NV2
□	65	Pole and/or tower installation and/or extension	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3	□ a1. NV2
□	66	Private, residential docks, piers, boathouses	□ a. NV1 □ f. SPCC5 □ g. L1, L2	None
■	67	Siting of temporary office trailers	■ a. NV1 ■ f. SSPC1, SSPC2, SSPC3, SSPC5 ■ g. L1, L2	None
□	68	Financing for speculative building construction	□ a. NV1 □ f. SSPC5	None
□	69	Renovation of existing structures	□ a. NV1 □ f. SSPC1, SSPC3, SSPC5 □ g. L1, L2	□ e. AR1, AR2, AR4, AR5
□	70	Lock maintenance and construction	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	□ a1. NV2
□	71	Concrete dam modification	□ a. NV1 □ f. SSPC2, SSPC3	□ a1. NV2
□	72	Ferry landings/service operations	□ a. NV1 □ f. SSPC5 □ g. L1, L2	None
□	73	Boat launching ramps	□ a. NV1 □ f. SSPC2, SSPC5	□ a1. NV2
□	74	Recreational vehicle campsites	□ a. NV1 □ g. SPCC5	None
□	75	Utility lines/light poles	□ a. NV1 □ f. SPCC5 □ g. L1, L2	None
□	76	Concrete sidewalk	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	None
□	77	Construction or expansion of land-based buildings	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5 □ g. L1, L2	□ e. AR1, AR2, AR5
□	78	Wastewater treatment plants	□ a. NV1 □ f. SSPC2, SSPC5 □ g. L1, L2	□ a1. NV2
□	79	Swimming pools and associated	□ a. NV1	

	#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
		equipment	□ f. SSPC5 □ g. L1, L2	None
□	80	Barge fleeting areas	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	□ a1. NV2
■	81	Water intakes - Industrial	■ a. NV1 ■ f. SSPC2, SSPC3, SSPC5	None
□	82	Construction of dam/weirs/ Levees	□ a. NV1 □ f. SPCC2, SPCC3, SPCC5	□ a1. NV2
■	83	Submarine pipeline, directional boring operations	■ a. NV1 ■ f. SSPC2, SSPC3, SSPC5	□ a1. NV2
□	84	On-site/off-site public utility relocation or construction or extension	□ a. NV1 □ f. SSPC1, SSPC3, SSPC5	None
□	85	Playground equipment - land-based	□ a. NV1 □ f. SSPC5	None
□	86	Landfill construction	□ a. NV1 □ f. SSPC2, SSPC3 □ g. L1, L2	□ a1. NV2
□	87	Aboveground storage tanks	□ a. NNV1 □ f. SSPC2, SSPC3, SSPC5	None
□	88	Underground storage tanks (USTs)	□ a. NV1 □ g. SSPC2, SSPC3, SSPC5	None
■	89	Structure demolition	■ f. SSPC1, SSPC2, SSPC3	■ e. AR1, AR2, AR4, AR5
□	90	Pond closure	□ a. NV1 □ f. SSPC2, SSPC3	None
□	91	Bridge replacement	□ a. NV1 □ f. SSPC3, SSPC5	□ a1. NV2 □ e. AR1, AR2, AR3, AR5,
□	92	Return of remains to former burial sites	□ a. NV1 □ b. HP2	□ b. HP1
□	93	Standard license	□ a. NV1 □ f. SSPC5	None
□	94	Special use license	□ a. NV1	None
□	95	Recreation license	□ a. NV1 □ f. SSPC5	None
□	96	Land use permit	□ a. NV1 □ f. SSPC5	None

STEP 3) Are all project activities limited to Table 1? If **YES**, **STOP HERE**. No Bat Strategy Conservation Measures required. Include this form in environmental documentation (e.g., attach to CEC) and send to batstrategy@tva.gov. If **NO**, proceed to Step 4.....□ **YES** ■ **NO**

STEP 4) Check ALL relevant characteristics below. If **none** apply, **STOP HERE** and check ☐. No Bat Strategy Conservation Measures required. Include form in environmental documentation and send to batstrategy@tva.gov

■ **a**. Project may occur outside, involves human presence, or use of equipment that **generates noise or vibration** (e.g., drilling, blasting, loud machinery).

□ **a1.** Project involves continuous noise (i.e., ≥ 24 hrs) that is >75 decibels measured on A scale (e.g., loud machinery).

□ **b**. Project may involve **human entry into/survey of a potential bat roost** (cave, bridge, other structure).

□ **c**. Project may involve **fire (e.g., prescribed fire, burn piles) or preparation of fire breaks** within 0.25 mi of trees, caves, or water sources. **If prescribed burn**, estimated acreage: _____

□ **d**. Project may involve **tree removal.**
Tree removal may need to occur **outside of winter**.....☐ **YES** ☐ **NO**
Tree removal will occur **only in winter**.....☐ **YES** ☐ **NO**

Estimated number of trees or acres to be removed: _____ □ acres □ trees
If warranted, project has flexibility for bat surveys (May 15-Aug 15):.....□ **MAYBE** □ **YES** □ **NO**

■ **e**. Project may involve **alteration or removal of bridges or other human structures**.

■ **f**. Project may involve land use activities involving **ground disturbance or use of chemicals or fuels** near water sources, wetlands, sinkholes, caves, or exposed limestone/karst.

■ g. Project may involve use of artifical lighting at night.

STEP 5) *Please contact Holly LeGrand or other Bat Strategy support staff for assistance if needed*. For those Activities selected in Table 2: select all Conservation Measures with letters (e.g., a-g) that correspond to characteristics selected in Step 4. If this results in selection of Conservation Measures in the last column of Table 2, a review by a terrestrial zoologist is required. Based on selection of Conservation Measures, does project require review by a terrestrial zoologist? If **YES**, **STOP HERE** and submit form as part of environmental review request; if **NO**, skip to **STEP 16**.....■ **YES** □ **NO**

Terrestrial Zoologist SME Verification (Steps 6-11 will be completed by a terrestrial zoologist if warranted):

STEP 6) Project is within range of: ☑ Gray bat ☐ VA Big-eared bat ☑ Indiana bat ☑ Northern long-eared bat

STEP 7a) Project includes the following:

- □ Removal/burning of suitable trees within 0.5 mile (0.8 km) of P1-P2 Indiana bat hibernacula or 0.25 mile (0.4 km) of P3-P4 Indiana bat hibernacula or any northern long-eared bat hibernacula.
- □ Removal/burning of suitable trees within 10 miles of documented Indiana bat hibernacula or within 5 miles of northern long-eared bat hibernacula.
- □ Removal/burning of suitable trees greater than 10 miles from documented Indiana bat hibernacula or greater than 5 miles from documented northern long-eared bat hibernacula.
- □ Removal/burning of trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity roost tree.
- □ Removal/burning of suitable trees within 2.5 miles of Indiana bat roost trees or within 5 miles of Indiana bat capture sites.
- □ Removal/burning of suitable trees greater than 2.5 miles from Indiana bat roost trees or greater than 5 miles from Indiana bat capture sites.
- □ Removal/burning of documented Indiana bat or northern long-eared bat roost tree, if still suitable.

STEP 7b) Amount of SUITABLE tree/acreage removal or burned (may be different than total amount of removal): N/A □ acres □ trees

STEP 8) Select anticipated date range of burning/tree removal in table below:

STATE	SWARMING	WINTER	NON-WINTER	PUP
GA, KY, TN	□ Oct 15 - Nov 14	□ Nov 15 - Mar 31	□ Apr 1 - May 31, Aug 1- Oct 14	□ Jun 1 - Jul 31
VA	□ Sep 16 - Nov 15	□ Nov 16 - Apr 14	□ Apr 15 - Sep 15	□ Jun 1 - Jul 31
AL	□ Oct 15 - Nov 14	□ Nov 15 - Mar 15	□ Mar 16 - May 31, Aug 1 - Oct 14	□ Jun 1 - Jul 31
NC	□ Oct 15 - Nov 14	□ Nov 15 - Apr 15	□ Apr 16 - May 31, Aug 1 - Oct 14	□ Jun 1 - Jul 31
MS	□ Oct 1 - Nov 14	□ Nov 15 - Apr 14	□ Apr 15 - Sep 30	□ Jun 1 - Jul 31

STEP 9) Presence/absence surveys (visual, mist net, acoustic) were/will be conducted: □ **YES** □ **NO** □ **TBD**

STEP 10) Result of presence/absence surveys (if conducted), on _____ (date): □ **NEGATIVE** □ **POSITIVE** □ **N/A** *NOTES*: No caves within 3 miles. None found during field survey.

STEP 11) ■ Conservation measures have been verified (and modified, if necessary) in Table 2. *NOTES*: During a field review on 2/14/2018, buildings proposed for demolition were identified as suitable roosting habitat for gray bat, Indiana bat, little brown bat, and northern long-eared bat.

Bat Strategy Compliance Verification (Steps 12-15 will be completed by SME/Bat Strategy Support staff):

STEP 12) Project □ **WILL** □ **WILL NOT** require use of Incidental Take in the amount of N/A □ acres or □ trees, proposed to be used during the □ **WINTER** □ **VOLANT** □ **NON-VOLANT** bat season (or ■ **N/A**).

STEP 13) Available Incidental Take as of N/A for N/A (Action):

TVA Action	Total 20-year acreage	Winter Burning/Removal	Volant Season Burning/Removal	Non-Volant Season Burning/Removal

STEP 14) Amount contributed to TVA's Bat Conservation Fund upon activity completion: _____or ■ **N/A**

STEP 15) Project Effects Determinations: ***Gray Bat***:☐NE ☑NLAA ☐N/A;***Virginia Big-eared Bat***:☐NE ☐NLAA ☑N/A ***Northern Long-eared Bat***: ☐NE ☑NLAA ☐LAA ☐N/A; ***Indiana Bat***: ☐NE ☑NLAA ☐LAA ☐N/A

NOTES: Drinking water and foraging habitat for all three bats exists over TN River adjacent to project footprint. During field review, buildings proposed for demolition were identified as suitable roosting habitat for gray bat, Indiana bat, and northern long-eared bat.

TVA's ESA Section 7 Bat Strategy Conservation Measures Required for:

STEP 16) Based on completion of Step 5, select the appropriate Conservation Measures listed in the table below (this will be completed/verified by a Terrestrial Zoologist if a Terrestrial Zoologist review is required) and review the following bullets. Save this form in project environmental documentation AND send a copy of form to batstrategy@tva.gov. Submission of this form is an indication that the Project Lead Eddie Mullinax (name) is (or will be made) aware of the requirements below.

- Implementation of conservation measures identified below is required to comply with TVA's programmatic Endangered Species Act bat consultation.
- Confirmation of completion (e.g., report from contractor, time stamped photos pre and post completion) for Conservation Measures below with an * (as well as any additional confirmation noted here by Terrestrial Zoologist: Bat surveys of buildings need to be performed within same season (see Step 8) as demolition) will be provided to TVA's Bat Strategy Compliance Officer (batstrategy@tva.gov) following completion of activit (ies).
- TVA may conduct post-project monitoring to determine if conservation measures were effective in minimizing or avoiding impacts to federally listed bats.

STEP 17) For projects that require use of Take and/or contribution to TVA's Bat Conservation Fund, please acknowledge the following statement:

□ Project Lead/Contact acknowledges that proposed project will result in use of N/A □ acres/□ trees in Incidental Take and will require N/A contribution to TVA's Conservation Fund upon completion of activity.

	Conservation Measure Acronym	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.
☐	NV2	Drilling, blasting, or any other activity that involves continuous noise (i.e., longer than 24 hours) disturbances greater than 75 decibels measured on the A scale (e.g., loud machinery) within a 0.5 mile radius of documented winter and/or summer roosts (caves, trees, unconventional roosts) will be conducted when bats are absent from roost sites.
☐	NV3	Drilling or blasting within a 0.5 mile radius of documented cave (or unconventional) roosts will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of the roost site.
☐	NV4	Drilling or blasting within 0.5 miles of a documented roost site (cave, tree, unconventional roost) that needs to occur when bats are present will first involve development of project-specific avoidance or minimization measures in coordination with the USFWS.
☐	HP1	Site-specific cases in which potential impact of human presence is heightened (e.g., conducting environmental or cultural surveys within a roost site) will be closely coordinated with staff bat biologists to avoid or minimize impacts below any potential adverse effect. Any take from these activities would be covered by TVA's Section 10 permit.
☐	HP2	Entry into roosts known to be occupied by federally listed bats will be communicated to the USFWS when impacts to bats may occur if not otherwise communicated (i.e., via annual monitoring reports per TVA's Section 10 permit). Any take from these activities would be covered by TVA's section 10 permit.
☐	SHF1	Fire breaks will be used to define and limit burn scope.
☐	SHF2	Site-specific conditions (e.g., acres burned, transport wind speed, mixing heights) will be considered to ensure smoke is limited and adequately dispersed away from caves so that smoke does not enter cave or cave-like structures.
☐	SHF3	Acreage will be divided into smaller units to keep amount of smoke at any one

		time or location to a minimum and reduce risk for smoke to enter caves.
☐	SHF4	If burns need to be conducted during April and May, when there is some potential for bats to present on the landscape and more likely to enter torpor due to colder temperatures, burns will only be conducted if the air temperature is 55° or greater, and preferably 60° or greater.
☐	SHF5	Fire breaks will be plowed immediately prior to burning, will be plowed as shallow as possible, and will be kept to minimum to minimize sediment.
☐	SHF6	Tractor-constructed fire lines will be established greater than 200 feet from cave entrances. Existing logging roads and skid trails will be used where feasible to minimize ground disturbance and generation of loose sediment.
☐	SHF7	Burning will only occur if site specific conditions (e.g. acres burned, transport wind speed, mixing heights) can be modified to ensure that smoke is adequately dispersed away from caves or cave-like structures. This applies to prescribed burns and burn piles of woody vegetation.
☐	SHF8	Brush piles will be burned a minimum of 0.25 mile from documented, known, or obvious caves or cave entrances and otherwise in the center of newly established ROW when proximity to caves on private land is unknown.
☐	SHF9	A 0.25 mile buffer of undisturbed forest will be maintained around documented or known gray bat maternity and hibernation colony sites, documented or known Virginia big-eared bat maternity, bachelor, or winter colony sites, Indiana bat hibernation sites, and northern long-eared bat hibernation sites. Prohibited activities within this buffer include cutting of overstory vegetation, construction of roads, trails or wildlife openings, and prescribed burning. Exceptions may be made for maintenance of existing roads and existing ROW, or where it is determined that the activity is compatible with species conservation and recovery (e.g., removal of invasive species).
☐	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.
☐	TR2	Removal of suitable summer roosting habitat within 0.5 mile of Priority 1/Priority 2 Indiana bat hibernacula, or 0.25 mile of Priority 3/Priority 4 Indiana bat hibernacula or any northern long-eared bat hibernacula will be prohibited, regardless of season, with very few exceptions (e.g., vegetation maintenance of TL ROW immediately adjacent to a known cave).
☐	TR3*	Removal of suitable summer roosting habitat within documented bat habitat (i.e., within 10 miles of documented Indiana bat hibernacula, within five miles of documented northern long-eared bat hibernacula, within 2.5 miles of documented Indiana bat summer roost trees, within five miles of Indiana bat capture sites, within one mile of documented northern long-eared bat summer roost trees, within three miles of northern long-eared bat capture sites) will be tracked, documented, and included in annual reporting. 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.
☐	TR5	Removal of any trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity summer roost tree during non-winter season, range-wide pup season or swarming season (if site is within known swarming habitat), will first require a site-specific review and assessment. If pups are present in trees to be removed (determined either by mist netting and assessment of adult females, or by visual assessment of trees following evening emergence counts),

		TVA will coordinate with the USFWS to determine how to minimize impacts to pups to the extent possible. May include establishment of artificial roosts before removal of roost tree(s).
☐	TR6	Removal of a documented Indiana bat or northern long-eared bat roost tree that is still suitable and that needs to occur during non-winter season, range-wide pup season, or swarming season (if site is within known swarming habitat) will first require a site-specific review and assessment. If pups are present in trees to be removed (determined either by mist netting and assessment of adult females, or by visual assessment of trees following evening emergence counts), TVA will coordinate with USFWS to determine how to minimize impacts to pups to the extent possible. This may include establishment of artificial roosts before removal of roost tree(s).
☐	TR7	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.
☐	TR8	Requests for removal of hazard trees on or adjacent to **TVA reservoir land** will be inspected by staff knowledgeable in identifying hazard trees per International Society of Arboriculture and TVA's checklist for hazard trees. Approval will be limited to trees with a defined target.
☐	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 continuing to carry out TVA's broad mission and responsibilities.
☑	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: o 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. o 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. o Features with high-medium likelihood of harboring bats but cannot be checked visually include soffits, cavity walls, space between roof covering and roof lining. o 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: ▪ 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 o 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). o Bat surveys usually are NOT needed in the following circumstances: ▪ 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.
☑	AR2	Additional bat P/A surveys (e.g., emergence counts) conducted if warranted (i.e., when AR1 indicates that bats may be present).
☐	AR3	Bridge survey protocols will be implemented, either by permittee (e.g., state DOT biologists) or qualified personnel. If a bridge is determined to be in use as an unconventional roost, subsequent protocols will be implemented.
☑	AR4	Removal of buildings with suitable roost characteristics within six miles of known or presumed occupied roosts for Virginia big-eared bat would occur between Nov 16 and Mar 31. Buildings may be removed other times of the year once a bat biologist evaluates a buildings' potential to serve as roosting habitat and determines that this species is not present and/or is not using structure(s).
☑	AR5	If evidence of bat use warrants seasonal modification or removal, TVA will carry out or recommend (i.e., to applicants) seasonal modification or removal. Risk to human safety, however, should take priority. For project-specific cases in which project is unable to accommodate seasonal modification or removal, and federally listed bat species are present, TVA will carry out or recommend consultation with the USFWS to determine the best approach in the context of the project-specific circumstance. This may include establishment of artificial roosts before demolition of structures with bats present.
☐	SSPC1	**Transmission actions and activities** will continue to Implement A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities. This focuses on control of sediment and pollutants, including herbicides. Following are key measures: o BMPs to minimize erosion and prevent/control water pollution in accordance with state-specific construction storm water permits. BMPS are designed to keep soil in place and aid in reducing risk of other pollutants reaching surface waters, wetlands and ground water. BMPs will undertake the following principles: ▪ Plan clearing, grading, and construction to minimize area and duration of soil exposure. ▪ Maintain existing vegetation wherever and whenever possible. ▪ Minimize disturbance of natural contours and drains. ▪ As much as practicable, operate on dry soils when they are least susceptible to structural damage and erosion. ▪ Limit vehicular and equipment traffic in disturbed areas. ▪ Keep equipment paths dispersed or designate single traffic flow

		paths with appropriate road BMPs to manage runoff. ▪ Divert runoff away from disturbed areas. ▪ Provide for dispersal of surface flow that carries sediment into undisturbed surface zones with high infiltration capacity and ground cover conditions. ▪ Prepare drainage ways and outlets to handle concentrated/increased runoff. ▪ Minimize length and steepness of slopes. Interrupt long slopes frequently. ▪ Keep runoff velocities low and/or check flows. ▪ Trap sediment on-site. ▪ Inspect/maintain control measures regularly and after significant rain. ▪ Re-vegetate and mulch disturbed areas as soon as practical. o Application of herbicide is in compliance with USEPA, state water quality standards, and state permits. Areas in which covered species are known to occur on existing transmission line ROW are depicted on referenced, applicable spreadsheets and include guidelines to follow for impact minimization or avoidance. During pre-job briefings, the ROW Forester will review location of resources with contractors and provide guidelines and expectations from TVA's BMP Manual (Appendix O). Herbicides labeled for aquatic use are utilized in and around wetlands, streams, and SMZs. Unless specifically labeled for aquatic use, measures are taken to keep herbicides from reaching streams whether by direct application or through runoff or flooding by surface water. Hand application of certain herbicides labeled for use within SMZs is used only selectively. o Specific guidelines regarding sensitive resources and buffer zones: ▪ Extra precaution (wider buffers) within SMZs is taken to protect stream banks and water quality for streams, springs, sinkholes, and surrounding habitat. ▪ BMPs are implemented to protect and enhance wetlands. Select use of equipment and seasonal clearing is conducted when needed for rare plants; construction activities are restricted in areas with identified rare plants. ▪ Standard requirements exist to avoid adverse impacts to caves, protected animals, and unique and important habitat (e.g., protective buffers around caves, restricted herbicide use, seasonal clearing of suitable habitat).
☑	SSPC2	Operations involving chemical/fuel storage or resupply and vehicle servicing will be handled outside of riparian zones (streamside management zones) in a manner to prevent these items from reaching a watercourse. Earthen berms or other effective means are installed to protect stream channel from direct surface runoff. Servicing will be done with care to avoid leakage, spillage, and subsequent stream, wetland, or ground water contamination. Oil waste, filters, other litter will be collected and disposed of properly. Equipment servicing and chemical/fuel storage will be limited to locations greater than 300-ft from sinkholes, fissures, or areas draining into known sinkholes, fissures, or other karst features.
☑	SSPC3	**Power Plant actions and activities** will continue to implement standard environmental practices. These include: o 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 o 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 o Storm Water Pollution Prevention (SWPP) Pollution Control Strategies ▪ Minimize storm water contact with disturbed soils at the 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 (>1 acre) o Every site has a Spill Prevention and Control Countermeasures (SPCC) Plan and requires training. Several hundred pieces of equipment often managed at the same time on power generation properties. Goal is to minimize fuel and chemical use
☐	SSPC4	Woody vegetation burn piles associated with **transmission construction** will be placed in the center of newly established ROWs to minimize wash into any nearby undocumented caves that might be on adjacent private property and thus outside the scope of field survey for confirmation. Brush piles will be burned a minimum of 0.25 miles from documented caves and otherwise in the center of newly established ROW when proximity to caves on private land is unknown.
☐	SSPC5	**Section** 26a permits and contracts associated with **solar projects**, **economic development projects** or land use projects include standards and conditions that include standard BMPs for sediment and contaminants as well as measures to avoid or minimize impacts to sensitive species or other resources consistent with applicable laws and Executive Orders.
☐	SSPC6	Herbicide use will be avoided within 200 ft of portals associated with caves, cave collapse areas, mines and sinkholes that are capable of supporting cave-associated species. Herbicides are not applied to surface water or wetlands unless specifically labeled for aquatic use. Filter and buffer strips will conform at least to federal and state regulations and any label requirements.
☐	SSPC7	Clearing of vegetation within a 200-ft radius of documented caves will be limited to that conducted by hand or small machinery clearing only (e.g., chainsaws, bush-hog, mowers). This will protect potential recharge areas of cave streams and other karst features that are connected hydrologically to caves.
☑	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).

[1]Bats 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).

Appendix C – Visual Resources

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Appendix C
Visual Resources

Scenic visibility of a landscape may be described in terms of three distance contexts: (1) foreground, (2) middleground and (3) background. In the foreground, an area within 0.5 mi of the observer, individual details of specific objects are important and easily distinguished. In the middleground, from 0.5 to 4 mi from the observer, object characteristics are 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 mi from the observer. Visual and aesthetic impacts associated with a particular action may occur as a result of the introduction or removal of a feature that is not consistent with the existing viewshed. Consequently, the character of an existing site is an important factor in evaluating potential visual impacts (TVA 2016b).

Visual resources were evaluated based on physical characteristics of the area, including topography, aerial photography, site inspection, vegetation, existing land uses, and distance from the project location. A viewshed map for the project study area was prepared using 30-meter resolution USGS digital elevation model (DEM) data obtained from the USGS. The project study area extent was defined as an area approximately a four mile radius from the JOF. To account for screening from vegetation, a base vegetation layer was created from the USGS 2011 National Land Cover Dataset (NLCD). This dataset characterizes land-cover into 16 classes. Those areas classified as deciduous forest, evergreen forest and mixed forest were assigned an assumed tree height of 30 feet. Areas of woody wetlands were assigned a vegetation height of 10 feet, while emergent herbaceous wetlands and shrub/scrub areas were assigned a height of 5 feet.

The vegetation heights were added to the ground surface elevations in the DEM to produce a surface model (DSM). Using Esri ArcGIS® software with the Spatial Analyst extension, a visibility analysis was run assuming a viewer height of six feet, a maximum stack height of 600 feet, and a plant layout map showing any large structures which may also be visible. The visibility analysis program calculates the visibility by reading every cell in the DSM and assigns a value based upon the existence of a direct unobstructed line of sight to the stack or other tall object. Each cell is then assigned a numeric value based on whether the JOF is visible. A value of zero is assigned to those cells which have obstructed views. Once the viewshed analysis was completed, the areas covered by forest vegetation as previously defined were assigned a visibility code of zero. The viewshed map shows the results of this analysis. It is important to note that screening provided by buildings or small forested areas such as yard trees or wind breaks are not included and may provide additional screening.

Figure C-1 shows the viewshed map of the JOF area indicating locations from where the JOF might be seen (in yellow). Sensitive visual receptors, including parks, places of worship, cemeteries, schools, and medical centers were identified within the middleground viewing distance of the proposed closures and landfill project sites. Using Google Street View ®, GIS aerial photography and elevation data, representative views of the site were identified for photographing. Figure C-1 shows the location of these photo locations. Table C-1 lists the location addresses.

Table C-1: Photo locations

Location ID	Location Name	Location Type	Address
1	CL Edwards Memorial Park	Recreation	414 Ashe Ave, New Johnsonville, TN 37134
2	Lakeview Elementary School	School	802 Long St, New Johnsonville, TN 37134
3	New Johnsonville Boat Ramp	Recreation	Broadway Ave, New Johnsonville, TN 37134
4	Beaver Dam Restaurant & Marina	Recreation	1280 Lodge Rd, Camden, TN 38320
5	Eva Park	Recreation	Eva Beach Dr, Eva, TN
6	Lakeshore Camp & Retreat Center	Recreation	1458 Pilot Knob Rd, Eva, TN 38333
7	New Johnsonville City Hall	Municipal	323 Long St, New Johnsonville, TN 37134
8	Cut Off Road, New Johnston, TN	Reference	Cut Off Road
9	Duck River Unit NWR	Recreation	Auto Road In NWR

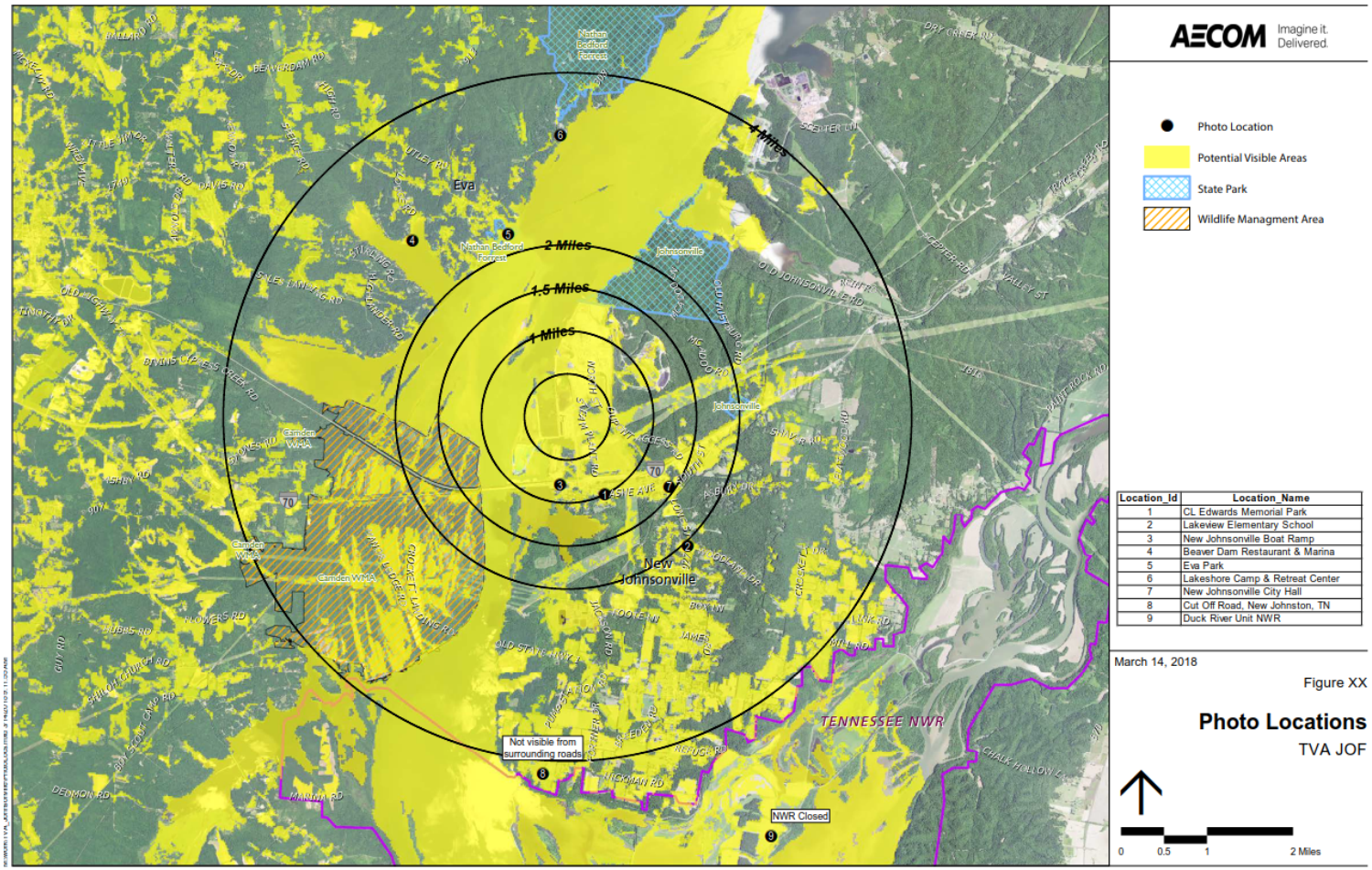

Figure C-1: The viewshed map including identified photograph locations.

Location 1 is just south of Broadway Ave. on 414 Ashe Ave. and is approximately one mile southeast of the site, looking northeast towards the plant (329 degrees from north). The 600-foot stack is visible in the background in the center of the photograph.

Existing conditions at Location 1.

Location 1 with the stack removed. Although the view is slightly improved without the stack, there is no significant visual difference between the photographs.

Location 2 is from Lakeview Elementary School located at 802 Long St., two miles southeast of the site. Here only the stack is barely visible through the trees.

Existing conditions at Location 2.

Location 2 with the stack removed. As the stack is barely visible in this view, there is no significant visual difference between the photographs.

Location 3 is from the New Johnsonville Boat Ramp, 0.75 miles south-southwest of the plant on Broadway Ave. The photo was taken looking northeast at the stacks (27 degrees from north). Only the upper portion of the 600 foot stack is visible.

Existing conditions at location 3.

Location 3 with the stack removed. Although the view is slightly improved without the stack, there is no significant visual difference between the photographs. Additionally, due to the quality of the view, consisting of a raised road and asphalt driveway, major improvements are not discernible.

Location 4 is about 3 miles northwest of the site at Beaver Dam Restaurant and Marina located at 1280 Lodge Road. Here, the stack is clearly visible in the background in the center of the photograph. The upper portion of the powerhouse is also visible to the right of the stack.

Existing conditions at Location 4.

Location 4 without the JOF stack and powerhouse. Although the view is somewhat improved without the industrial objects in the background, due to the distance and the intervening trees and dock, the improvement is not significant.

Location 5 is about 2.2 miles north-northwest of the site at Eva Park Waterfront. The photograph was taken looking south-southeast (130 degrees from north). The stack and the powerhouse are visible in the center of the photograph.

Existing conditions at Location 5.

Location 5 with the stacks removed. Although the view is improved with the removal of the stack and powerhouse, due to the distance, the change would be minor. This is the location which would receive the most beneficial impacts to visual resources; however, these impacts would still be minor.

Location 6 is located about 3.5 miles north of the site at Lakeshore Camp and Retreat Center on Pilot Knob Rd. The photograph was taken looking south (180 degrees from north) at the stack. From this location the stack is barely visible through the trees.

Existing Conditions at Location 6.

Location 6 with the stack removed. No impacts to visual resources at this location would be anticipated as the stack is barely visible due to the intervening trees.

Location 7 is located 1.5 miles southeast of the project at New Johnsonville City Hall on Long St. The photograph was taken looking northwest (302 degrees from north) towards the site. Here the top three-quarters of the stack is visible behind the house with the red roof.

Existing conditions at Location 7.

Location 7 with the stack removed. Although a minor improvement in the view would occur, due to the distance and the intervening object, this would be an insignificant impact.

Location 8 is located about 4.1 miles south of the site on Cutoff Rd. The photograph was taken looking due north towards the site. The stack was not visible from this photo location or the surrounding general vicinity.
 Existing conditions at Location 8.
As the stack is not visible from this location, no impacts to visual resources would occur.

Photographs were not able to be taken from Location 9. Location 9 is located within the Duck River Unit National Wildlife Refuge (NWR) on Auto Road. The NWR was closed and all entrance gates were locked. Below is a photo of the locked main entrance.

References:

TVA. 2016c. Final Ash Impoundment Closure Environmental Impact Statement Part I – Programmatic NEPA Review. June 2016.

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Appendix D – Cultural Resources Consultation

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Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

January 25, 2018

To Those Listed:

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 federally-recognized Indian tribes and the Tennessee State Historic Preservation Office (SHPO) 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 SHPO agreed that the construction, maintenance, and additions at JOF since the 1950s rendered the archaeological APE void of intact archaeological sites. No consulted tribe disagreed with that finding, or identified historic properties in the APE. Our background research for the current undertaking also leads to the conclusion that no archaeological sites are present in the APE. Therefore, TVA finds that the proposed retirement of JOF would affect no archaeological sites.

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. SHPO agreed and no consulted tribe objected. 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 the following 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: Absentee Shawnee Tribe of Oklahoma, Cherokee Nation, Chickasaw Nation, Coushatta Tribe of Louisiana, Eastern Band of Cherokee Indians, Eastern Shawnee Tribe of Oklahoma, Kialegee Tribal Town, Muscogee (Creek) Nation, Shawnee Tribe, Thlopthlocco Tribal Town, and the United Keetoowah Band of Cherokee Indians in Oklahoma,.

By this letter, TVA is providing notification of these findings and is seeking your comments regarding any properties that may be of religious and cultural significance and may be eligible for listing in the NRHP pursuant to 36CFR § 800.2 (c)(2)(ii), 800.3 (f)(2), and 800.4 (a)(4)(b).

Please respond by February 24, 2018 if you have any comments on the proposed undertaking. If you have any questions, please contact me by phone at (865) 632-6461, or by email at pbezzell@tva.gov.

Sincerely,

Pat Bernard Ezzell

Patricia Bernard Ezzell
Tribal Relations and Corporate Historian
Communications

SCC:ABM
Enclosures
cc (Enclosures):

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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Kerr, Jonathan P.
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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.

IDENTICAL LETTER MAILED TO THE FOLLOWING ON JANUARY 25, 2018:

Ms. Holly Austin (NHPA)
Federal Cultural Resource Law Liaison
Tribal Historic Preservation Office
Eastern Band of Cherokee Indians
Post Office Box 455
Cherokee, North Carolina 28719

cc: Mr. Russell Townsend
Tribal Historic Preservation Officer
Eastern Band of Cherokee Indians
Post Office Box 455
Cherokee, North Carolina 28719

Mr. Brett Barnes
Tribal Historic Preservation Officer
Eastern Shawnee Tribe of Oklahoma
127 West Oneida
Seneca, Missouri 64865

Ms. Karen Brunso
Tribal Historic Preservation Officer
Division of Historic Preservation
Department of Culture & Humanities
The Chickasaw Nation
Post Office Box 1548
Ada, Oklahoma 74821-1548

Ms. RaeLynn Butler
Manager
Historic & Cultural Preservation Department
Muscogee (Creek) Nation
Post Office Box 580
Okmulgee, Oklahoma 74447

cc: Ms. Corain Lowe-Zepeda
Tribal Historic Preservation Officer
Historic & Cultural Preservation Department
Muscogee (Creek) Nation
Post Office Box 580
Okmulgee, Oklahoma 74447

Mr. Terry Clouthier
Thlopthlocco Tribal Town
Tribal Historic Preservation Officer
Post Office Box 188
Okemah, Oklahoma 74859

Mr. David Cook
Tribal Administrator
Kialegee Tribal Town
Post Office Box 332
Wetumka, Oklahoma 74883

Dr. Linda Langley
Tribal Historic Preservation Officer
Coushatta Tribe of Louisiana
Post Office Box 10
Elton, Louisiana 70532

Ms. Karen Pritchett
Tribal Historic Preservation Officer
United Keetoowah Band of Cherokee Indians in Oklahoma
Post Office Box 1245
Tahlequah, Oklahoma 74465

Ms. Erin Thompson
Tribal Historic Preservation Officer
Absentee-Shawnee Tribe of Oklahoma
2025 S. Gordon Cooper Drive
Shawnee, Oklahoma 74801

Ms. Tonya Tipton
Shawnee Tribe
Post Office Box 189
Miami, Oklahoma 74355

Ms. Elizabeth Toombs
Cherokee Nation
Post Office Box 948
Tahlequah, Oklahoma 74465

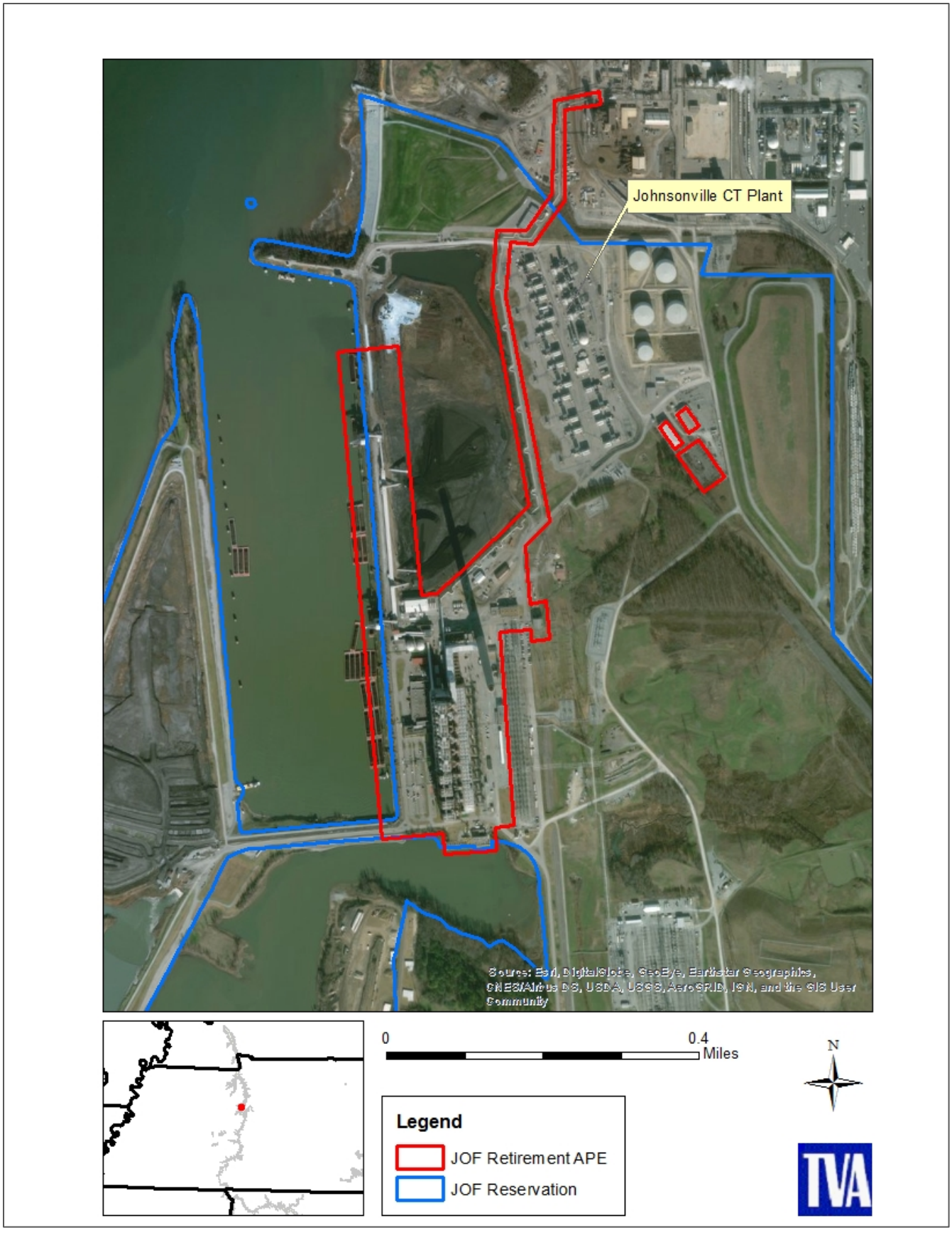

Figure 1. JOF Reservation (TVA fee-owned) and JOF Deconstruction APE.

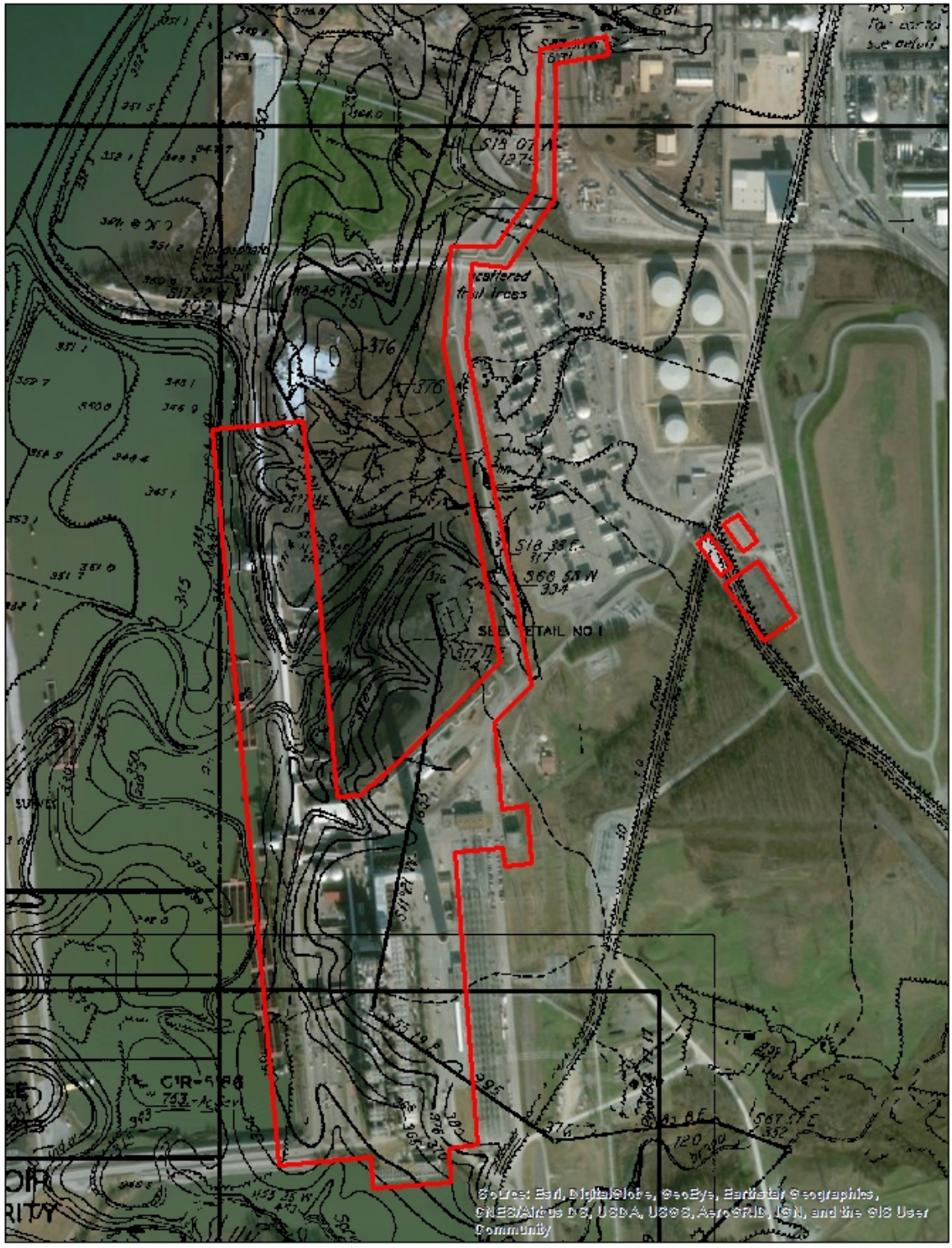

Figure 2. TVA's 1937 land acquisition map for Kentucky Reservoir, overlaid on the archaeological APE.

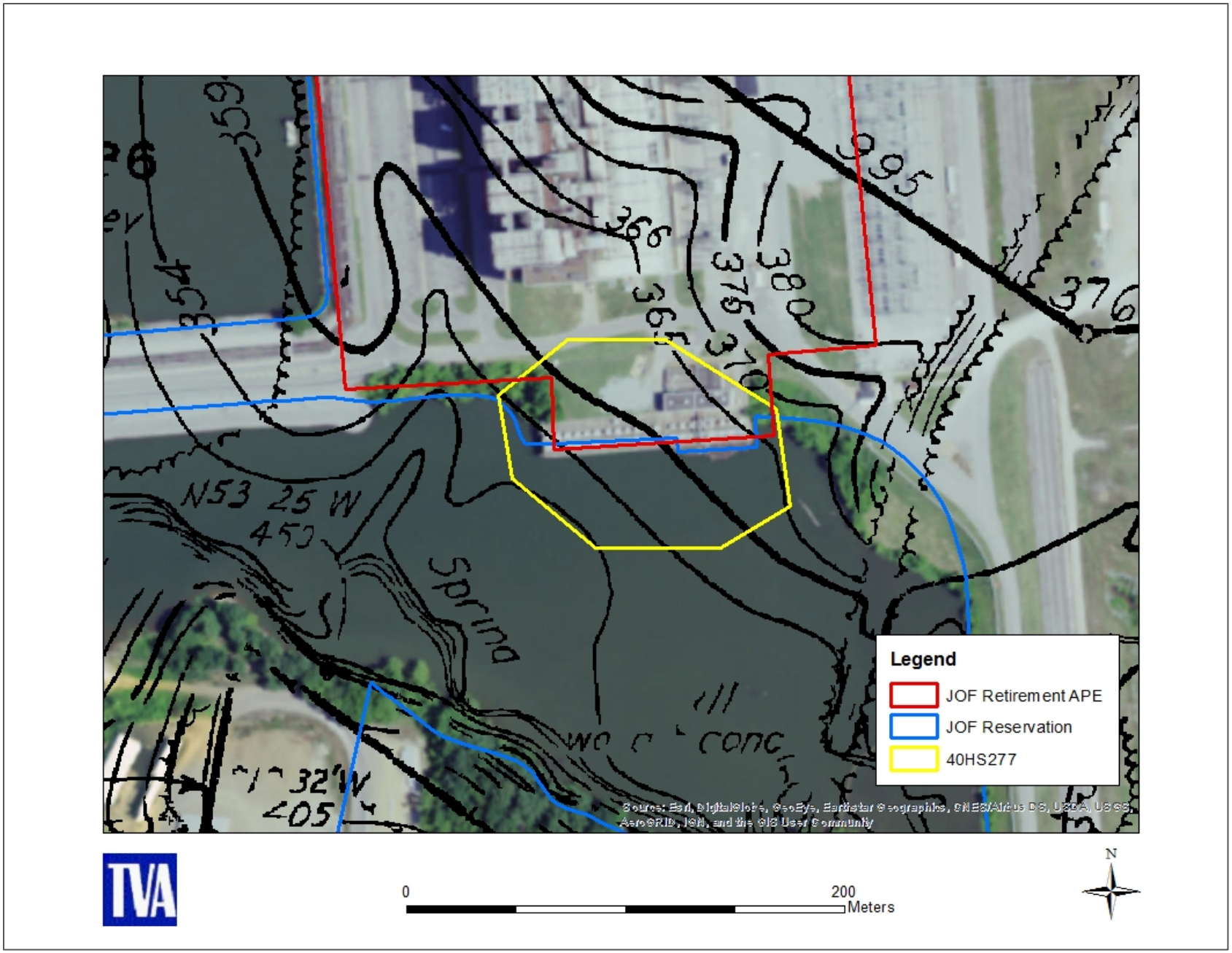

Figure 3. Recorded location of 40HS277, currently occupied by the JOF condenser water intake and water treatment plant. Overlay shows TVA's 1937 land acquisition map, with original contours. Normal summer pool elevation of Kentucky Reservoir is 359 feet amsl.

Tennessee 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.

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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.

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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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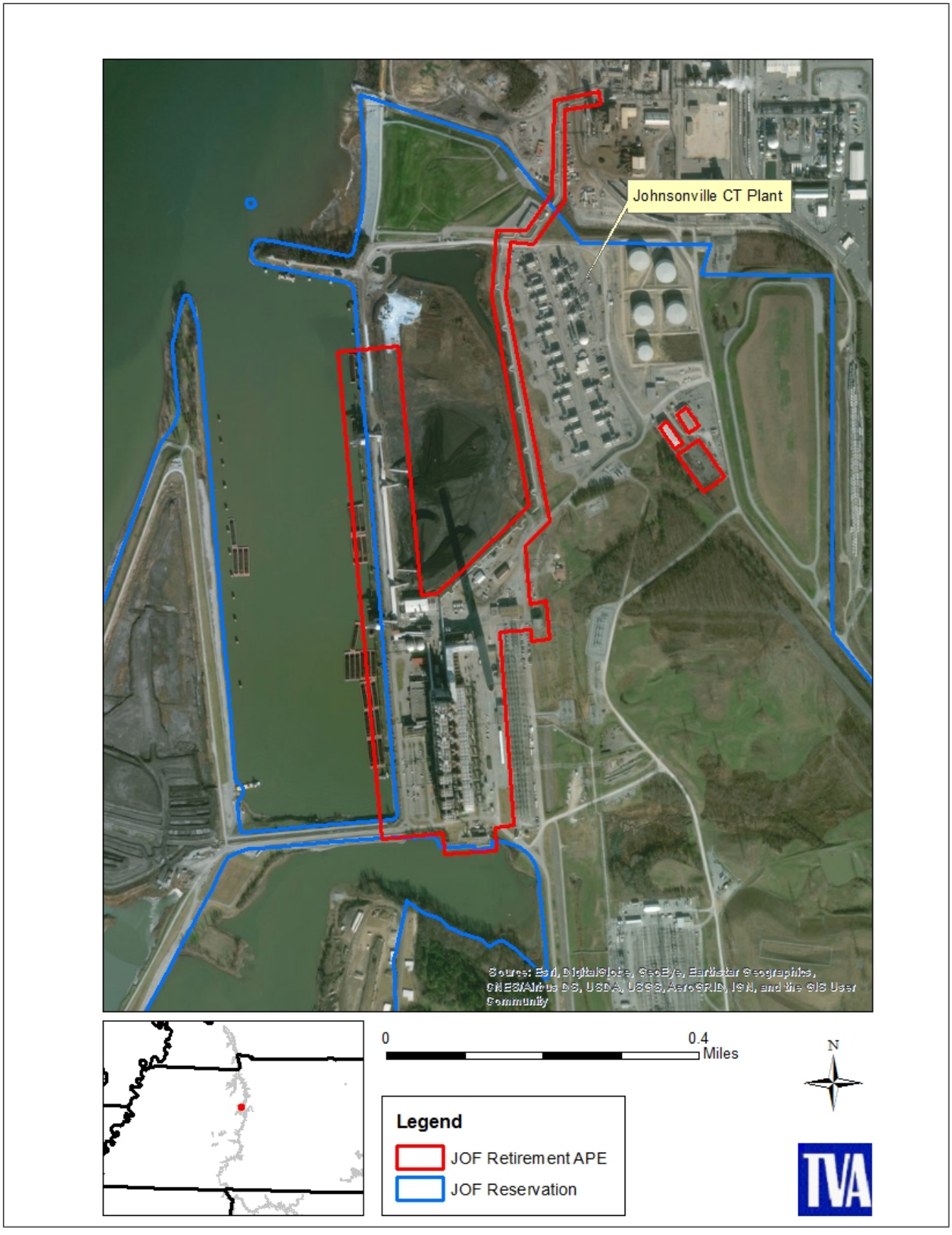
INTERNAL COPIES ONLY, NOT TO BE INCLUDED WITH OUTGOING LETTER:

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



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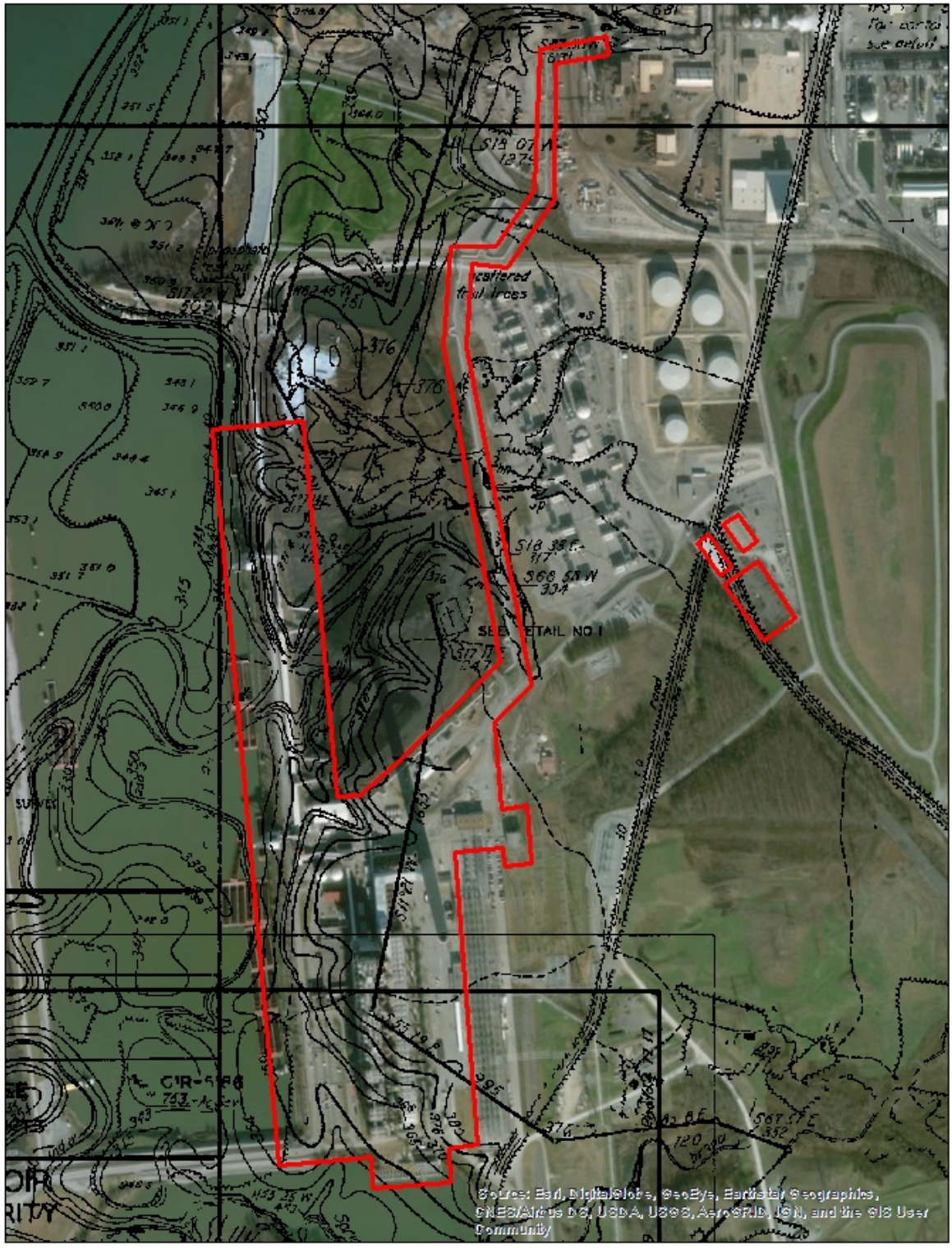

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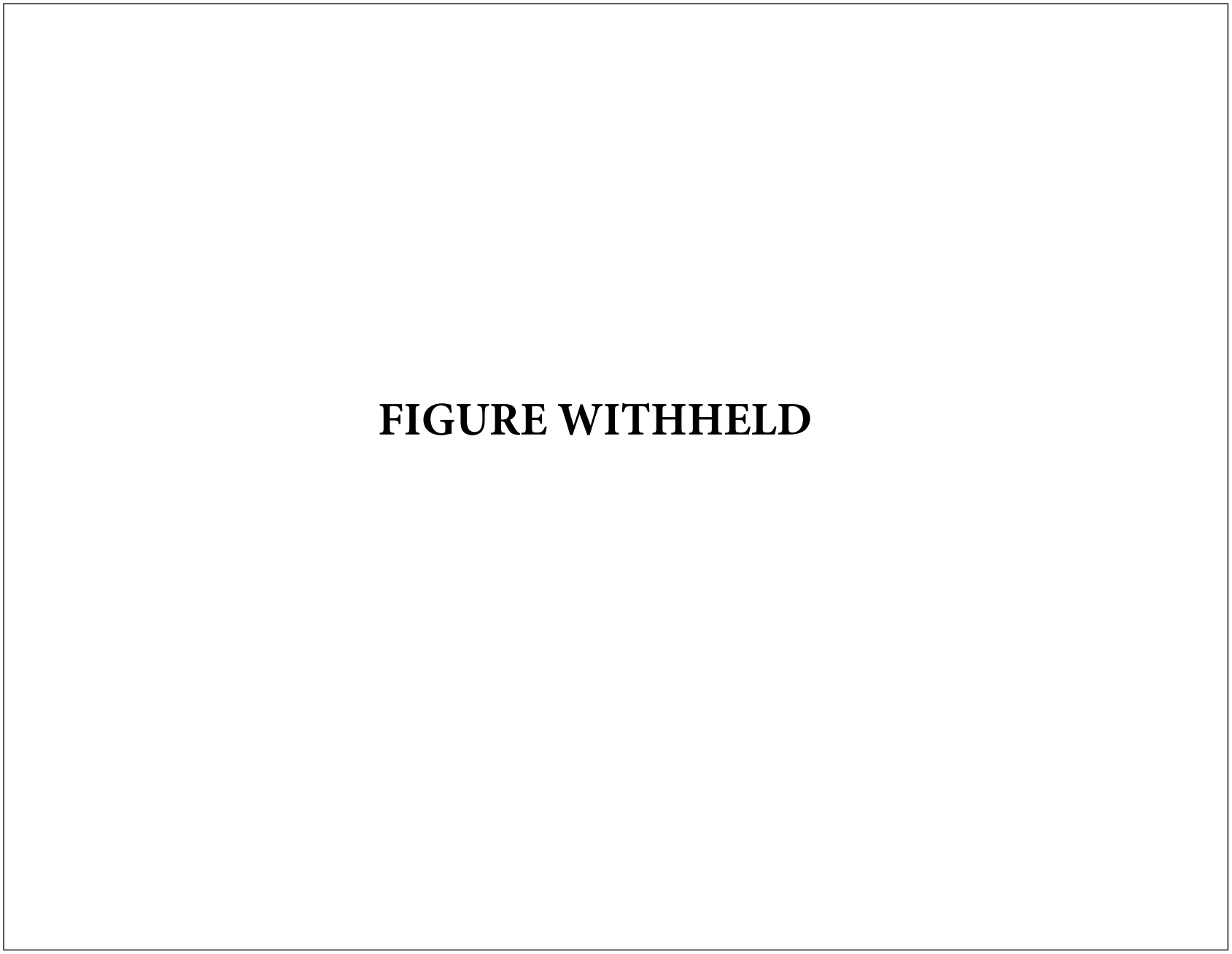

Figure 3.

From:	Ezzell, Patricia Bernard
To:	Shuler, Marianne M; Wells, Edward William III; Cole, Steve C; McCampbell, Amy Boardman
Subject:	FW: TVA, Johnsonville Fossil Plant Deconstruction, Humphreys County, Tennessee
Date:	Tuesday, January 30, 2018 2:54:57 PM
Attachments:	image001.jpg image002.png image003.jpg image004.jpg image005.jpg image006.jpg image007.jpg image008.jpg image009.jpg

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Comments from Shawnee Tribe.

From: tonya@shawnee-tribe.com [mailto:tonya@shawnee-tribe.com]
Sent: Tuesday, January 30, 2018 2:53 PM
To: Ezzell, Patricia Bernard
Subject: RE: TVA, Johnsonville Fossil Plant Deconstruction, Humphreys County, Tennessee

This letter is in response to the above referenced project.
The Shawnee Tribe's Tribal Historic Preservation Department concurs that no known historic properties will be negatively impacted by this project.
We have no issues or concerns at this time, but in the event that archaeological materials are encountered during construction, use, or maintenance of this location, please re-notify us at that time as we would like to resume immediate consultation under such a circumstance.
If you have any questions, you may contact me via email at tonya@shawnee-tribe.com
Thank you for giving us the opportunity to comment on this project.
Sincerely,
Tonya Tipton THPO
Shawnee Tribe

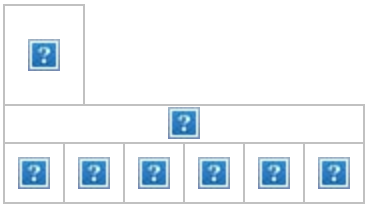
From: Ezzell, Patricia Bernard [mailto:pbezzell@tva.gov]
Sent: Thursday, January 25, 2018 4:09 PM
To: ethompson@astribe.com; elizabeth-toombs@cherokee.org; HPO@chickasaw.net; 'Llangley@coushatta.org' <Llangley@coushatta.org>; Jonas John <jonasj@coushattatribela.org>; 'Michael Tarpley' <kokua.aina57@gmail.com>; hollymaustin94@gmail.com; BBarnes@estoo.net; dc13.dc4@gmail.com; 'section106@mcn-nsn.gov' <section106@mcn-nsn.gov>; Tonya Tipton (tonya@shawnee-tribe.com) <tonya@shawnee-tribe.com>; 'THPO' <thpo@tttown.org>; 'karen pritchett' <kpritchett@ukb-nsn.gov>
Cc: Stephen Yerka <syerka@nc-cherokee.com> (syerka@nc-cherokee.com) <syerka@nc-cherokee.com>; 'Russell Townsend' <RussellT@nc-cherokee.com>; David.Cook@kialegeetribe.net
Subject: TVA, Johnsonville Fossil Plant Deconstruction, Humphreys County, Tennessee
Good Afternoon,
Please find the attached letter regarding TVA's proposal to deconstruct JOF with the goal of

developing the site as a brownfield.
The referenced figures are part of the attachment.
Please let me know if you have any questions, and please provide any comments on the proposed undertaking no later than February 24, 2018.
Thank you.
Sincerely,
Pat

Pat Bernard Ezzell
Senior Program Manager and Federal Preservation Officer
Community Relations

Tennessee Valley Authority
400 W. Summit Hill Drive
Knoxville, TN 37902

(865) 632-6461 (w)
(865) 806-0370 (m)
pbezzell@tva.gov



Absentee Shawnee Tribe of Oklahoma
Cultural/Tribal Historic Preservation Department
2025 S. Gordon Cooper Dr.
Shawnee, Oklahoma 74801
Phone: (405) 275-4030 ext 6340

1/30/18

RE: JOHNSONVILLE FOSSIL PLANT DECONSTRUCTION, HUMPHREYS COUNTY, TENNESSEE

To Whom It May Concern:

This response is regarding the request from your office for a review of the project listed above. We have reviewed the information provided in your letter of January 25, 2018. We find after review of this information that we concur with your findings of no adverse effects. We have no objection to the project in Humphreys County, Tennessee, and we defer comment to your office as well as to the State Historic Preservation Office and/or the State Archaeologist.

We remain interested in further communications regarding this project due to the location. The Shawnee people have a documented historical presence in Tennessee. While there are no documented village sites within the project site or within a close proximity outside the project site, there still remains the potential of finding unknown sites in and surrounding the project location.

It is further advised that if the area of potential effect changes or in the event of an inadvertent discovery of human remains or other cultural resources that we receive notification within 48 hours. As well, any advertent discovery of human remains or other cultural resources should remain in situ until consultation with interested tribes and agencies is undertaken.

Thank you for your time and patience in communications regarding section 106 and NAGPRA issues. We appreciate your continued efforts in such matters. Please do not hesitate to contact me at the information below if you have any questions or concerns.

Best Regards,

Erin Thompson
Tribal Historic Preservation Officer
Absentee Shawnee Tribe of Oklahoma
2025 Gordon Cooper Drive
Shawnee, OK 74801
(P) 405.275.4030 Ext. 6340
ethompson@astribe.com

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

February 15, 2018

Ms. Pat Bernard Ezzell, Senior Program Manager
Tribal Relations and Corporate History
Tennessee Valley Authority
400 West Summit Hill Drive
460 WT 7D-K
Knoxville, TN 37902

Dear Ms. Ezzell:

Thank you for the letters of notification of the proposed projects delineated in the attached table. We accept the invitation to consult under Section 106 of the National Historic Preservation Act.

The Chickasaw Nation supports the proposed undertakings and is not presently aware of any specific historic properties, including those of traditional religious and cultural significance, in the project area. In the event the agency becomes aware of the need to enforce other statutes, we request to be notified under ARPA, AIRFA, NEPA, NAGPRA, NHPA and Professional Standards.

Your efforts to preserve and protect significant historic properties are appreciated. If you have any questions, please contact Ms. Karen Brunso, tribal historic preservation officer, at (580) 272-1106 or at karen.brunso@chickasaw.net.

Sincerely,

Lisa John, Secretary
Department of Culture and Humanities

cc: pbezzell@tva.gov

Enclosure

THE
MUSCOGEE (CREEK) NATION

HIstoric and Cultural Preservation
P.O. Box 580
Okmulgee, OK 74447
T: 918.732.7733 F: 918-.758-0649

JAMES R. FLOYD
PRINCIPAL CHIEF
LOUIS A. HICKS
SECOND CHIEF

February 19, 2018

Patricia Bernard Ezzell
Senior Program Manager and Federal Preservation Officer
Community Relations
Tennessee Valley Authority
400 W Summit Hill Drive
Knoxville, TN 37902

RE: TVA Proposal to Deconstruct Johnsonville Fossil Plant, Humphreys County, Tennessee

Ms. Ezzell,

Thank you for the correspondence to the Muscogee (Creek) Nation regarding the proposal to deconstruct Johnsonville Fossil Plant with the goal of developing the site as a brownfield. This project is located in Humphreys County, Tennessee. Humphreys County is located in the Muscogee (Creek) Nation's historical area of interest and we would like to consult on this project.

After reviewing this undertaking, we are unaware of any Muscogee cultural resources or sacred sites located in the immediate project area. We recommend a finding of "no Effect" to historic properties and work should proceed as planned. However, if artifacts or archaeological features are encountered during project activities, work shall cease and our office shall be consulted immediately. This can include but are not limited to arrowheads, broken pieces of pottery or glass, stone implements, metal fasteners or tools, human remains, etc. Archaeological features are stains in the soil that indicate disturbance by human activity. Some examples are post holes, building foundations, trash pits, and human burial. These stipulations should be placed on the construction plans to insure contractors are aware of it. Any changes to the approved scope of work for this project will require re-submission to, and evaluation and approval by the Muscogee (Creek) Nation prior to initiation of any work for compliance with Section 106. If you have any questions, please let us know.

Thank you.

Ms Corain Lowe-Zepeda
Tribal Historic Preservation Officer
Historic and Cultural Preservation Department
Muscogee (Creek) Nation
P.O. Box 580 I Okmulgee, OK 74447
T: 918-732-7835
Email: clowe@mcn-nsn.gov

Eastern Band of Cherokee Indians
Tribal Historic Preservation Office
P.O. Box 455
Cherokee, NC 28719
Ph: 828-359-6854 Fax 828-359-0424

DATE: 23 – February – 2018

TO: Tennessee Valley Authority
ATTN: Patricia Bernard Ezzell
400 West Summit Hill Drive
Knoxville, TN 37902

PROJECT: Johnsonville Fossil Plant Deconstruction, Humphreys County, Tennessee.

Program Manager Ezzell:

The Tribal Historic Preservation Office of the Eastern Band of Cherokee Indians (EBCI THPO) accepts the invitation to comment on this proposed section 106 activity under §36CFR800.

It is the opinion of the EBCI THPO that no cultural resources important to the Cherokee people should be adversely impacted by this proposed federal undertaking. As such, the proposed undertaking may proceed as planned. In the event that project design plans change, or cultural resources or human remains are inadvertently discovered, the EBCI THPO requests that all work cease and be notified so we may continue the nation-to-nation consultation process as stipulated under §36CFR800.

If we can be of further service, or if you have any comments or questions, please feel free to contact me at (828) 359-6854.

Sincerely,

Holly Austin
Tribal Historical Preservation Office
Eastern Band of Cherokee Indians

Project Description	Location
Proposed modifications to Counce-Hickory Valley transmission line.	Hardeman County, Tennessee
Proposed deconstruction of Johnsonville Fossil Plant with the goal of developing the site as a brownfield.	Humphreys County, Tennessee
Proposed construction of access roads for the Shelby-Drummonds transmission line project.	Shelby County, Tennessee

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www.tnhistoricalcommission.org

November 14, 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 Deconstruction, Laydown Yards and Guard Shack, 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

GWYᏰ DᏃᏢ
CHEROKEE NATION®
P.O. Box 948 • Tahlequah, OK 74465-0948 • 918-453-5000 • cherokee.org

Office of the Chief

Bill John Baker
Principal Chief
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ᎤEᎾGᏋ

S. Joe Crittenden
Deputy Principal Chief
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December 7, 2018

Marianne Shuler
Tennessee Valley Authority
400 W Summit Hill Drive
Knoxville, TN 37902

Re: Johnsonville Fossil Plant Deconstruction, Laydown Yards and Guard Shack, Expanded Area of Potential Effect (APE)

Ms. Marianne Shuler:

The Cherokee Nation (Nation) is in receipt of your correspondence about and related report for **Johnsonville Fossil Plant Deconstruction, Laydown Yards and Guard Shack, Expanded Area of Potential Effect (APE)**, and appreciates the opportunity to provide comment upon this project. Please allow this letter to serve as the Nation's interest in acting as a consulting party to this proposed undertaking.

The Nation maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project, cross referenced the project's legal description against our information, and found instances where this project is adjacent to such resources, including the CHEROKEE TRAIL OF TEARS, Deas, Drew, Whitely, and Drane Detachments. These resources, however, are outside the proposed Area of Potential Effect (APE). Further, this Office reviewed and concurs with the related report.

Thus, this Office does not object to the project proceeding as long as the following recommendations are observed:

- The Nation requests that Tennessee Valley Authority (TVA) re-contact this Office for additional consultation if there are any changes to the scope of or activities within the Area of Potential Effect;
-
- The Nation requests that TVA halt all project activities immediately and re-contact this Office for further consultation if items of cultural significance are discovered during the course of this project;

- The Nation requests that TVA conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the Nation's databases or records.

If you require additional information or have any questions, please contact me at your convenience. Thank you for your time and attention to this matter.

Wado,

Elizabeth Toombs, Tribal Historic Preservation Officer
Cherokee Nation Tribal Historic Preservation Office
elizabeth-toombs@cherokee.org
918.453.5389

United Keetoowah Band
Of Cherokee Indians in Oklahoma

P.O. Box 746 • Tahlequah, OK 74465
18263 W Keetoowah Circle • Tahlequah, OK 74464
Phone: (918) 871-2800 • Fax: (918) 414-4000
www.ukb-nsn.gov

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October 3, 1950

12/7/2018

RE: Johnsonville Fossil Plant Deconstruction, Laydown Yards, and Guard Shack, Humphreys County, Tennessee

To Whom It May Concern:

Thank you for consulting with the United Keetoowah Band of Cherokee Indians in Oklahoma (UKB). This response is regarding the request from your office for a review of the project listed above. We have reviewed the information provided in your letter of November 9, 2018. We find after review of the information we concur with your findings of no adverse effects.

We remain interested in further communication regarding this project due to the location. The UKB people have a documented historical presence in Humphreys County, Tennessee. While there are no documented village sites within the project site or within a close proximity outside the project site, there still remains the potential of finding unknown sites in and surrounding the project location.

It is further advised that if the area of potential effect changes or in the event of an inadvertent discovery of human remains or other cultural items that we receive notification within 48 hours. As well, any inadvertent discovery of human remains or other cultural resources should remain in situ until consultation with interested tribes and agencies is undertaken.

Please note that these comments are based on information available to us at the time of the project review. We reserve the right to revise our comments as information becomes available. If you have any questions or concerns, please contact our Tribal Archaeologist/NAGPRA Coordinator, Erin Thompson at (918) 871-2838 or by email ethompson@ukb-nsn.gov.

Best Regards,

Sheila Bird
Director of Natural Resources
NAGPRA and THPO
United Keetoowah Band of Cherokee Indians
Office (918) 871-2852 Fax (918) 414-4052

Appendix E – Public and Agency Comments and Responses

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Appendix E – Public Comments and Responses

A Draft Environmental Assessment (EA) of the proposed Johnsonville Fossil Plant Decontamination and Deconstruction Project was released for comment on August 20, 2018. The comment period closed on September 19, 2018. TVA transmitted the Draft EA to various agencies and consulted with federally recognized tribes. The Draft EA was posted on TVA's public National Environmental Policy Act (NEPA) review website (http://www.tva.gov/nepa). A notice of availability including a request for comments on the Draft EA was published in newspapers serving the Humphreys County, Tennessee area. Comments were accepted through September 19, 2018, via TVA's website, mail, and e-mail.

Three public comments were received via TVA's website and one more comment was submitted by email. Additionally, a comment letter was received from TDEC. The comments (emails and letter) are included at the end of this appendix. There were a total of eight comments. Comments concentrated on impacts to specific resources and alternatives. TVA's responses to comments raised in these documents are provided below.

Resource Specific Comments

Comment 1 (Air Resources): The Draft EA does not provide estimates of the fugitive emissions impacts for the proposed complete demolition and removal of the facility components from the site. TDEC recommends TVA include this information in the Final EA.

No timeline for regulated asbestos containing material (ACM) removal was presented nor were the approved disposal locations that will receive the waste materials identified. TDEC recommends TVA develop a specific action plan to address such ACMs encountered during demolition that were not previously removed and include discussion of this plan in the Final EA.

The Draft EA does not provide estimates of the emissions which will result from the proposed demolition equipment, transportation of removed materials, and staff commuting to and from the demolition site. Similarly the Draft EA does not offer estimates of the total cubic yards of debris to be disposed of (including estimates of the total amount of hazardous waste containing materials, such as regulated ACM that could not be removed prior to demolition). Additionally, no estimates were provided for the emissions associated with proposed explosive use in controlled demolitions. TDEC recommends TVA include these considerations in the Final EA (*Commenter: Tennessee Department of Environment and Conservation [TDEC]*).

> **Response 1:** Although the EA analysis is not quantitative, it does acknowledge a short-term air quality impact and the need for mitigation through dust control, and it provides enough qualitative detail to distinguish among alternatives. Developing quantitative estimates of air emissions would not provide any further information regarding the aerial extent of impacts, need for mitigation, or the preferable alternative. TVA has used this approach on recent EAs for similar decontamination and deconstruction projects.
>
> Gross asbestos abatement would occur at the beginning of the demolition process. However, as a demolition contractor has not been selected, means and methods of asbestos removal along with a schedule are to be determined. All asbestos abatement activities will be in accordance with applicable state and federal regulations. Disposal of asbestos waste will occur offsite in an appropriately approved landfill.

Permitting of particulate matter emissions associated with any crushing equipment may be required. Particulate matter emission calculations and permitting would be the responsibility of the selected contractor. In addition, TVA and selected contractors will follow the elements of the "Dust Control Plan" to minimize any fugitive dust mobilization.

Comment 2 (Solid Waste): TDEC reiterates that all materials determined to be wastes must be evaluated (e.g., waste determinations) and managed (e.g., inspections, container requirements, permitted transport) in accordance with the Solid and Hazardous Wastes Rules and Regulations of the State (TDEC Division of Solid Waste Management Rule 0400 Chapters 11 and 12, respectively) in addition to other applicable regulations (federal, state, e.g., rules) and TVA best management practices (*Commenter: TDEC*).

Response 2: TVA has added a statement to Section 3.12.1 of the Final EA: "Along with TVA best management practices, all materials determined to be waste would be evaluated (e.g. waste determinations) and managed (e.g. inspections, container requirements, permitted transport) in accordance with applicable federal and state rules including TDEC Solid and Hazardous Waste Rules and Regulations as described in TDEC Division of Solid Waste Management Rule 0400 Chapters 11 and 12, respectively."

Comment 3 (Water Resources): As TVA notes, the current NPDES Permit (TN0005444) would remain as the closure project continues. Modifications to the Multi-Sector General Stormwater Permit's (TNR05000) Storm Water Pollution Prevention Plan (SWPPP) would need to be modified to reflect current site conditions. Depending on the specific closure project chosen, an Aquatic Resource Alteration Permit (ARAP) could be necessary if there will be any alterations to wet weather conveyances, streams, wetlands, or other aquatic resources. The Draft EA states that a desktop review of the proposed project area did not document any wetlands, streams or water features within the area proposed for demolition/deconstruction. An onsite hydrologic determination will have to be performed by a certified hydrologic professional to identify all of the aquatic resources within the project limits of disturbance and assess the potential for any alterations to wet weather conveyances, streams, wetlands, or other aquatic resources to adequately consider potential impacts to these resources. TDEC recommends TVA include these permitting and hydrologic determination considerations in the Final EA (*Commenter: TDEC*).

Response 3: Comment noted. A TVA Qualified Hydrologic Professional has determined that there are no surface water features within the project boundary.

Comment 4 (Cultural Resources): TDEC believes the Draft EA adequately addresses potential impacts to cultural and natural resources within the proposed project area (*Commenter: TDEC*).

Response 4: Comment noted. Appendix D contains final copies of all cultural resources consultation.

Alternatives Comments

Comment 5: I personally concur with Option C as TVA prefers. I believe the only real and best option is to deconstruct the facility to as minimal of footprint as possible. However, I would only suggest such if and only if TVA has forecasted the future need of power and energy demand and concluded that a re-tooling of the plant would not be cost-effective to meet such future

power demands. I also have concerns as to the “after-effect” of this site once the structure is deconstructed. Will it simply sit empty and vacant landscape on the river shore?
The decontamination is a concern as well. It seems Benton County's gravel pits have become a home to the fly-ash residue and this does not sit well with me knowing that ground water and air quality via evaporation means negatively impacts our citizens. Although the business investment is immeasurable to Benton County, the negatives of loss lands, contaminated natural resources and suppressed use of lands controlled by TVA are far greater than the investment. If we are a consideration for further dumping of materials in the decontamination or deconstruction efforts of the New Johnsonville site, then such will be met with great resistance in my capacity as County Mayor.

I believe the site still has great potential and I would like to see TVA pursue studies as to a heavy freight cargo port, but my fear is the site will be so minimized that it will sit idly as if it were a former nuclear plant where nothing will ever be considered for possible industrial development (*Commenter: Brett Lashlee*).

> **Response 5:** TVA’s preferred alternative is demolition to a brownfield site (Alternatives C2, C3, or C4). Removed materials would be transported either by truck or by rail to a landfill or other approved disposal facility operated by a company under TVA contract. Hazardous waste, PCB, ACM, and universal waste require specific handling, labeling, and disposal protocols. Disposal of any hazardous material removed would be done at facilities specifically permitted to receive such waste. Some concrete and other uncontaminated materials could be deposited in the structure basement as fill. Future reuse of the Johnsonville Fossil Plant site is out of scope for this project.

Comment 6: Of the option being considered I think environmentally the best option being considered would be to demolish and grade making it a “Brownfield” site, in addition I feel a controlled removal of the stack would be a good choice. My reason for this is a “Brownfield” site would offer TVA an opportunity to expand its energy resources as “Brownfield” sites are a good option to implement wind and solar energy on, as I have experience on placing a wind power plant on a “Brownfield” site and also know that the solar industry is starting to utilize areas such as old landfills to construct on (*Commenter: Uteva Chesser*).

> **Response 6:** TVA’s preferred alternative is demolition to a brownfield site (Alternatives C2, C3, or C4). The preferred option for removal of the stack will be determined during development of the deconstruction plan. Future reuse of the Johnsonville Fossil Plant site is out of scope for this project.

Comment 7: TVA should continue to use the site for generating revenue. This could be done by installing a new Combined cycle plant or a natural gas peaker. The voltage being an issue in western TVA area could relive this issue. All the infrastructure is there and permitting should be easily done. I believe this would be the best fit for TVA and the area, Humphreys and Benton counties are in need of good paying jobs that will continue to stay in the area (*Commenter: Mickey Blackburn*).

> **Response 7:** Comment noted. Future reuse of the Johnsonville Fossil Plant site is out of scope for this project. However, the adjacent Johnsonville Combustion Turbine facility will continue operations on the site.

Comment 8: The old power plant would make a great fallout shelter during disastrous times. This could save many lives (*Commenter: George Beard*).

Response 8: Comment noted. Future reuse of the Johnsonville Fossil Plant site is out of scope for this project.