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FLUE GAS DESULFURIZATION SYSTEM AT KINGSTON FOSSIL PLAN FINAL SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT Roane County, Tennessee

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Symbols, Acronyms, and Abbreviations

AD Anno Domini APE area of potential effects ARAP Aquatic Resource Alteration Permit BC before Christ BMP best management practice BPC Bat Programmatic Consultation CAA Clean Air Act CCR Coal Combustion Residuals CEC Categorical Exclusion Checklist CFR Code of Federal Regulations CO carbon monoxide CRM Clinch River Mile dBA Decibels on the A-Weighted scale EA Environmental Protection Agency ERM Emory River Mile FEMA Federal Highway Administration FONSI Finding of No Significant Impact FRP Flood Risk Profile HUC Hydrologic Unit Code IMP Internal Monitoring Point IPaC Information for Planning and Consultation KIF Kingston Fossil Plant MOA Memorandum of Agreement MSAT Mobile Source Air Toxics msi mean sea level NAAQS National Environmental Policy Act	ACHP	Advisory Council on Historic Preservation		
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Flue Gas Desulfurization System at Kingston Fossil Plant

TWRA	Tennessee Wildlife Resources Agency
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOI	U.S. Department of the Interior
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
WMA	Wildlife Management Area

CHAPTER 1 – PURPOSE AND NEED FOR ACTION

1.1 Introduction and Background

The Tennessee Valley Authority's (TVA) Kingston Fossil Plant (KIF) is a 1.7 gigawatt (GW) coal-burning power plant with nine generating units located in Harriman, Roane County, Tennessee, on the shore of Watts Bar Reservoir.

In 2006, TVA completed an Environmental Assessment (EA) and issued a Finding of No Significant Impact (FONSI) for the installation of flue gas desulfurization (scrubber) equipment at KIF to reduce sulfur dioxide (SO₂) emissions. The byproduct of this scrubber technology, gypsum, required the construction of a new landfill disposal facility. An on-site landfill location was chosen on the southern end of the KIF property (See Figure 0-1).

TVA has completed two additional environmental reviews related to the disposal of materials in the on-site landfill. A 2010 EA and FONSI discussed impacts related to the disposal of fly ash and gypsum, while a 2016 EA and FONSI discussed the disposal of bottom ash.

The landfill was designed to be constructed in two phases. Phase 1 was constructed in 2015 and is approaching its full capacity. Phase 2 is needed to support the continued operation of KIF. This SEA evaluates the environmental impacts of expanding the project area boundary analyzed in the 2006 EA to include laydown area, borrow area, and a haul road to support the construction of Phase 2 of the landfill.

The current review is an amendment to the original proposal which was reviewed in TVA's 2006 *Flue Gas Desulfurization System at Kingston Fossil Plant* EA. TVA is preparing this SEA to address the proposed construction support areas, and any changes to environmental conditions within the footprint of Phase 2 of the landfill, as described in the preferred alternative in the 2006 EA. The rest of KIF's flue gas desulfurization system has been constructed and is operational. The limits of waste as described in the 2006 EA are not proposed to change. Therefore, those actions are not addressed in this SEA.

Since the preparation and public review of the initial draft SEA in 2018, it was determined that the proposed laydown area could also be used as a borrow area. Therefore, this revised draft SEA analyzes two options for a borrow area. In addition, TVA personnel indicated that additional space for the design and construction of the haul road could be needed to allow for sufficient width for two articulating dump trucks to pass. The project area limits were adjusted to account for this and an additional haul road option was proposed. The revised draft SEA analyzes the increase in area for the haul road and the new haul road option.

1.2 Purpose and Need for the Proposed Action

The purpose of the proposed action is to expand the project area boundary for the on-site landfill at KIF to include adequate room for a laydown area, borrow areas, a haul road, and stormwater management. The proposed action is needed so TVA can adequately and effectively construct the second phase of the landfill.

1.3 Description of the Proposed Action

TVA proposes to expand the boundary for the on-site landfill construction support areas and to develop a borrow area to facilitate the landfill's construction. The two actions are described in detail below.

Laydown Area

TVA proposes to analyze approximately 22 acres in the area northeast of the permitted landfill as a construction laydown area (See Figure 1-1). The project will only require approximately 2 acres for laydown; however, the design is not at a stage where the exact location for the laydown area is known. Therefore, the entire 22 acres are reviewed within this SEA.

Borrow Area

TVA also proposes to utilize two areas as sources of borrow material. Borrow Area Option 1 would utilize the area northeast of the permitted landfill in the area of the proposed laydown area. For Borrow Area Option 2, an approximate 21-acre area on the peninsula east of the landfill at the confluence of the Emory and Clinch Rivers would be developed. The borrow areas would provide soil which would be used to aid in the construction and operation of Phase 2 of the landfill. TVA plans to use the borrow areas as long as they contains usable borrow material, which may extend to future projects other than the construction of Phase 2 of the landfill. If Borrow Area 2 is chosen, a haul road would connect the borrow area on the peninsula with the landfill and laydown area.

Stormwater Management

During preliminary design phases of Phase 2 of the landfill and the proposed borrow site on the peninsula, it was determined that additional room would be necessary outside of the existing survey boundaries to properly manage stormwater. The project limits have been amended in two locations to provide additional room to develop the stormwater ponds (See Figure 1-1).



Figure 1-1. Project Area Map

1.4 Related Environmental Reviews and Consultation Requirements

- Installation of Flue Gas Desulfurization System at Kingston Fossil Plant EA, 2006. The landfill was originally analyzed under the National Environmental Policy Act (NEPA) in this EA. At the time, TVA planned to place gypsum into the landfill.
- *Kingston Dry Fly Ash Conversion EA*, 2010. The landfill was discussed in this document as TVA wanted to dispose of dry fly ash in the landfill in addition to gypsum.
- *Kingston Fossil Plant Dewatering Project, 2016.* The landfill was discussed in this document as TVA wanted to dispose of bottom ash in addition to fly ash and gypsum. The project area boundary for the landfill that was reviewed in the 2006 EA did not change in the 2010 and 2016 EAs.

1.5 Scope of the Supplemental Environmental Assessment

This SEA evaluates the potential environmental and cultural impacts from the development of a laydown area, borrow area, a haul road, and stormwater management areas to support the construction of Phase 2 of the landfill at KIF. The 2006 and 2010 EAs were prepared to study the impacts from the construction and operation of the landfill. These documents are incorporated into this SEA by reference. This SEA analyzes the additional impacts that would occur from the proposed action.

This SEA has been prepared in compliance with NEPA (42 U.S.C [US Code] §§ 4321 et seq.), the Council of Environmental Quality's implementing regulations (40 CFR [Code of Federal Regulations] 1500-1508), and TVA's implementing procedures. TVA conducted an internal preliminary review of the potential environmental resources that could be affected by the project. Based upon this review, several environmental resource areas analyzed within the 2006 and 2010 EAs were considered but determined not to require additional analysis in this SEA due to the existing conditions at KIF remaining consistent and because no new impacts were identified as a result of the proposed action. The following resource areas are analyzed in this SEA:

- Air Resources
- Visual Resources
- Noise
- Surface Water and Wastewater
- Wetlands
- Floodplains
- Terrestrial Ecology
- Threatened and Endangered Species
- Cultural Resources

1.6 Public and Agency Involvement

During the preparation of this SEA, and in conjunction with the development of Phase 2 of the landfill at KIF, TVA has consulted with the following federal and state agencies:

- U.S. Fish and Wildlife Service (USFWS)
- U.S. Army Corps of Engineers (USACE)
- U.S. Environmental Protection Agency (EPA)
- Tennessee Department of Environment and Conservation (TDEC)
- Tennessee Wildlife Resources Agency (TWRA)
- Tennessee Historical Commission (THC)

A complete list of agency and public correspondence can be found in Appendix A.

TVA's public and agency involvement included publication of a notice of availability on February 14, 2018, for a 30-day public review and comment period of the initial draft SEA. The availability of the initial draft SEA was announced through a media release and direct mailings. The initial draft SEA was also posted on TVA's website. TVA's agency involvement includes circulation of the draft SEA to local, state, and federal agencies and federally recognized tribes as part of the review.

Five comments were received during the public and agency comment period on the initial draft SEA. Three comments were received from the general public, one comment was

received from the Roane County Environmental Review Board, and one comment was received from the U.S. Environmental Protection Agency.

Since the publication of the initial draft SEA in 2018, TVA considered an additional proposed haul road and borrow area. The revised draft SEA addressed the additional impacts associated with an additional haul road and borrow area and was posted on TVA's website. A notice of availability was published on April 5, 2019, for a 15-day public review and comment period of the revised draft SEA.

Three comments were received during the public and agency comment period. One comment was received from the Roane County Environmental Review Board, one comment was received from the TDEC, and one comment was received from the U.S. Environmental Protection Agency. All comments that were received on the initial and revised draft SEAs were carefully reviewed and considered in this final SEA. Appendix B contains comments on the initial and revised draft SEAs and TVA's responses to those comments.

1.7 Necessary Permits or Licenses

In addition to the necessary approvals from TVA, the following permits would be required for implementation of the proposed action:

- USACE Permit pursuant to Section 404 of the Clean Water Act for the discharge of fill material into the waters of the United States.
- Aquatic Resource Alteration Permit/Water Quality Certification from TDEC pursuant to Section 401(a)(1) of the Clean Water Act for proposed discharge of fill material into waters of the State of Tennessee.
- Coverage under Tennessee General National Pollutant Discharge Elimination System (NPDES) Permit for Discharges of Stormwater Associated with Construction Activities. The development of a Stormwater Pollution Prevention Plan (SWPPP) is a component of this permit.
- An update to TVA's Tennessee General NPDES Storm Water Multi-Sector General Permit for Industrial Activities TNR0510000 may be necessary.

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CHAPTER 2 - ALTERNATIVES

This chapter describes the alternatives that TVA has considered for the development of the laydown area, borrow area, haul road, and associated stormwater management to support the construction of Phase 2 of the landfill.

2.1 Description of Alternatives

2.1.1 Alternative A – The No Action Alternative

Under the No Action Alternative, TVA would not expand the project area boundary analyzed in the 2006 EA of the on-site landfill at KIF. There would be insufficient laydown room to efficiently construct Phase 2 of the landfill. Suitable borrow material would have to come from an established, off-site source. Construction equipment and materials used to construct the landfill would be stored on other portions of the KIF property and commute to the landfill site during construction. Construction vehicles and equipment would commute to the landfill, and on and off-site repeatedly during construction. Temporary laydown areas could obstruct the path of working equipment, which would interfere with normal operating procedures.

2.1.2 Alternative B – Action Alternative

Under the Action Alternative, TVA would expand the project area boundary analyzed in the 2006 EA of the on-site landfill to include the laydown area, the borrow areas, and a haul road. As part of this action, a new stormwater pond would be constructed within Phase 2 of the landfill for Cells 1 and 2 and an additional stormwater pond would be constructed within the proposed Borrow Area Option 2 on the peninsula, if necessary. Both of these stormwater ponds would be temporary and would be built to ensure compliance with NPDES permits during construction (see Figure 2-1).

Laydown Area

The proposed laydown area was used as a borrow area for construction of Phase 1 of the landfill and therefore is mostly cleared with patches of undeveloped grass and wooded lands. Topsoil would be removed, and stockpiled, and minimum grading would occur to ensure a level surface. Gravel would be applied to the surface after grading is complete. The laydown area would be used to store material necessary for construction of the landfill. These items generally include, but are not limited to, fuel tanks, mobile office facilities, Conex storage units, construction equipment, building materials, and construction waste.

Borrow Area

TVA would develop an approximately 21-acre borrow area. Two options for borrow areas are being considered. Borrow Area Option 1 would utilize the area northeast of the permitted landfill in the area of the proposed laydown area. Borrow Area Option 2 would utilize the peninsula east of the landfill at the confluence of the Emory and Clinch Rivers. The borrow areas would provide soil which would be used to aid in the construction and operation of Phase 2 of the landfill. TVA plans to use the borrow area as long as it contains usable borrow material, which may extend to future projects other than the construction of Phase 2 of the landfill. The area for Borrow Area Option 1 is described above and the area for Borrow Area Option 2 is currently undeveloped forest and former agricultural fields that are intermittently cleared. All vegetation would be removed, and topsoil would be removed and stockpiled. A temporary stormwater facility would be accessed using one of two haul road options. Haul Road Option 1 would utilize the transmission line right-of-way for development of the road. This option was analyzed in the initial draft SEA. However, the

width of the road was expanded to allow two haul trucks to pass. This area has been previously disturbed by the construction and operation of the existing transmission line. Haul Road Option 2 would access the borrow area by constructing a new road through closed canopy forest. Either haul road option would be regraded and resurfaced to allow for off road vehicle traffic and stormwater drainage.



Figure 2-1. Proposed Action Alternative

2.2 Comparison of Alternatives

The environmental impacts anticipated under the No Action and the Action Alternative are compared and summarized below in Table 2-1.

Resource Area	Alternative A – No Action	Alternative B – Action Alternative
Air Resources	Temporary impacts from construction activities during construction of Phase 2 of the landfill. Long-term impacts from operation of Phase 2 of the landfill would not be significant. Potential impacts associated with trucking could occur depending on location of offsite borrow area.	Temporary impacts from construction activities during construction of Phase 2 of the landfill and the development of the laydown area, borrow area, and haul road. Impacts would occur during the extended use of the borrow area. Long-term impacts from operation of Phase 2 of the landfill would not be significant.
Visual Resources	Construction and operation of Phase 2 of the landfill would permanently alter views. Laydown area chosen could result in visual impacts. Neither activity would substantially diminish scenic value.	 Temporary impacts during construction and potential longer-term impacts from use of Borrow Area Option 2. Construction and operation of Phase 2 of the landfill would permanently alter views. Neither activity would substantially diminish scenic value.
Noise	Temporary impacts to residents would occur during construction and operation of Phase 2 of the landfill. Potential impacts associated with trucking could occur depending on location of off- site borrow area.	Temporary impacts to residents would occur during construction and operation of Phase 2 of the landfill and development of the laydown area, borrow area, and haul road. Impacts to residents would occur during the extended use of borrow area option 2.
Surface Water and Wastewater	Temporary impacts from surface water runoff would occur during construction of Phase 2 of the landfill. Permanent impacts to surface water features would occur from the construction of Phase 2 of the landfill. Potential impacts from leachate and stormwater runoff during the operation of Phase 2 of the landfill would not be significant. Surface water withdrawal and thermal discharges would not change. No project-related impacts would occur at the off-site borrow area.	Temporary impacts from surface water runoff would occur during construction of Phase 2 of the landfill and during the development of the laydown area, borrow area, and haul road. Permanent impacts to surface water features would occur from the construction of Phase 2 of the landfill. Potential impacts from leachate and stormwater runoff during the operation of Phase 2 of the landfill would not be significant. Surface water withdrawal and thermal discharges would not change.
Wetlands	Permanent loss of wetlands from the construction of Phase 2 of the landfill. Wetland mitigation would ensure compliance with Executive Order (EO) 11990. No project- related impacts would occur at the off-site borrow area.	Permanent loss of wetlands from the construction of Phase 2 of the landfill and the haul road. Wetland mitigation would ensure compliance with EO 11990. There would be no net loss of wetland resources.

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

Resource Area	Alternative A – No Action	Alternative B – Action Alternative
Floodplains	Portions of the landfill are within the floodplain but the action complies with EO 11988. Temporary ponds would not be located within the floodplain. No project-related impacts would occur at the off-site borrow area.	Portions of the landfill are within the floodplain, but the action complies with EO 11988. Temporary ponds would not be located within the floodplain. No impacts to floodplains would occur from the development of Borrow Area Option1/laydown area, Borrow Area Option 2, or Haul Road Option 2. Excavation for the borrow areas would avoid floodplain areas. The stormwater facility would be located within the floodplain, but it would be designed to withstand flood impacts.
Terrestrial Ecology	Construction and operation of Phase 2 of the landfill would result in impacts to terrestrial wildlife and vegetation; however, these impacts would not be significant. No project-related impacts would occur at the off-site borrow area.	Construction and operation of Phase 2 of the landfill would result in impacts to terrestrial wildlife and vegetation; however, these impacts would not be significant. Removal of vegetation for Borrow Area Option 1/laydown area, Borrow Area Option 2, and Haul Road Option 2 would occur; however, these impacts would not be significant. Removal of vegetation for the borrow area would occur but would be replanted.
Threatened and Endangered Species	Construction of Phase 2 has the potential to impact foraging and roosting habitat for endangered bat species. No impacts would occur to aquatic wildlife or vegetation.	Construction of Phase 2 of the landfill and the development of the laydown area, borrow areas, and Haul Road Option 2 have the potential to impact foraging and roosting habitat for endangered bat species. No impacts would occur to aquatic wildlife or vegetation.
Cultural Resources	No impacts	No impacts

2.3 Summary of Mitigation Measures and Best Management Practice for the Preferred Alternative

Section 2.4 of the 2006 EA identifies mitigation measures and best management practices (BMPs) associated with the alternatives evaluated in that analysis. Those mitigation measures and BMPs continue to apply to any actions still ongoing with respect to that analysis. New mitigation and minimization measures for the preferred alternative and those outlined in the 2006 EA are described below.

Air Resources

In order to reduce vehicle emissions from the development of the laydown area, borrow area and haul road, TVA would ensure that all construction vehicles would be properly maintained, and not idle equipment when not in use and/or idling times would be kept to a minimum.

The following mitigation measures were described in the 2006 EA and would be employed during the construction and operation of Phase 2 of the landfill. Emissions from open construction areas and unpaved roads would be mitigated by spraying water on the roadways as needed to reduce fugitive dust emissions and other BMPs, as outlined in the Fugitive Dust Control Plan (required by KIF's Title V permit). TVA would use paved roads, wet suppression, and vacuum sweepers to reduce fugitive emissions from the operation of the landfill.

Visual Resources

Once the newly developed borrow areas have been exhausted of usable material, TVA would regrade and re-vegetate the area to minimize long-term visual impacts.

Noise

As described in the 2006 EA, in order to minimize potential impacts from noise, construction would typically take place during normal weekday/daytime hours; however, construction could occur during nights or weekends, if necessary to maintain schedule. This applies to both the proposed action and the construction and operation of Phase 2 of the landfill.

Surface Water and Wastewater

During construction of the laydown area, borrow area, and haul road, appropriate BMPs would be implemented to ensure proper treatment of stormwater run-off before discharge from the site. Additionally, TVA would implement BMPs to control stormwater runoff from entering the Clinch and Emory Rivers during the operation of the borrow area. All proposed project activities would be conducted in a manner to ensure that waste materials are contained, and the introduction of pollutants to the receiving waters would be minimized.

There is a possibility that a portion of both landfill phases would be open during the Phase 1 closure process. During this process, TVA would limit the open work area to minimize leachate generation. TVA would coordinate with state and federal agencies to maintain the NPDES permit conditions for site discharges. Mitigation methods, such as the use of waste water treatment or off-site disposal of leachate, could be implemented if impacts dictate they would be necessary.

The following mitigation measures were described in the 2006 EA and would be employed during the construction and operation of Phase 2 of the landfill.

- Stormwater flows from the landfill would be managed through the implementation of BMPs through the project SWPPP and site-specific operation and maintenance plans.
- Portable toilets would be pumped out regularly, and the sewage would be transported by tanker truck to a publicly-owned wastewater treatment works that accepts pump out.
- Equipment washing, and dust control discharges would be handled in accordance with BMPs described in the SWPPP for water-only cleaning, and/or NPDES Permit TN 0005452.
- Hydrostatic Testing discharges would be handled in accordance with NPDES Permit TN0005452 or the TDEC General NPDES Permit for Discharges of Hydrostatic Test Water (TN670000).

Wetlands

In 2007, TVA restored approximately 19.5 acres of wetlands in the floodplain of Drowning Creek in Cumberland County, Tennessee. The restoration was performed as mitigation for wetland impacts from the initial development of the landfill at KIF. Impacts to wetlands at that time amounted to less area than the total mitigation project and therefore created a bank of credits for TVA's use as needed in the future for other unavoidable impacts to wetlands. Impacts to 0.91-acre of wetlands from the development of Phase 2 of the landfill would be mitigated via the use of credits at the Drowning Creek Mitigation Site.

TVA must obtain an Aquatic Resource Alteration Permit/CWA Section 401 Water Quality Certification from TDEC and a CWA Section 404 permit from USACE to authorize any impact to wetlands.

Floodplains

TVA will avoid excavation activities in the floodplain during the development of Borrow Area Option 2. In addition, the following measures would be employed:

- standard BMPs would be used during construction activities;
- the stormwater facility would be designed to withstand flooding with minimum damage; and
- any haul road construction would be conducted in such a manner that upstream flood elevations would not be increased.

To minimize adverse flood impacts, the toe of the Phase 2 landfill berm will be designed to withstand flooding to at least the 500-year flood elevation of 749.2 feet.

Threatened and Endangered Species

TVA will track and document removal of potentially suitable summer roost trees and include this information in annual reporting in accordance with Section 7(a)(2) consultation. Additionally, if removal of suitable bat roost tree habitat needs to be removed when bats may be present on the landscape, TVA would set aside funding to be applied towards future bat-specific conservation projects. TVA currently plans to conduct the tree removal between October 15 and March 31, when Indiana and northern long-eared bats are not on the landscape. This would avoid any potential direct impact to juvenile bats at a time when they are unable to fly.

A number of activities associated with the proposed project were addressed in TVA's programmatic consultation with the USFWS on routine actions and federally listed bats in accordance with ESA Section 7(a)(2) and completed in April 2018. For those activities with potential to affect bats, TVA committed to implementing specific conservation measures. These activities and associated conservation measures are identified in TVA's Bat Strategy Project Assessment.

2.4 The Preferred Alternative

TVA has identified Alternative B as the preferred alternative to meet the purpose and need for this project. Alternative B meets the purpose and need of the project as it would allow TVA to expand the project area boundary for the on-site landfill at KIF for a laydown area, borrow areas, a haul road, and associate stormwater management. Implementation of this alternative would adequately and effectively allow TVA to construct the second phase of the landfill.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter includes descriptions of the affected environment, which document the existing conditions of the project area. These descriptions serve as a baseline for understanding the resources that could be impacted by implementation of the alternatives described in Chapter 2. This chapter also describes the potential impacts of adopting each of the alternatives described in Chapter 2.

TVA conducted an internal preliminary review of the potential environmental resources that could be affected by the project. Based upon this review, several environmental resource areas analyzed within the 2006 and 2010 EAs were considered but determined not to require additional analysis in this SEA due to the existing conditions at KIF remaining consistent and because no new impacts were identified as a result of the proposed action. These resources are listed below with an explanation for why they were not analyzed in detail.

Groundwater Quality

Impacts to groundwater quality from the construction and operation of both phases of the landfill were analyzed in the 2006 and 2010 EAs. In these EAs it was noted that no groundwater features occur at the KIF site that could be impacted by construction and operation of the landfill. A 2005 groundwater use survey indicated there are no groundwater supplies within a 1-mile radius of the KIF and there are no groundwater wells in use for domestic purposes downgradient from the KIF landfill. The study noted that the KIF is bounded hydraulically virtually on all sides, further reducing the likelihood of groundwater impacts. Originally, the synthetic gypsum waste was sluiced to the site and managed in accordance with the solid waste permit in a ponded setting. Subsequently, permit modifications approved by TDEC resulted in the entire Phase 1 landfill footprint, including the stilling pond, to be reengineered and lined with two feet of compacted lowpermeability clay, a flexible membrane liner and a leachate collection system. A gypsum dewatering plant was constructed which now allows the landfill to receive dry CCR material. Subsequent to the conversion from wet to dry and the lining of the entire landfill area. groundwater samples gathered during the TDEC-mandated assessment monitoring program have shown steadily improving water quality. Currently, TVA conducts groundwater monitoring for potential coal combustion residual (CCR) constituents at several locations immediately downgradient of the Phase 1 landfill. Additional groundwater monitoring wells have been installed around the Phase 2 portion of the landfill. The final groundwater monitoring plan, as required by the facility solid waste permit and the Federal CCR Rule, is detailed in the facility operations plan.

The construction and use of the proposed laydown area, borrow area, and haul road have minimal potential to impact groundwater quality. The use and implementation of standard BMPs would provide adequate protection of groundwater resources at the site. Ongoing groundwater monitoring would occur during construction and operation of Phase 2 of the landfill; therefore, groundwater quality is not analyzed in detail in this SEA.

Solid and Hazardous Waste

KIF has historically produced two CCRs: fly ash and bottom ash. The 2010 and 2016 EAs evaluated the impacts of converting KIF's wet ash handling system to dry collection methods. The landfill was constructed to handle these byproducts in addition to gypsum

which is produced as a result of the flue gas desulfurization (FGD) process. KIF currently holds a solid waste permit related to the on-site disposal of these materials.

KIF is considered a small quantity generator (SQG) by TDEC for generation of hazardous waste. The types of hazardous waste currently generated include small quantities of waste paint; waste paint solvents; mercury contaminated debris; sandblasting, scraping, paint chips; solvent rags due to cleaning electric generating equipment; Coulomat (used as moisture removal from oil); and liquid-filled fuses. The status of KIF as a SQG of hazardous waste would not change as a result of the Action Alternative.

The proposed laydown area, borrow areas, and haul road are currently vacant, vegetated areas located on the KIF property. During the development of these areas, some debris and waste would be generated due to clearing, stripping, and grading activities. Any wastes that are generated during the construction process or uncovered during site preparation would be managed in accordance with the U.S. EPA and the Solid and Hazardous Waste Rules and Regulations of the State of Tennessee. Excess soils would be stockpiled and stored elsewhere on the KIF property. Any other debris, primarily cleared vegetation, would be disposed of in accordance with all federal, state, and local regulations. No new hazardous waste would be generated and this designation would not change as a result of the proposed action. Therefore, solid and hazardous waste was not analyzed in detail in this SEA.

Transportation

The 2006 EA analyzed impacts to area roadway and waterway traffic from the anticipated increase in construction vehicles delivering supplies and equipment for the construction of the landfill. TVA does not anticipate increased roadway or waterway traffic above what was analyzed in the 2006 EA because vehicles and equipment already located at the KIF property for the existing landfill would be used to develop the borrow area and haul road. The proposed action is also not expected to result in a daily increase in vehicles entering or exiting the KIF property during operation of the facility. Construction vehicles using the haul road would not affect area roadways because the haul road is not a public road and would be used only by construction vehicles. Since the proposed action would not cause additional impacts to transportation over those analyzed in the 2006 EA, transportation is not analyzed in this SEA.

Natural Areas and Recreation

The proposed activities would occur within the boundaries of the Kingston State Wildlife Management Area (WMA) and Refuge. Portions of the project area are under license from TVA to TWRA "for the purpose of carrying out its wildlife management program and prohibiting hunting and trapping on the approximately 835 acres." The area is listed as closed to hunting, trapping, and dog training by TWRA. The 2006 EA analyzed the impacts of disturbing approximately 125 acres of natural area for the construction of the landfill. Additional disturbance would occur from the proposed action; however, large portions of the KIF property have been heavily disturbed by construction, maintenance, and operation of the facility. As a result of this wholesale alteration of the physical landscape, many areas on-site are unvegetated or support highly altered early successional plant habitats. The proposed laydown area is dominated by herbaceous vegetation interspersed with small patches of disturbed forest. Most of the proposed Borrow Area Option 2 is cleared on an annual basis and only supports herbaceous vegetation. In 2019, TWRA removed the license agreement for this area, thereby removing it from natural area status. In addition, recreational activities are prohibited on the KIF property. Since the proposed project area has been heavily disturbed and is no longer in its natural state and because recreational

activities are prohibited on the KIF property, there would be no impacts to natural areas or recreation. Therefore, this topic is not analyzed in detail in this SEA.

Socioeconomics and Environmental Justice

Impacts to socioeconomics and disadvantaged populations from the construction and operation of both phases of the landfill were analyzed in the 2006 EA. The incorporation of an additional laydown area and the development of a borrow area and haul road into Phase 2 could result in a temporary increase in employment during construction; however, this increase is not expected to be greater than what was initially estimated in the 2006 EA. Since Phase 1 of the landfill has already been constructed and is operational, the regional economy has already benefited from the increase in permanent employment positions that have been created by the project. Additionally, the proposed action would not disproportionately affect disadvantaged populations because it would occur completely within the KIF property boundaries and would not increase traffic, noise, or other pollution in areas where these populations exist. No additional impacts to socioeconomics or disadvantaged populations would occur over what was analyzed in the 2006 EA and therefore the topics are not analyzed further in this SEA.

Prime Farmland

Portions of the project area contain soils that have been designated as Prime Farmland by the U.S. Department of Agriculture (USDA). Development of the laydown area, borrow area, and haul road would involve clearing and grading of prime farmland soils. However, the entire KIF site is heavily disturbed and no longer supports agricultural activities. In 2006, TVA determined the Farmland Conversion Impact Rating for the entire KIF site to be well below the critical score of 160. The proposed activities would not raise this rating to a critical level and therefore, this topic is not analyzed in detail in this SEA.

The following resources have the potential to be affected by the proposed action.

3.1 Air Resources

3.1.1 Affected Environment

The EPA regulates air emissions and pollutants under the authority of the Clean Air Act (CAA) (42 U.S.C. § 7401 et seq.). The EPA has set National Ambient Air Quality Standards (NAAQS) for the following pollutants: ozone (O₃), particulate matter (PM_{2.5} and PM₁₀), nitrogen dioxide (NO₂), carbon monoxide (CO), sulfur dioxide (SO₂), and lead (Pb). If any of these standards are exceeded in a geographic area (City, County, etc.), and the area does not meet the NAAQS, it is considered in "non-attainment" for that pollutant. An area with air quality better than the NAAQS is designated as an "attainment" area.

Roane County and all surrounding counties (Morgan, Anderson, Knox, Loudon, McMinn, Meigs, Rhea, and Cumberland) are in attainment for all criteria pollutants (EPA 2017). Roane County is also in compliance with Tennessee ambient air quality standards which can be found in the Tennessee Air Pollution Control Rules Chapter 1200-03-03Resource 2

3.1.2 Environmental Consequences

3.1.2.1 Alternative A – No Action

Under the No Action Alternative, TVA would not expand the project area boundary of the on-site landfill at Kingston. Borrow material would have to come from an off-site source to construct the second phase of the landfill. Additionally, there would be insufficient laydown room to efficiently construct the landfill. Construction equipment and materials would be stored on other portions of the KIF property. Under the No Action Alternative, impacts to air

quality could occur from the excavation and transport of borrow material from an established off-site source to KIF due to vehicular emissions related to the transport of borrow material from a commercial source. These impacts would be greater than Alternative B.

As described in the 2006 and 2010 EAs, construction-related impacts associated with Phase 2 of the landfill would occur as a result of land clearing, site preparation, and construction vehicles. The 2010 EA determined that emissions from the operation of the landfill would not exceed federal or state prevention of significant deterioration (PSD) thresholds. TVA would employ mitigation measures as outlined in the 2006 and 2010 EAs in order to minimize air quality impacts related to the construction and operation of Phase 2 of the landfill. Emissions from open construction areas and unpaved roads would be mitigated by spraying water on the roadways as needed to reduce fugitive dust emissions. TVA would use paved roads, wet suppression, and vacuum sweepers to reduce fugitive emissions from the operation of the landfill.

3.1.2.2 Alternative B – Action Alternative

Under Alternative B, TVA would expand the project area boundary for the on-site landfill and develop a laydown area, borrow area, stormwater ponds, and haul road to facilitate construction of Phase 2 of the landfill. In order to develop these areas, vegetation and topsoil would be removed, and minor grading would occur. The haul road would also be resurfaced to handle construction vehicles no matter which haul road option is chosen. Temporary air quality impacts would occur during the development of the laydown area, borrow area, and haul road from construction vehicle emissions and from fugitive dust generated during site preparation. To minimize these impacts, TVA would ensure that all construction vehicles would be properly maintained and idling times would be kept to a minimum to reduce emissions. Fugitive dust would be controlled using wet suppression and other BMPs, as outlined in the fugitive dust control plan (required by KIF's Title V permit). Prior to construction, TVA would obtain an air construction permit in accordance with the CAA.

No matter which borrow area is chosen, TVA plans to use the borrow area as long as it contains usable borrow material which may extend beyond the construction of Phase 2 of the landfill. Impacts to air quality from the use of the borrow area would continue to occur through the duration of the use of the site. These impacts would be similar to those occurring during construction and TVA would continue to employ BMPs to reduce emissions and fugitive dust during this time.

As described in the 2006 and 2010 EAs, construction-related impacts associated with Phase 2 of the landfill would occur as a result of land clearing, site preparation, and construction vehicles. The 2010 EA determined that emissions from the operation of the landfill would not exceed federal or state prevention of significant deterioration (PSD) thresholds. TVA would employ mitigation measures as outlined in the 2006 and 2010 EAs in order to minimize air quality impacts related to the construction and operation of Phase 2 of the landfill. Emissions from open construction areas and unpaved roads would be mitigated by spraying water on the roadways as needed to reduce fugitive dust emissions. TVA would use paved roads, wet suppression, and vacuum sweepers reduce fugitive emissions from the operation of the landfill

3.2 Visual Resources

3.2.1 Affected Environment

Visual resources are evaluated based on existing landscape character, distances of available views, sensitivity of viewing points, scenic attractiveness (human perceptions of landscape/beauty/sense of place), and scenic integrity (the degree of visual unity and wholeness of the natural landscape in the course of human alteration).

The topography of the project area ranges from mildly sloping along the river edges to gently sloping within KIF. Land use is predominately industrial with dispersed areas of open pasture and woodlands. Potential user groups that would likely have direct views of the site include motorists traveling along I-40 near the Samuel T. Rayburn Memorial Bridge, motorists along local roads within 2 miles of KIF, recreational users along the Clinch and Emory Rivers, employees and visitors to the plant, and area residents. Residences across the Clinch and Emory Rivers, and recreational users of the rivers, have a direct view of the southeast portion of the KIF property, where the Borrow Area Option 2 is proposed.

3.2.2 Environmental Consequences

3.2.2.1 Alternative A – No Action

Under the No Action Alternative, TVA would not expand the project area boundary of the on-site landfill at Kingston. Borrow material would have to come from an established off-site source to construct the second phase of the landfill. Additionally, there would be insufficient laydown room to efficiently construct the landfill. Construction equipment and materials would be stored on other portions of the KIF property. Visual impacts would not occur at the alternative off-site borrow site because the borrow material would come from an established source and there would be no physical change to existing conditions associated to the proposed borrow and laydown areas. Visual impacts could occur on-site where TVA chooses to laydown construction equipment; however, the activity is consistent with the activities currently occurring on the KIF property and the scenic value would not be substantially diminished.

As described in the 2006 EA, visual impacts would occur during construction, as it would be visible from certain areas surrounding KIF. Additionally, views of the area where the landfill would be constructed would be permanently altered. TVA determined that the construction activities and the landfill would be consistent with the existing industrial setting of the site and scenic value would not be substantially diminished

3.2.2.2 Alternative B – Action Alternative

Under Alternative B, TVA would expand the project area boundary for the on-site landfill and develop a laydown area, borrow area, stormwater ponds, and haul road to facilitate construction of Phase 2 of the landfill. The development of Borrow Area Option 2 would involve vegetation removal that could alter views of the southeast portion of the KIF property from the Clinch and Emory Rivers and from surrounding residential areas. Using Haul Road Option 2 would have slightly greater impacts compared to using Haul Road Option 1, because Haul Road Option 2 would require the clearing of approximately 10 acres of vegetation. Construction vehicles, equipment, and personnel could be visible from these locations. TVA plans to retain the line of trees along the shoreline that surrounds the proposed borrow area. This would reduce the likelihood of visual impacts, especially during the summer months. TVA plans to utilize the borrow area as long as it remains productive; however, it is unknown how long this will be. Visual impacts would continue to occur as long as the borrow area is in use. Once the borrow area has been exhausted, TVA would regrade and re-vegetate the area. Much of the proposed Borrow Area Option 1/laydown area was used as a borrow area for construction of Phase 1 of the landfill. However, the 22-acre proposed laydown area still contains vegetation that may need to be removed once an exact location for the laydown area is selected and/or if this area is used as a borrow area. The removal of this vegetation would slightly alter the visual quality of the site. However, the activity is consistent with the industrial character of the existing landscape and the scenic value would not be substantially diminished.

As described in the 2006 EA, visual impacts would occur during construction, as it would be visible from certain areas surrounding the KIF property. Additionally, views of the area where the landfill would be constructed would be permanently altered. TVA determined that the construction activities and the landfill would be consistent with the existing industrial setting of the site and scenic value would not be substantially diminished.

3.3 Noise

3.3.1 Affected Environment

The EPA defines noise pollution as "unwanted or disturbing sound" and noise pollution is regulated under the Noise Control Act of 1972 (EPA 2018). Noise is measured in decibels on the A-weighted scale (dBA) which represents the range of sounds that can be heard by the human ear. Noise is usually caused by human activity that adds to the natural acoustic setting of a locale. The perceived loudness or intensity between a noise source and a receptor may change as a result of distance, topography, vegetation, water bodies, and structures. The closer a receptor is to a noise source the louder the noise seems; for every doubling of distance from a source the intensity drops by about 6 dBA over land and about 5 dBA over water. Topography, vegetation, and structures can change noise intensity through reflection, absorption, or deflection. Reflection tends to increase the intensity, while absorption and deflection tend to decrease the intensity.

The KIF property is bordered by Watts Bar Reservoir to the south, Emory River to the east and north, and a partially wooded ridge to the west. Noise emission levels from generating facilities can range from 70 dBA to 100 dBA (USDOI 2008). Noise from generators at TVA facilities produce a constant, low frequency drone during generation. However, because they are housed in buildings, they are not audible at a distance.

There are homes located along Swan Pond Road to the west of the plant, on Swan Pond Circle and Emory River Road to the north, and on Lakewood Landing, Windswept Lane, and Lakewood Drive to the south. The residences most affected by noise from the landfill are west of the KIF property on Swan Pond Road. I-40 is directly south of the plant and influences noise levels at residences on the south side of the Watts Bar Reservoir.

Proposed Borrow Area Option 2 is located on the southeast portion of the KIF property. Residences across the Clinch and Emory Rivers on Sugar Grove Valley Road and North Kentucky Street could be affected by noise from this site.

3.3.2 Environmental Consequences

3.3.2.1 Alternative A – No Action

Under the No Action Alternative, TVA would not expand the project area boundary of the on-site landfill at Kingston. Borrow material would have to come from an established off-site source to construct the second phase of the landfill. Additionally, there would be insufficient laydown room to efficiently construct the landfill.

Increases in noise, mainly associated with the trucking of material, may occur off-site while TVA obtains borrow material. These impacts would be greater than those associated with Alternative B during hauling hours. However, these impacts should be minor as trucks would likely use existing interstate highways and major arterial roadways as much as possible. Additional noise could also occur on-site where TVA chooses to laydown construction equipment; however, it would likely not be discernable from noise already occurring on the KIF property.

As described in the 2006 EA, noise would occur during the construction and operation of the landfill. Construction activities would involve site preparation which would involve the use of compactors, front loaders, scrapers, excavators, and graders. This type of equipment is expected to generate noise ranging from 79 to 88 dBA at 50 feet (EPA 1971). Maximum construction noise of 88 dBA at 50 feet would be about 59 dBA at the nearest residence approximately 1,500 feet away. This is expected to be audible at the nearest residence on Swan Pond Road during periods of low traffic, but it would not cause a significant increase in average noise levels. In order to minimize potential impacts from noise, construction would typically take place during normal weekday/daytime hours; however, construction could occur during nights or weekends, if necessary, to maintain schedule.

3.3.2.2 Alternative B – Action Alternative

Under Alternative B, TVA would expand the project area boundary for the on-site landfill and develop a laydown area, borrow area, stormwater ponds, and haul road to facilitate construction of Phase 2 of the landfill. Use of Borrow Area Option 1/laydown area would create noise that would be perceptible by residents nearby. Development and use of the Borrow Area Option 2 and either haul road option would create noise that could be perceptible by residents across the Clinch and Emory Rivers. These impacts would occur during the development and use of the borrow area. Noise would also occur during the construction and operation of the landfill.

TVA plans to use the borrow area as long as it contains usable borrow material which may extend beyond the construction of Phase 2 of the landfill. Noise from the use of the borrow area would continue to occur through the duration of the use of the site. These impacts would be similar to those occurring during construction and TVA would continue to employ BMPs to reduce impacts to residents.

Construction activities for both the landfill and proposed laydown area, borrow areas, and haul roads would involve site preparation which would involve the use of compactors, front loaders, scrapers, excavators, and graders. This type of equipment is expected to generate noise ranging from 79 to 88 dBA at 50 feet (EPA 1971). Maximum construction noise of 88 dBA at 50 feet would be about 59 dBA at the nearest residence on Swan Pond Road, approximately 1,500 feet away. The nearest residence across the Clinch and Emory Rivers is approximately 1,000 feet away. The maximum construction noise to be heard by those residences would be less than 88 dBA, but just slightly greater than 58 dBA. This audible sound level compares with similar common noise levels (See Table 3-1).

Table 3-1:	Common	sound	levels
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Source	Sound Level (dBA)
Busy Road Traffic	80

Washing	
Machine/Dishwasher	70
Normal conversation	60
rainfall	50

Source: CDC, 2018

While construction of the landfill is expected to be audible at the nearest residence on Swan Pond Road during periods of low traffic and construction; and use of the borrow area is expected to be audible at the nearest residence across the Clinch and Emory Rivers; these activities would not cause a significant increase in average noise levels.

In order to minimize potential impacts from noise, construction would typically take place during normal weekday/daytime hours; however, construction could occur during nights or weekends, if necessary, to maintain schedule.

3.4 Surface Water and Wastewater

3.4.1 Affected Environment

Hydrology

CRM 2.6. River flow rates past the site are regulated by upstream dams on the Clinch River (Melton Hill and Norris dams) and downstream on the Tennessee River by Watts Bar Dam. The flow rates are also influenced by upstream dam operations on the Tennessee River (Tellico and Fort Loudoun dams). Flow patterns can be complex in the Clinch and Emory River embayments. The Emory River flow fluctuates between flowing upstream from the Clinch River through the Emory River embayment to also flowing backwards upstream of KIF. Water is pushed up the Emory River because of inflows that raise the pool elevation in Watts Bar Reservoir. Such inflows typically occur when the reservoir is filling in the spring or during a flood event. Different rates and timing of releases from Watts Bar, Fort Loudoun, and Melton Hill reservoirs can also cause reverse flows in the Clinch River arm of Watts Bar Reservoir. There is also the potential for water from the Clinch River to flow upstream into the Tennessee River during the filling of Watts Bar Reservoir.

These flow patterns are further complicated by water temperature and density differences. Warmer water is less dense and therefore stays on the surface of a reservoir. In the summer, the sun and ambient air temperatures warm the surface water, introduce thermal layering that becomes stable and prevents mixing with deeper, cooler, and denser water. This stable thermal layering of water is known as stratification. Norris Dam and Melton Hill Dam discharges tend to keep the Clinch River relatively cool despite increased air temperatures in the summer. When Clinch River water flows upstream into the Emory River embayment to the KIF water intakes in the summer, this cooler water flows along the bottom of the embayment, and the warmer Emory River water flows downstream over the top of the cooler Clinch River water.

Within the boundary of the proposed project area, 12 ephemeral streams (wet weather conveyances) and one intermittent stream were identified in a December 2017 survey (TVA, 2017a). One ephemeral stream was identified in the area of Haul Road Option 2 during the August 2018 and November 2018 field surveys.

In 2019, TDEC implemented a new model, the Tennessee Stream Quantification Tool (TN SQT) to ensure proposed mitigation projects adequately offset aquatic losses. In April 2019, TVA conducted a stream quantification analysis within the project area to determine mitigation requirements related to stream impacts. Based on the results of this survey

utilizing the new model, the aquatic features within the project area now total 5 ephemeral streams (wet weather conveyances) and one intermittent stream. The reduction in ephemeral streams was due to features being incorrectly labeled as jurisdictional. A Jurisdictional Determination has been requested by both TDEC and the USACE. Surface water features are shown below on Figure 3-1.

There are also wetlands that will be further discussed in the Wetland section (Section 3.5) of this document.

Current Water Quality

This proposed project would drain to both the Clinch and Emory Rivers which are located in the 06010207 and 06010208 8-digit hydrologic unit code (HUC) watersheds. Both rivers are designated for domestic water supply, industrial water supply, fish and aquatic life, recreation, livestock, watering and wildlife, and irrigation. The Clinch River is also designated for navigation purposes.

Presently, the Clinch and Emory River arms of Watts Bar Reservoir have been de-listed from the TDEC 303(d) list for any ash spill related reasons; however, the areas surrounding the spill site still continue to be monitored per TVA's agreement with TDEC/EPA. The Clinch River arm of Watts Bar Reservoir continues to be listed as impaired by chlordane,



Figure 3-1: Surface water features identified within the project area

mercury, and PCBs pollutants. Chlordane and PCB impairment is due to contaminated sediments, while mercury impairment is due to industrial point source discharges and

atmospheric deposition. Additionally, the Clinch River is listed as threatened by loss of native mussel species for unknown reasons. Nearby tributaries to the Clinch River are also listed for PCBs, chlordane, and mercury; one nearby tributary is listed for arsenic. (TDEC, 2018a)

The Emory River arm of Watts Bar Reservoir is also listed on the state 303(d) list (TDEC 2018a) as impaired by chlordane, mercury and PCBs pollutants. Chlordane impairment is due to contaminated sediments; mercury impairment is due to industrial point source discharges and atmospheric deposition; and PCB impairment is due to contaminated sediments and industrial point source discharges. Additionally, the Emory River arm, including Swan Pond Creek embayment and the unnamed embayment, was previously listed because of ash spill related contamination, including arsenic and coal ash deposits; however, these areas have subsequently been delisted from the 303(d) list due to recovery efforts (TDEC, 2016).

TVA conducted Reservoir Ecological Health assessments on Watts Bar Reservoir annually from 1991 through 2012. Values of good, fair, or poor are assigned to each metric monitored by TVA. The overall ecological health condition for Watts Bar Reservoir rated fair in 2012. Ecological health scores for Watts Bar have fluctuated between a "high fair" and poor and have generally followed reservoir flow conditions. Flow conditions in 2012 were low during most of the summer months in response to the generally dry weather pattern. The indicator most responsive to flow is dissolved oxygen, which rated poor at the forebay of the Watts Bar Hydro Dam in 2012. In addition, common problems are elevated chlorophyll concentrations, poor bottom life and the presence of metals and/or organic contaminants in the sediments. (TVA 2017b).

Existing Wastewaters and Drainage Areas Including Stormwater

There are several existing wastewater streams at KIF permitted to be discharged by the KIF NPDES permit (Number TN0005452) (TDEC 2018). The primary streams that would potentially be impacted by this proposed project would be the Special Waste Landfill leachate waste stream (currently discharged through IMP 01A, see Figure 3-2), stormwater discharged from the area of the current Phase 1 and proposed Phase 2 landfill, the proposed borrow area and laydown area, and the condenser cooling water (CCW) discharge (Outfall 002). Construction stormwater flows are released to the Clinch and/or Emory Rivers directly through stormwater outfalls, while leachate, process water flows and some stormwater flows discharge to the area from IMP 01A and ultimately leave the site through the plant discharge channel (Outfall 002) at CRM 2.6. The 2018 NPDES permit has the following limitations at Outfall 002: temperature (36.1 deg C), pH (6.0 – 9.0 s.u.) total mercury (30 ng/L), Chronic WET Testing (100%), and total residual oxidation (0.011 mg/L monthly average and 0.019 mg/L daily maximum).

Existing facilities and BMPs are used to ensure compliance with the permit conditions. Some plant runoff is directed through the process water basin system to be discharged from Outfall 001, the FGD Process Water Basin to be discharged from Outfall IMP 01A or through to the CCW to be discharged from Outfall 002 as discussed above. Other stormwater discharges associated with the industrial activity at KIF are covered by the Tennessee Storm Water Multi-Sector General Permit for Industrial Activities TNR0510000, Tracking Number TNR051787, while construction stormwater discharges are covered under TNR191259.

A hydraulic characterization of both Haul Road Options 1 and 2 found one ephemeral stream located in the area Haul Road Option 2 that would be impacted if this option was selected.

Coal Combustion Residuals

KIF currently produces two ash-related CCR streams, fly ash and bottom ash, which are byproducts from coal combustion. Fly ash comprises approximately 80 percent and bottom ash comprises the remaining 20 percent of these CCR streams. Currently, fly ash is handled dry and is pneumatically conveyed to silos. Bottom ash is currently directed to a dewatering process facility to dewater the solids and clarify the bottom ash sluice water. Both dry ash by-products are currently trucked to the on-site Phase 1 Landfill.



Figure 3-2: Map of Outfalls, Internal Monitoring Points, and TMSP Permitted Stormwater Outfalls at KIF

FGD gypsum by-product is also categorized as a CCR and is disposed of in the landfill. Currently, the FGD dewatering wastewater stream and related wastewaters from operation of the facility, the landfill leachate and associated stormwater are permitted to be discharged through IMP 01A.

3.4.2 Environmental Consequences

3.4.2.1 Alternative A – No Action

Under the No Action Alternative, TVA would not expand the project area boundary beyond that of Phase 1 and 2 of the on-site landfill at KIF. Borrow material would have to come from an established off-site source to construct the second phase of the landfill. Additionally, there would be insufficient laydown room to efficiently construct the landfill. Construction equipment and materials would have to be stored on other portions of the KIF property. Project related impacts to surface waters would not occur as borrow material would come from an established borrow source. There would be no physical change to the existing conditions associated to the proposed borrow area and laydown areas.

Operational Impacts of the On-site Landfill

The 2006 and 2010 EAs evaluated the surface water impacts from the construction and management of the landfill; however, it will be discussed briefly here to note any permitting requirements that may need to be met or evaluated as part of construction or maintenance of this facility.

The only operational flows that would be anticipated by the expansion of the landfill could be potential changes in the leachate and/or contact stormwater flows from the actual landfill itself.

The landfill has a liner system that consists of a 2-foot compacted clay layer with hydraulic conductivity of less than 1 x 10-7 centimeters/second with a 60-millimeter flexible membrane layer above the clay. The current leachate waste stream is a low flow waste stream with relatively low levels of solids and metals. The current leachate collection system (LCS) generally functions as follows: (i) portions of rainwater that percolate through the disposed CCRs will first filter through the sand layer and then flow into the gravel drainage layer; (ii) the gravel drainage layer and the embedded perforated pipe network will convey the leachate flow towards leachate collection sumps; and (iii) submersible pumps located at each leachate collection sump will transfer the collected leachate via attached piping (run inside a larger diameter riser HDPE pipe) to a force main/carrier pipe, which will ultimately transfer the leachate to a leachate storage tank, a permitted pond, or IMP 01A (Geosyntec 2012).

Since the Phase 1 portion of the landfill would be capped and closed while the Phase 2 portion of the landfill is open, the leachate discharges would not be expected to change significantly. According to the Hydraulic Evaluation of Landfill Performance (HELP) model (Geosyntec, 2012), only one gallon of leachate per acre is anticipated to be produced after closure of Phase 1 takes place. This would total a maximum of 104 gallons per day. This is only 0.031 percent of the maximum estimated leachate generated over the life of the landfill with all precipitation going to leachate.

There is a possibility that a portion of both landfill phases would be open during the Phase 1 closure process; however, leachate flow would be minimized by the utilization of a maximum ten-acre open face of disposal area and the use of smart compaction techniques that minimize leachate production. The landfill stormwater flows may increase if both non-contact stormwater (from the capped portion of Phase 1) and contact stormwater from Phase 2 are routed to discharge through the FGD Process Water Basin and IMP 01A.

Significant modification of either the leachate or the contact stormwater flows could constitute the need to modify or submit a planned change of the site's individual NPDES

permit to account for flow generation differences. If future changes were required, then the change of flows and concentrations discharged from IMP 01A would be further evaluated. Currently, the approximate daily discharge of IMP 01A is approximately 1.605 million gallons per day (MGD) which discharges into the site's CCW discharge which discharges approximately 999.14 MGD to the Clinch River from Outfall 002. The IMP 01A accounts for 0.16 percent of the total CCW flows from the site and the associated changes would not be expected to significantly change the composition of the overall waste stream being discharged to the Clinch River at Outfall 002. However, mitigation methods such as the use of waste water treatment or off-site disposal of leachate, could be implemented if impacts dictate they would be necessary.

Consequently, potential operational impacts to surface water would be expected to be insignificant with the use of proper BMPs and mitigation methods, when necessary.

Surface Water Withdrawal and Discharge Impacts

Raw water withdrawal and discharge rates would not change with the implementation of Alternative A. The discharges from the site would be leachate, minimal low volume wastewater flows, and stormwater driven flows. The majority of the stormwater flows would be managed through the implementation of BMPs which will be part of the project SWPPP and site-specific operation and maintenance plans. Appropriate BMPs would be implemented to ensure proper treatment of stormwater run-off before discharge from the borrow area.

All process water flows including leachate and low-level wastes, such as FGD dewatering waters, would be co-treated as process wastewater in the current FGD Process Water Basin before being discharged from IMP 01A. The FGD Process Water Basin was designed with a capacity to handle the 25 year, 24-hour storm event from both the Phase 1 and Phase 2 landfill area. Storm water may also be discharged or treated by this pond and released from this outfall.

The primary withdrawal usage plant-wide is for the CCW, which carries the majority (99.9 percent) of the thermal loading from KIF discharges at Outfall 002. The current project would not change the thermal loading at Outfall 002. Thermal discharges from IMP 01A would also not change. Waters utilized in the construction and management process of this project and stormwater flows associated with this project would remain at ambient temperatures; therefore, no additional thermal impacts would be anticipated.

3.4.2.2 Alternative B – Action Alternative

Under Alternative B, TVA would expand the project area boundary for the on-site landfill and develop a laydown area, borrow area, stormwater ponds, and haul road to facilitate construction of Phase 2 of the landfill. In addition to the impacts under the No Action Alternative, the following additional impacts would occur under Alternative B.

Construction Impacts

Wastewaters generated during construction of the landfill are detailed in the 2006 EA. The use of the borrow and laydown area(s) may include construction stormwater runoff, dewatering of work areas, domestic sewage, non-detergent equipment washings, dust control water, and hydrostatic test discharges.

• Surface Runoff - Construction activities have the potential to temporarily affect surface water via stormwater runoff. TVA would comply with all appropriate state and federal permit requirements. Construction activities of the associated project would be located on the KIF property. Appropriate BMPs would be followed, which would include stormwater ponds, and all proposed project activities would be conducted in a manner to ensure that waste materials are contained, and the introduction of pollutants to the receiving waters would be minimized. A General Permit for Storm Water Discharges Associated with Construction Activities would be required for this project and this permit would require development of a projectspecific SWPPP. The Tennessee Erosion and Sediment Control Handbook would be referenced to ensure BMPs are appropriate (TDEC, 2012).

Borrow Area Option 2 has been identified and evaluated to ensure the material is suitable for construction and capping activities for the proposed projects. The borrow material has been evaluated to ensure that it can meet the required compaction requirements of the proposed designs and other specifications.

- Domestic Sewage Portable toilets would be provided for the construction workforce as needed. These toilets would be pumped out regularly, and the sewage would be transported by tanker truck to a publicly-owned wastewater treatment works that accepts pump out.
- Equipment Washing and Dust Control Equipment washing and dust control discharges would be handled in accordance with BMPs described in the SWPPP for water-only cleaning, and/or NPDES Permit TN 0005452.
- Hydrostatic Testing These discharges would be handled in accordance with NPDES Permit TN0005452 or the TDEC General NPDES Permit for Discharges of Hydrostatic Test Water (TN670000).

On-site Streams and Wetlands

A characterization of aquatic features utilizing TDEC's new TN SQT model on the proposed project area was completed in 2019. Five ephemeral streams (wet weather conveyances) and one intermittent stream was identified in the project footprint. The USACE and TDEC would perform Jurisdictional Determinations to determine wetlands and stream features that would require mitigation within the limits of disturbance (LOD) of the proposed landfill, borrow areas, laydown area and haul roads (TVA, 2017a, 2018, 2019). The requirements of a state 401 water quality certification, either an individual or general ARAP permit, and federal 404 permits to be obtained for any stream/wetland alteration and the terms and conditions of these permits, would likely require mitigation from these proposed activities. Impacts would be expected to the streams and wetlands within the areas of disturbance; however, mitigation measures would be implemented to mitigate these impacts through the above regulatory process. Additionally, two haul routes are being evaluated and impacts would vary based on the different routes. More information on wetland and stream disturbance can be found in the Wetland and Aquatic Ecology sections (Section 3.5 and 3.8, respectively) of this evaluation.

Construction of the borrow sites, haul road, and laydown, along with the actions in Alternative B could temporarily impact 5 ephemeral streams (wet weather conveyances) and one intermittent stream. These impacts would be permitted under the applicable CWA Section 401 and 404 permitting processes and the state permitting process. And with the implementation of appropriate BMPs, only temporary minor, indirect impacts to surrounding surface waters would be expected from construction activities associated with the actions under Alternative B.

Operational Impacts

Impacts related to the operation of Phase 2 of the landfill under Alternative B would be the same as described under Alternative A.

3.5 Wetlands

3.5.1 Affected Environment

December 2017, July 2018, and November 2018 field surveys of the landfill and borrow area documented five wetlands within the boundaries of the proposed project area (See Figure 3-3).



Figure 3-3: Wetland identified within the project area

Activities in wetlands are regulated by state and federal agencies to ensure no net loss of wetland resources. Under CWA Section 404, activities resulting in the discharge of dredge or fill into waters of the United States, and associated secondary effects, must be authorized by the USACE through a Nationwide, Regional, or Individual Permit. CWA Section 401 requires state water quality certification for projects requiring USACE approval, pursuant to the Federal Water Pollution Control Act (33 U.S.C §§1251, 1341). TDEC is responsible for issuance of water quality certifications, pursuant to Tennessee Water Quality Control Act (TCA §69-3-108, Tenn. Comp. R. & Regs. 0400-40-07) and Tennessee's water quality criteria and anti-degradation statement (Tenn. Comp. R. & Reg. 0400-40-03). Lastly, EO 11990 requires federal agencies to minimize wetland destruction, loss, or degradation, and preserve and enhance natural and beneficial wetland values, while carrying out agency responsibilities. Wetland determinations were performed according to the USACE standards, which require documentation of hydrophytic vegetation, hydric soil, and wetland hydrology (Environmental Laboratory 1987; Lichvar et al. 2016; USACE 2012).
Using a TVA-developed modification of the Ohio Rapid Assessment Method (Mack 2001) specific to the TVA region (TVA Rapid Assessment Method or "TVARAM"), wetlands were evaluated by their functions and classified into three categories: low quality, moderate quality, and superior quality. Low quality wetlands (Category 1) are degraded aquatic resources which may exhibit low species diversity, minimal hydrologic input and connectivity, recent or ongoing disturbance regimes, and/or predominance of non-native species. These wetlands provide low functionality and are considered of low value. Moderate guality wetlands (Category 2) provide functions at a greater value due to a lesser degree of degradation and/or due to their habitat, landscape position, or hydrologic input. Moderate quality wetlands are considered healthy water resources of value. Disturbance to hydrology, substrate and/or vegetation may be present to a degree at which valuable functional capacity is sustained and there is reasonable potential for restoration. Superior quality wetlands (Category 3) includes those wetlands offering high functions and values within a watershed or are of regional/statewide concern. Superior quality wetlands may exhibit little, if any, recent disturbance, provide essential and/or large scale stormwater storage, sediment retention, and toxin absorption, contain mature vegetation communities, and/or offer habitat to rare species. Conditions found in superior quality wetlands often represent restoration goals for wetlands functioning at a lower capacity. The wetlands identified in the field surveys and their TVRAM scores are listed below in Table 3-2.

Wetland Identifier	Type ¹	Wetland Acreage within Review Area				
W1	PFO1A	2	0.27			
W2	PFO1A	2	0.12			
W3	PEM/PSS1A	2	0.14			
W4	PFO1A	2	0.08			
W5	PEM/PSS1A	2	0.30			
TOTAL			0.91			

Table 3-2: Wetlands in the proposed project area

¹Classification codes as defined in Cowardin et al. (1979): A = Seasonally flooded/saturated; PEM1 = Palustrine emergent, persistent vegetation; PFO1=Palustrine forested, broadleaf deciduous vegetation; PSS1=Palustrine, scrub-shrub, broadleaf deciduous vegetation.

W1 (0.27 acre) and W2 (0.12 acre) were delineated in 2006 for the original landfill EA and were revisited in 2017. These wetlands are forested habitats associated with a wet weather conveyance and shoreline of Watts Bar Reservoir. Dominant vegetation in these areas includes red maple (*Acer rubrum*), sycamore (*Platanus occidentalis*), sweetgum (*Liquidambar styraciflua*), silky dogwood (*Cornus amomum*), and buttonbush (*Cephalanthus occidentalis*). These wetlands exhibited hydrologic indicators such as drift deposits and drainage patterns; the soil profile contained grey coloration with mottling, indicative of hydric conditions.

W3 (0.14 acre) is a scrub-shrub wetland along an existing haul road in the northwest portion of the site which has developed since the 2006 review. The wetland is associated with a roadside drainage feature. Dominant vegetation includes cattail (*Typha latifolia*), soft rush (*Juncus effusus*), black willow (*Salix nigra*), and Frank's sedge (*Carex frankii*). There was standing water present as well as hydric soil indicators.

W4 (0.08 acre) is a forested wetland hydrologically connected to W3 via a culvert running beneath the roadway which has also developed since the 2006 review. Dominant vegetation includes black willow, sycamore, box elder (*Acer negundo*), green ash (*Fraxinus*)

pennsylvanica), and Japanese stilt grass (*Microstegium vimineum*). Hydrologic indicators included visible drainage patterns, drift lines, and sediment deposits. Soils in this area were problematic, in that they did not indicate standard hydric soil characteristics.

W5 (0.30 acre) is an emergent/scrub-shrub wetland that has developed within a drainage feature along the existing road within the transmission line ROW. Dominant vegetation includes cattail, soft rush, and black willow. There was saturated soil, some areas of standing water, as well as hydric soil indicators.

Two small areas exhibiting wetland characteristics were identified within stormwater control features that were constructed to comply with NPDES stormwater permitting requirements of the borrow 1/laydown area. Cattails have colonized these areas and standing water is present. However, as these areas do not exhibit hydric soils, they do not meet the USACE's requirements of wetlands and are therefore not considered wetlands for this analysis.

3.5.2 Environmental Consequences

3.5.2.1 Alternative A – No Action

Under the No Action Alternative, TVA would not expand the project area boundary of the on-site landfill at KIF. Borrow material would have to come from an established off-site source to construct the second phase of the landfill and there would be no physical changes to the existing conditions associated with the proposed borrow area and laydown areas. Additionally, there would be insufficient laydown room to efficiently construct the landfill. Construction equipment and materials would be stored on other portions of the KIF property.

As described in the 2006 EA, construction and clearing activities associated with Phase 2 of the landfill would impact W1, W2, W3, and W4 as these wetlands are located within the original footprint of the project as described in the 2006 EA. Wetland impacts are subject to approval and mitigation requirements of the USACE Nashville District and TDEC to ensure no net loss of wetland resources. Additionally, EO 11990 requires agencies to minimize wetland destruction, loss, or degradation and to preserve and enhance natural and beneficial wetland values while carrying out agency responsibilities. Mitigation for impacts to 0.61-acre of wetlands would be mitigated via the use of credits at the Drowning Creek Mitigation Site, in Cumberland County, Tennessee, satisfying the requirements of EO 11990.

3.5.2.2 Alternative B – Action Alternative

Under Alternative B, TVA would expand the project area boundary for the on-site landfill and develop a laydown area, borrow area, stormwater ponds, and haul road to facilitate construction of Phase 2 of the landfill. Impacts to wetlands associated with the Action Alternative would be the same as described under the No Action Alternative for Borrow Area Option 1/laydown area and Borrow Area Option 2. If Haul Road Option 1 was implemented, additional wetland impacts to W5 would occur from construction of the haul road. No impacts would occur if Haul Road Option 2 was implemented. Wetland impacts are subject to approval and mitigation requirements of the USACE Nashville District and TDEC to ensure no net loss of wetland resources.

Additionally, EO 11990 requires agencies to minimize wetland destruction, loss, or degradation and to preserve and enhance natural and beneficial wetland values while carrying out agency responsibilities. Mitigation for impacts to 0.91-acre of wetlands would be mitigated through the use of credits at the Drowning Creek Mitigation Site, in Cumberland County, Tennessee, satisfying the requirements of EO 11990.

3.6 Floodplains

3.6.1 Affected Environment

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

Borrow Area Option 2 would be located at the confluence of the Clinch and Emory Rivers, at Clinch River Mile (CRM) 4.4. At this location, the 100- and 500-year flood elevations are 747.6 and 749.4 feet mean sea level (msl), respectively. The southwestern tip of the project area on the mainland and the stormwater facility would be located adjacent to CRM 3.8. At this location, the 100- and 500-year flood elevations would be 747.5 and 749.2 feet, msl, respectively. The northeastern tip of the project area is located upland of and adjacent to Emory River Mile (ERM) 1.5. At this location, the 100- and 500-year flood elevations would be 747.6 and 749.9 feet, msl, respectively. The project area in green, the haul road area in gray, and the stormwater facility in tan are shown on Figure 3-4.

The 2008 release of approximately 5.4 million cubic yards of fly ash into the Clinch and Emory Rivers permanently increased computed flood elevations in the Clinch River. The 100-year flood elevation at CRM 3.8, where the southeastern tip of the Phase 2 landfill and the stormwater facility would be, increased from 746.4 ft msl to 747.5 ft msl following the ash spill. Similarly, the 500-year flood elevation increased from 747.9 ft msl to 749.2 ft msl.

As a federal agency, TVA adheres to the requirements of EO 11988, Floodplain Management. The objective of EO 11988 is "to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or 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). The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative..

3.6.2 Environmental Consequences

3.6.2.1 Alternative A – No Action

Under the No Action Alternative, TVA would not expand the project area boundary of the on-site landfill at KIF. Borrow material would be obtained from an established off-site source to construct the second phase of the landfill. Construction equipment and materials would be stored on other portions of Borrow Area Option 1/laydown area contemplated in the 2006 EA (see Figure 3-5). The laydown area would be located outside the 100-year floodplain and above the 500-year flood elevation, which would be consistent with EO 11988.

3.6.2.2 Alternative B – Action Alternative

Under Alternative B, TVA would expand the project area boundary for the on-site landfill and develop a laydown area, borrow area, stormwater ponds, and haul road to facilitate construction of Phase 2 of the landfill. As shown in Figure 3-4, with the exception of the backwater area within the footprint of the Phase 2 landfill and a portion of the sediment basin, the Borrow Area Option 1/laydown area would be located outside the 100-year and above the 500-year flood elevation, which would be consistent with EO 11988. Any temporary ponds needed prior to the establishment of the laydown area would also be located outside of the floodplain.



Figure 3-4: Floodplains in the vicinity of the proposed project area (FEMA 2007)



Figure 3-5: Floodplain map for the laydown area for the No Action Alternative

A small portion of the proposed Borrow Area Option 2 is located immediately adjacent to the 100-year floodplain of the Clinch and Emory Rivers. Excavation activities are not planned beyond the treeline and would avoid floodplain areas. As a result, there would be no impacts to floodplains or their natural and beneficial functions due to the development of the proposed borrow area.

A portion of Haul Road Option 2 and the sediment basin would be located within the 100year floodplain. Consistent with EO 11988, haul roads are considered to be repetitive actions in the 100-year floodplain that should result in minor impacts. To minimize adverse impacts, any road construction would be done in such a manner that upstream flood elevations would not be increased. No impacts to floodplains would occur as a result of Haul Road Option 1. There is no practicable alternative to locating a portion of the stormwater facility outside the floodplain because the remaining upland areas would be needed for the Phase 2 landfill. To minimize adverse impacts, the stormwater facility would be designed to withstand flood impacts with minimum damage. Therefore, the stormwater facility would be consistent with EO 11988.

As described in the 2006 EA, portions of the landfill are located within the 100-and 500-year floodplain. TVA analyzed eight alternative landfill locations; however, all were ruled out due to one or more issues including inadequate size, topography, other floodplains or wetlands, relocation of transmission lines, karst topography, and cost. As a result of this analysis, TVA determined that there were no practicable alternatives to siting portions of the landfill within the 100-year floodplain.

Although flood elevations in the Roane County Flood Insurance Study at Clinch River Mile 3.8 have increased since 2007, the impact analysis in the 2006 EA remains valid. Other landfill sites still are not suitable, and for the same reasons, TVA determined that there is no

practicable alternative to locating portions of Phase 2 of the landfill in the floodplain. The volume of displaced flood control storage from both phases of the landfill has been minimized as required by the TVA Flood Control Storage Loss Guideline. Therefore, the expanded project boundary of the Phase 2 landfill would be consistent with the requirements of EO 11988.

A Critical Action is an action for which even the slight chance of flooding is too great. The floodplain of concern for Critical Actions is the 500-year floodplain. The toe of the Phase 1 landfill is located outside the 100-year floodplain and several feet above the 500-year flood elevation, which would be consistent with EO 11988 for Critical Actions. Portions of the toe of the Phase 2 landfill, however, would be located within the 100-year floodplain of the Clinch River. To minimize adverse flood impacts, the toe of the Phase 2 landfill berm would be designed to withstand flooding to at least the 500-year flood elevation of 749.2 feet. The low crest of the Phase 2 landfill berm would be about elevation 754, which would protect the material within the berm to at least the 500-year flood. Therefore, phases 1 and 2 of the landfill and the proposed project would be consistent with EO 11988.

3.7 Terrestrial Ecology

3.7.1 Affected Environment

Wildlife

The proposed project area consists of approximately 13 acres of forested habitat as well as approximately 35 acres of early successional habitat. Haul Road Option 1 consists of 0.8 acre of forest and 7.8 acres of early successional habitat whereas Haul Road Option 2 consists of 9.8 acres of forest and 0.3 acre of early successional habitat to the area impacted. Herbaceous fields and forest fragments provide habitat for a variety of common wildlife species. Species associated with each habitat type at KIF are described in the 2006 EA and are listed below.

The southeast spoil storage area, and the module, ball mill, and new chimney areas lack wildlife habitat. The northwest spoil storage and the limestone stockpile areas consist of scrub/shrub and herbaceous field habitat. These areas have limited wildlife potential due to their poor quality and their isolation from other tracts of natural habitat.

The proposed gypsum disposal area consists primarily of herbaceous fields dominated by Johnson grass. Eastern meadowlarks, grasshopper sparrows, and savannah sparrows have all been recorded from this habitat. Red-tailed and red-shouldered hawks use the open areas for hunting. Edge habitat occurs where fields meet with forests. This edge habitat creates a diverse bird community. Birds inhabiting edges include northern bobwhite, eastern phoebe, Carolina wren, brown thrasher, white-eyed vireo, northern cardinal, indigo bunting, eastern towhee, field and song sparrows, and others. Small mammals and larger mammals such as white-tailed deer and coyotes use these edges.

Forests on the peninsula range from dry oak-hickory and dry mesic oak-hickory forests to bottomland forests. Oak-hickory forests provide habitat for wild turkey, yellow-billed cuckoos, woodpeckers, eastern wood pewees, blue jays, American crows, Carolina chickadees, eastern tufted titmice, white-breasted nuthatches, and many Neotropical migrants. Mammals occurring in oak-hickory forests include deer mice, white-tailed deer, gray fox, gray squirrel, eastern chipmunk, and others. Reptiles include rat snakes, five-lined skinks, eastern box turtles, and others.

Narrow bands of bottomland forests are found on the peninsula along the river margin and within wet sloughs. Birds observed in these areas include green and great blue herons,

wood ducks, spotted sandpipers, belted kingfishers, and eastern kingbirds. Mammals specific to bottomland forests in the area include the beaver and muskrat. Because these areas typically stay wet, amphibians may be abundant. Amphibians include the American toad, eastern newt, spring peeper, and others. Water snakes are also typically abundant. Fringe wetlands along the Clinch River provide habitat for red eared sliders, painted turtles, and other turtle species.

Review of the TVA Regional Natural Heritage database on November 6, 2017, resulted in no records of caves within 3 miles of the project footprint. 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 (IPaC) database resulted in identification of five migratory birds of conservation concern that have the potential to be impacted by the proposed actions: bald eagle (*Haliaeetus leucocephalus*), bobolink (*Dolichonyx oryzivorus*), rusty blackbird (*Euphagus carolinus*), wood thrush (*Hylocichla mustelina*), and yellow-bellied sapsucker (*Sphyrapicus varius*). The project footprint may offer habitat for all of these bird species of conservation concern. Five records of colonial wading bird colonies exist within 3 miles, four of which are extirpated. The nearest viable colonial wading bird colony record is approximately 1.4 miles from the project footprint. Six records of osprey exist within 3 miles of the project footprint, three of which are extant. No aggregations of birds, bald eagle nests, or colonial wading bird colonies were documented within the project footprint during field reviews on March 17, 2017; October 26, 2017; July 20, 2018; and November 28, 2018.

Vegetation

Large portions of the KIF property have been heavily disturbed by construction, maintenance, and operation of the facility. As a result of this wholesale alteration of the physical landscape, many areas on-site are unvegetated or support highly altered early successional plant habitats. The Borrow Area Option 1/laydown area is dominated by herbaceous vegetation interspersed with small patches of disturbed forest. These highly fragmented and degraded habitats contain a profusion of invasive plant species including Chinese privet (*Ligustrum sinense*), Japanese honeysuckle (*Lonicera japonica*), and sericea lespedeza (*Lezpedeza cuneata*).

Vegetation at KIF was surveyed and characterized for the 2006 EA. Existing plant communities observed within the project area included mixed deciduous forest, palustrine forest and wetlands, and grass/forbs. A description of these areas can be found in the 2006 EA and below.

Mixed deciduous forest occurs on gentle slopes and hilltops throughout the SEA project area. This community covers approximately 50 percent of the proposed project area and is characterized by a wide variety of canopy species, including black oak, mockernut hickory, red cedar, southern red oak, sugar maple, sweet gum, sycamore, Virginia pine, and white oak. Characteristic understory trees and shrubs include American holly, blueberry, bush honeysuckle, Chinese privet, flowering dogwood, tree of heaven and Russian olive. Common understory vines and herbaceous species include Carolina moonseed, Christmas fern, crossvine, greenbriar, Japanese honeysuckle, poison ivy, trumpet creeper, Virginia creeper, and muscadine.

Palustrine forest and wetlands cover approximately 20 percent of the proposed project area. Narrow bands of bottomland forests are found on the peninsula along the margins of the riverbank, streams, and sloughs. Common bottomland hardwood forest species include American beech, hackberry, persimmon, pignut hickory, red maple, sourwood, and sycamore. Characteristic understory trees and shrubs include arrowwood, bush honeysuckle, Chinese privet, common buttonbush, hophornbeam, paw paw, Russian olive, silky dogwood, smooth alder, spicebush, and Virginia sweetspire. The common understory vines and herbaceous layer include Carolina moonseed, greenbriar, Christmas fern, horehound, jewelweed, oriental bittersweet, poison ivy, New York fern, dissected grape fern, sensitive fern, and winged sumac.

Grass/forbs cover approximately 30 percent of the proposed SEA project area. This area was dominated by grasses including Johnson grass, Bermuda grass, broom-sedge, and fescue. Other representative species include goldenrod, thoroughwort, blackberry, javabean, Carolina vetch, and horse nettle.

Much of the proposed Borrow Area Option 1/laydown area was used as a borrow area for previous construction of scrubbers at the facility and Phase 1 of the landfill (TVA 2006). The proposed Borrow Area Option 2 is comprised of regularly mowed herbaceous vegetation that closely resembles similar habitats found in pastures and old agricultural fields across east Tennessee. Neither areas contain plant habitats with conservation value.

Borrow Area Option 2 would be accessed using one of two haul road options. Haul Road Option 1 would utilize the transmission line ROW for development of the road. This area has been previously disturbed by the construction and operation of the existing transmission line. This site is currently dominated by species indicative of early successional, weedy habitats and does not possess conservation value. Haul Road Option 2 would require the construction of a new road through closed canopy forest. This option would require clearing of about 10 acres of deciduous forest, much of which is mature second growth. The forest varies in quality and is most disturbed on the southeastern edge. These disturbed areas contain overstory trees that average between 4- and 6-inches in diameter at breast height (dbh) and an understory dominated by the non-native Japanese stiltgrass. The interior of the forest is characterized by large canopy trees that often reach 24- to -30-inches dbh. Common overstory species include blackgum, red oak, southern red, sweetgum, and white oak with the occasional white pine. Midstory trees include dogwood, red maple, and sourwood with pawpaw and muscadine, often thick, in the shrub layer. The herbaceous layer is depauperate and contains few species. Neither proposed haul road alternatives intersect rare or unique plant communities; all habitats are common and well represented throughout the region.

3.7.2 Environmental Consequences

3.7.2.1 Alternative A – No Action

Wildlife

Under the No Action Alternative, TVA would not expand the project area boundary for the on-site landfill or develop a laydown area, borrow area, or haul road. Borrow material would have to come from an off-site source to construct the second phase of the landfill. Additionally, there would be insufficient laydown room to efficiently construct the landfill. Construction equipment and materials would be stored on other portions of the KIF property. Impacts to wildlife would not occur at the off-site location selected for borrow material because TVA would obtain the material from an established source.

Vegetation

Under the No Action Alternative, TVA would not expand the project area boundary for the on-site landfill or develop a laydown area, borrow area, and haul road. Borrow material would have to come from an off-site source to construct the second phase of the landfill. Additionally, there would be insufficient laydown room to efficiently construct the landfill. Construction equipment and materials would be stored on other portions of the KIF

property. Impacts to vegetation would not occur at the off-site location selected for borrow material because TVA would obtain the material from an established source.

As described in the 2006 EA, the construction and operation of the landfill would result in impacts to terrestrial vegetation and wildlife. Since no uncommon animal or plant species have been observed on the KIF property, TVA determined that the impacts to terrestrial vegetation and wildlife would not be significant.

3.7.2.2 Alternative B – Action Alternative

Under Alternative B, TVA would expand the project area boundary for the on-site landfill and develop a laydown area, borrow area, stormwater ponds, and haul road to facilitate construction of Phase 2 of the landfill.

Wildlife

Any wildlife (primarily common, habituated species) found in the project footprint would be permanently displaced when vegetation is removed. However, the actions are not likely to affect populations of species common to the area, as similar forested and early successional field habitat exists in the surrounding landscape. Direct effects to wildlife would be greater under Haul Road Option 2 as it provides contiguous closed canopy forest capable of providing habitat for a greater variety of common and less common wildlife species than the more disturbed Haul Road Option 1. Overall, 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.

Disturbances and habitat removal associated with the project would likely force wildlife to move into surrounding areas to find new food sources, shelter, and to reestablish territories. In the event that the surrounding areas are already overpopulated, further stress to wildlife populations could occur to those species presently utilizing these areas as well as those attempting to relocate. However, the proposed project area and surrounding landscape is highly fragmented and influenced by human activity. It includes fragmented forests, agricultural fields, TVA's KIF, residential homes in and near the town of Kingston, industrial buildings, highways, and county roads. It is unlikely that the species currently occupying habitat surrounding the project footprint would be negatively impacted by the influx of new wildlife.

Based on the relatively small amount of habitat proposed for removal and the significant amount of disturbance in the areas immediately adjacent to the proposed action, populations of migratory birds are not likely to inhabit the proposed action area. No active, documented osprey nests or heronries are known within 660 feet of the proposed action or would be impacted by the proposed action. Migratory bird populations are not likely to be impacted by the proposed action.

Vegetation

The proposed action would result in clearing, grading, removal of borrow material, and staging of construction related equipment on-site. Most of these areas are currently heavily disturbed and do not contain intact native plant communities. Adoption of this alternative would not change that situation. Utilization of Haul Road Option 2 would require clearing of about 10 acres of forest, much of which is mature and relatively free of non-native species. Using Haul Road Option 2 would have slightly greater impacts compared to using Haul Road Option 1, but these impacts would not be significant. The mature forest that would be impacted does not represent a unique or rare plant community and the habitat is common and well represented throughout the region. The vegetation found on site is comprised of

non-native weeds and early successional plants that have no conservation value. Once the laydown area and borrow area are no longer needed, TVA would revegetate those areas. Adoption of Alternative B would not negatively impact vegetation of the region.

As described in the 2006 EA, the construction and operation of the landfill would result in impacts to terrestrial vegetation and wildlife. Since no uncommon animal or plant species have been observed on the KIF property, TVA determined that the impacts to terrestrial vegetation and wildlife would not be significant.

3.8 Threatened and Endangered Species

3.8.1 Affected Environment

Terrestrial Wildlife

A review of the TVA Regional Heritage database on November 6, 2017 and August 31, 2018, resulted in no state-listed species within three miles of the project footprint. However, there are records of two federally listed terrestrial animal species (piping plover and red knot) within three miles of the KIF property. Two federally listed species (gray bat and northern long-eared bat), a candidate species for federal listing (Berry Cave salamander), and a federally delisted and monitored species (bald eagle) are known to occur in Roane County, Tennessee. Additionally, the US Fish and Wildlife Service has determined that the federally endangered Indiana bat has the potential to occur in the project action area (Table 3-3).

Common Name	Scientific Name	Federal Status ²	State Status ² (Rank ³)
AMPHIBIANS			
Berry Cave salamander ⁴	Gyrinophilus gulolineatus	С	T(S1)
BIRDS			
Bald eagle ⁵	Haliaeetus leucocephalus	DM	D(S3)
Piping plover	Charadrius melodus	LE	
Red knot	Calidris canutus	PS	
MAMMALS			
Gray bat⁵	Myotis grisescens	LE	E(S2)
Indiana bat ⁶	Myotis sodalis	LE	E(S1)
Northern long-eared bat ⁵	Myotis septentrionalis	LT	-(S1S2)

Table 3-3: Federally Listed Terrestrial Animal Species located within Roane County,Tennessee and other species of conservation documented within threemiles of the project area

Source: TVA Regional Natural Heritage Database, extracted 11/6/2017; USFWS Information for Planning and Conservation (https://ecos.fws.gov/ipac/), accessed 11/6/2017 and 08/31/2018.

² Status Codes: C= Candidate for listing; D= Deemed in need of management; DM = Delisted but monitored; E =

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

⁶ Federally listed species whose range includes Roane County, Tennessee, though no records are known from this county.

Endangered; LE = Listed Endangered; LT = Listed Threatened; PS = Partial Status; T = Threatened

⁴ A subspecies of the red knot (*Calidris canutus rufa*) is federally threatened and may use stop over grounds in Tennessee during migration. Red knot (*Calidris canutus*) was observed at KIF in September of 1980.

⁵ Federally listed or protected species known from Roane County, Tennessee but not from within three miles of the project footprint.

Bald eagles are protected under the Bald and Golden Eagle Protection Act (USFWS 2013). This species is associated with larger mature trees capable of supporting its massive nests. These are usually found near larger waterways where the eagles forage (Turcotte and Watts 1999). Although bald eagles have been observed perched on KIF property prior to 2008, today the nearest bald eagle nesting record is approximately 5.3 miles away from the project footprint. No bald eagles or their nests were observed in or near the project footprint during field reviews performed on March 17, 2017; October 26, 2017; July 20, 2018; and November 28, 2018.

The Berry Cave salamander is a candidate for federal listing. This amphibian is an aquatic, cave-obligate species reported from only from 11 locations in Tennessee, 10 of which are from caves (Niemiller, et al. 2018). No caves are known within three miles of the project action area and none was observed during field reviews. The closest record of Berry Cave salamander is approximately 9.6 miles from the project footprint.

Piping plovers forage in exposed sand flats, mudflats, sandy beaches, stream shorelines, and ephemeral ponds (USFWS 2003). Similarly, red knot feeds along sandy beaches and mudflats for invertebrates, especially mollusks (National Geographic 2002, NatureServe 2017). The populations of piping plover that can be found in the Tennessee Valley Region are rare fall and spring migrants, while populations of red knot in the Tennessee Valley are accidental fall migrants (Fowler 1983, Robinson 1990, Henry 2012). In the past, both red knot and piping plover have been observed foraging at the KIF ash ponds during fall migration (Fowler 1983). Suitable habitat for piping plover and red knot does not occur in the proposed project action area for the laydown area and borrow areas.

Gray bat inhabits caves throughout the year, migrating among different caves across seasons (Brady et al. 1982, Tuttle 1976). During summer, bats disperse from colonies at dusk to forage for insects over streams, rivers, and reservoirs (Harvey 1992). The nearest gray bat hibernacula is approximately 5.9 miles from the project footprint. No caves or other roosting habitat has been documented within three miles of the project footprint and none was observed in the action area during field reviews. Drinking water and foraging habitat for gray bat exists over the Clinch and Emory Rivers adjacent to the project footprint as well as a small pond, stream, and wetlands within the project footprint.

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). Although Roane County is within the range of this species, no records of this species are known from this county. No caves have been documented within a three-mile radius of the project footprint and no other suitable winter roosting habitat was observed in the project footprint during field reviews. Drinking water and foraging habitat for Indiana bat exists over the Clinch and Emory Rivers adjacent to the project footprint as well as a small pond, stream, and wetlands within the project footprint. Foraging habitat for Indiana bat also exists above tree canopies and along forested edges within the project footprint. During field reviews on March 17, 2017, and October 26, 2017, 2.8 acres of forest in Phase 2 and the proposed Borrow Area Option 1/laydown area were identified as suitable summer roosting habitat for Indiana bat (See Figure 3-6). Field surveys of the proposed haul roads options on July 20, 2018 did not identify any suitable roosting habitat along Haul Road Option 1 whereas the entire forest along proposed Haul Road Option 2 (9.8 acres) provides high quality summer roosting

habitat for Indiana bat. Additional field surveys on November 28, 2018 identified more suitable summer roosting habitat in the proposed landfill site (1.3 acres) and at the proposed location for stormwater infrastructure at the Borrow Area Option 2 (0.5 acres).



Figure 3-6: Suitable Bat Habitat within the Project Area

The northern long-eared bat predominantly overwinters in large hibernacula such as caves, abandoned mines, and cave-like structures. During the fall and spring, they utilize entrances of caves and the surrounding forested areas for swarming and staging. In the summer, northern long-eared bats roost individually or in colonies beneath exfoliating bark or in crevices of both live and dead trees. Roost selection by the northern long-eared bat is similar to the Indiana bat; however, it is thought that northern long-eared bats are more opportunistic in roost site selection. This species is also known to roost in abandoned buildings and under bridges. Northern long-eared bats emerge at dusk to forage below the canopy of mature forests on hillsides and roads, and occasionally over forest clearings and along riparian areas (Harvey et al. 2011; USFWS 2014; USFWS 2017). The closest known record of northern long-eared bat is from a mist capture approximately 6.1 miles from the project footprint. No caves have been documented within a three-mile radius of the project footprint and no other suitable winter roosting habitat was observed in the project footprint during field reviews. Drinking water for the northern long-eared bat exists in the Clinch and Emory Rivers adjacent to the project footprint as well as a pond and small streams. Foraging habitat for the northern long-eared bat also exists under forested canopies within the project footprint. During field review on March 17, 2017, and October 26, 2017, 2.8

acres of forest were identified as suitable summer roosting habitat for northern long-eared bat within Phase 2 and Borrow Area Option 1/laydown area (See Figure 3-6). Field surveys of the proposed haul roads options on July 20, 2018 did not identify any suitable roosting habitat along Haul Road Option 1. However, the entire forest along proposed Haul Road Option 2 (9.8 acres) provides high quality summer roosting habitat for northern long-eared bat. Additional field surveys on November 28, 2018 identified more suitable summer roosting habitat in the proposed landfill site (1.3 acres) and at the proposed location for stormwater infrastructure at the Borrow Area Option 2 (0.5 acres).

Aquatic Wildlife

A query of the TVA Natural Heritage Database (October 10, 2017 and December 14, 2018) for records of state and/or federally listed aquatic animal species within ten miles of the proposed project, indicated nine federally listed as endangered (8 mussels, 1 fish), one federally listed threatened fish, and five state-listed fish species (Table 3-4).

Common Name	Scientific Name	Element Rank ²	Federal Status ³	State Status ³	State Rank⁴
CRAYFISH				0.000	
Emory River Crayfish	Cambarus sp. 1	H?			S1
FISH					
	Etheostoma				
Ashy Darter	cinereum	E		Т	S2S3
Blue Sucker	Cycleptus elongatus Hemitremia	Х		Т	S2
Flame Chub	flammea	Н		D	S3
Highfin Carpsucker	Carpiodes velifer Percina	H?		D	S2S3
Longhead Darter	macrocephala	E		Т	S2
Slender Chub	Erimystax cahni	Х	LT	Т	S1
Spotfin Chub	Erimonax monachus	E	LT	Т	S2
Tangerine Darter	Percina aurantiaca Chrosomus	E		D	S3
Tennessee Dace	tennesseensis	E		D	S3
Yellowfin Madtom	Noturus flavipinnis	Х	LT	E	S1
INSECTS					
Incurved Cave Isopod	Caecidotea incurva	Н			S1
MUSSELS					
Alabama Lampmussel	Lampsilis virescens	E	LE	E	S1
Birdwing Pearlymussel	Lemiox rimosus	Х	LE	E	S1
Cracking Pearlymussel	Hemistena lata Medionidus	Х	LE	Е	S1
Cumberland Moccasinshell	conradicus	E			S3
Dromedary Pearlymussel	Dromus dromas	Х	LE	Е	S1
Fanshell	Cyprogenia stegaria	Х	LE	Е	S1
Fine-rayed Pigtoe	Fusconaia cuneolus	Н	LE	Е	S1

Table 3-4: Records of federal and state-listed aquatic animal species known within
the 10-digit HUC's Clinch Rive (0601020704) and Emory River
(0601020804) watersheds, a 10-mile radius of Kingston Fossil Plant¹

Common Namo	Scientific Name	Element	Federal Status ³	State Status ³	State
Green Blossom	Enioblasma torulosa	Nalik	Status	Status	nalin
Pearlymussel	gubernaculum Plethobasus	Х	LE	Е	SX
Orange-foot Pimpleback	cooperianus Epioblasma	Н	LE	Е	S1
Oyster Mussel	capsaeformis	Е	LE	Е	S1
Pink Mucket	Lampsilis abrupta	Н	LE	Е	S2
Purple Bean	Villosa perpurpurea	Е	LE	Е	S1
Pyramid Pigtoe	Pleurobema rubrum	H?			S1S2
Rainbow Mussel	Villosa iris	Е			
Rough Pigtoe	Pleurobema plenum Plethobasus	Х	LE	Е	S1
Sheepnose	cyphyus	E	LE		S2S3
Shiny Pigtoe Pearlymussel	Fusconaia cor Pleuronaia	Н	LE	E	S1
Slabside Pearlymussel	dolabelloides Cumberlandia	H?	LE		S2
Spectaclecase	monodonta Epioblasma	Н	LE		S2S3
Tan Riffleshell	, florentina walkeri Pleurobema	Х	LE	Е	S1
Tennessee Clubshell	oviforme Fusconaia	H?			S2S3
Tennessee Pigtoe Turaid Blossom	barnesiana Epioblasma	E			
Pearlymussel	turgidula Plethobasus	Х	LE	Е	SX
White Wartyback	cicatricosus	Н	LE	Е	S1
SNAILS					
Anthony's River Snail	Athearnia anthonyi	Х	LE	E	S1
Ornate Rocksnail	Lithasia geniculata	Н			S2
Spiny Riversnail	lo fluvialis	Е			S2

¹ Source: TVA Natural Heritage Database, queried on 10/10/2017 and 12/14/2018

² Heritage Element Occurrence Rank; E = extant record ≤25 years old; H = historical record ≥25 years old; X = extirpated; H? = Possibly Historical.

³ Status Codes: É, LE, or END = Listed Endangered; LT or THR - Listed Threatened; D = Deemed in need of management. ⁴ State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; SX = Extirpated.

Vegetation

A November 2017 and August 2018 query of the TVA Heritage database indicates that no federally-listed and sixteen state-listed plant species are known from within five miles of the proposed project area. Four federally listed plants have been previously reported from Roane County, Tennessee, where the project would be located (Table 3-5). A field review of the KIF property indicates that no habitat for federal or state-listed plant species occurs in the potential affected area. The habitat on site has been severely degraded and is populated primarily with non-native species. Forested habitats are relatively intact, but do not contain habitat for state- or federally-listed plants. No designated critical habitat for plants occurs in the proposed project area.

Common Name	Scientific Name	Federal Status ²	State Status ²	State Rank ³
PLANTS				
Earleaf Foxglove American Hart's-tongue	Agalinis auriculata Asplenium scolopendrium var.	-	Е	S2
Fern ⁴	americanum	Т	Е	S1
Spreading False-foxglove	Aureolaria patula		S	S3
Cumberland Rosemary ⁴	Conradina verticillata	Т	Т	S3
Tall Larkspur Northern Bush-	Delphinium exaltatum	-	Е	S2
honeysuckle Mountain Bush-	Diervilla lonicera	-	Т	S2
honeysuckle	Diervilla sessilifolia var. rivularis	-	Т	S2
Western Wallflower	Erysimum capitatum	-	E	S1S2
Schreber Aster	Eurybia schreberi	-	S	S1
Naked-stem sunflower	Helianthus occidentalis	-	S	S2
Fetter-bush	Leucothoe racemosa	-	Т	S2
Slender Blazing-star	Liatris cylindracea	-	Т	S2
Mountain Honeysuckle Large-flowered Barbara's-	Lonicera dioica	-	S	S2
buttons	Marshallia grandiflora	-	E	S2
American ginseng	Panax quinquefolius	-	S-C	S3S4
Monkey-face Orchid ⁴	Platanthera integrilabia	Т	END	S2S3
Heller's Catfoot	Pseudognaphalium helleri	-	S	S2
Prairie Goldenrod	Solidago ptarmicoides	-	Е	S1S2
Virginia Spiraea ⁴	Spiraea virginiana	Т	Е	S2
Northern White Cedar	Thuja occidentalis	-	S	S 3

Table 3-5: Plant species of conservation concern known from within five miles of the Kingston Fossil Plant Dewatering Facility project area

¹ Source: TVA Natural Heritage Database, queried November 2017 and August 2018.

² Status Codes: E = Listed Endangered; S = Special Concern; S-C = Special Concern/Commercially Exploited; T = Listed Threatened.

³ State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure; S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2)

⁴ Federal-listed species occurring within the county where work would occur, but within 5 miles of the project area

3.8.2 Environmental Consequences

3.8.2.1 Alternative A – No Action

Terrestrial Wildlife

Under the No Action Alternative, TVA would not expand the project area boundary for the on-site landfill or develop a laydown area, borrow area, and haul road. Borrow material would have to come from an off-site source to construct the second phase of the landfill. Additionally, there would be insufficient laydown room to efficiently construct the landfill. Construction equipment and materials would be stored on other portions of the KIF property. Impacts to terrestrial threatened and endangered species would not occur at the off-site location selected for borrow material because there would be no physical change to existing conditions at the proposed borrow and laydown areas.

Habitat assessment surveys for Indiana bat and northern long-eared bat were performed on March 17, 2017; October 26, 2017; July 20, 2018; and November 28, 2018 using the USFWS 2018 and 2017 Range-wide Indiana bat Summer Survey Guidelines. Habitat assessments of the Borrow Area Option 2 and landfill site identified 4.6 acres of trees scattered across seven fragments as potentially suitable summer roosting habitat for Indiana bat and northern long-eared bat.

The No Action Alternative includes removal of up to approximately 4.6 acres of suitable summer roosting habitat for Indiana bat and northern long-eared bat. As part of TVA's ESA programmatic biological assessment for bats, TVA programmatically quantified and minimized removal of potentially suitable summer roosting habitat during time of potential occupancy by Indiana bat and northern long-eared bat so that the project area is not within any known habitat for either species of bat. Accordingly, TVA will track and document removal of potentially suitable summer roost trees and include in annual reporting in accordance with Section 7(a)(2) consultation. Additionally, if removal of suitable bat roost tree habitat is required when bats may be present on the landscape, TVA would set aside funding to be applied towards future bat-specific conservation projects. TVA currently plans to conduct the tree removal between October 15 and March 31, when Indiana and northern long-eared bats are not on the landscape. This would avoid any potential direct impact to juvenile bats at a time when they are unable to fly.

A number of activities associated with the proposed project were addressed in TVA's programmatic consultation with the USFWS on routine actions and federally listed bats in accordance with ESA Section 7(a)(2) and completed in April 2018. For those activities with potential to affect bats, TVA committed to implementing specific conservation measures. Therefore, direct and indirect impacts to federally-listed bat species are expected to be minor. These activities and associated conservation measures are identified in TVA's Bat Strategy Project Assessment.

Aquatic Wildlife

Under the No Action Alternative, TVA would not expand the project area boundary for the on-site landfill or develop a laydown area, borrow area, and haul road. Borrow material would have to come from an off-area source to construct the second phase of the landfill. Additionally, there would be insufficient laydown room to efficiently construct the landfill. Construction equipment and materials would be stored on other portions of the KIF property. Impacts to aquatic threatened and endangered species would not occur at the off-site location selected for borrow material because there would be no physical change to existing conditions at the proposed borrow and laydown areas.

The construction of Phase 2 of the landfill could affect aquatic life either directly by the alteration of habitat conditions or indirectly due to modification of riparian zones and stormwater runoff resulting from construction activities associated with the vegetation removal efforts. Potential impacts due to removal of streamside vegetation within the riparian zone include increased erosion and siltation, loss of in-stream habitat, and increased stream temperatures. Other potential construction impacts include alteration of stream banks and stream bottoms by heavy equipment and runoff of herbicides into streams.

The streams documented within the proposed project footprint would be protected by BMPs as defined in TDEC (2012) or as required by standard permit conditions. These categories of protection are based on the variety of species and habitats that exist in the streams as well as the state and federal requirements to avoid harming certain species. No suitable habitat was documented occurring within the identified streams within the landfill and

borrow area. Therefore, with appropriate implementation of BMPs and adherence to permit conditions, no impacts to federal or state-listed aquatic species are anticipated to occur as a result of the No Action Alternative.

Vegetation

Under the No Action Alternative, TVA would not expand the project area boundary for the on-site landfill or develop a laydown area, borrow area, and haul road. Borrow material would have to come from an off-site source to construct the second phase of the landfill. Additionally, there would be insufficient laydown room to efficiently construct the landfill. Construction equipment and materials would be stored on other portions of the KIF property. Impacts to threatened and endangered plant species would not occur at the off-site location selected for borrow material because there would be no physical change to existing conditions at the proposed borrow and laydown areas.

Construction, operation, and maintenance on the KIF plant site has resulted in significant disturbance that makes the project area incapable of supporting threatened or endangered plant species. The construction of Phase 2 of the landfill would result in some additional disturbance on the KIF site, but the action would not affect federal or state-listed plants because those species are not present.

3.8.2.2 Alternative B – Action Alternative

Under Alternative B, TVA would expand the project area boundary for the on-site landfill and develop a laydown area, borrow area, stormwater ponds, and haul road to facilitate construction of Phase 2 of the landfill.

Terrestrial Wildlife

Suitable habitat for Berry Cave salamanders, piping plover, and red knot does not occur in the project action area nor would it be impacted by the proposed action. No bald eagle nests are known to exist within the project rea and none were observed during field reviews. Therefore, TVA has determined these proposed actions would have no effect on bald eagles, Berry Cave salamanders, piping plover, or red knot.

Alternative B would impact some areas of existing wetlands, streams, and a pond used for foraging and drinking water by gray bats, Indiana bats, and northern long-eared bats. Additionally, the proposed action could remove up to 13.1 acres of forested habitat for the proposed borrow areas and landfill, 0.8 acres along Haul Road Option 1 and 9.8 acres along Haul Road Option 2 which could remove additional foraging habitat for Indiana bat and northern long-eared bat. However, suitable foraging habitat, as well as the Clinch and Emory Rivers, exist adjacent to the project area and would not be impacted.

Habitat assessment surveys for Indiana bat and the northern long-eared bat were performed on March 17, 2017; October 26, 2017; July 20, 2018; and November 28, 2018 using the USFWS 2018 and 2017 *Range-wide Indiana bat Summer Survey Guidelines*. Habitat assessments of Borrow Area Option 2 identified 4.6 acres of trees scattered across seven fragments as potentially suitable summer roosting habitat for Indiana bat and northern long-eared bat. Habitat assessment of Haul Road Option 1 did not observe any suitable summer roosting habitat for either species. In contrast, Haul Road Option 2 was comprised of 9.8 acres of suitable summer roosting habitat for both bat species.

Alternative B includes removal of up to approximately 14.4 acres of suitable summer roosting habitat for Indiana bat and northern long-eared bat. As part of TVA's ESA programmatic biological assessment for bats, TVA programmatically quantified and minimized removal of potentially suitable summer roosting habitat during time of potential

occupancy by Indiana bat and northern long-eared bat. Therefore, the project area is not within any known habitat for either species of bat. Accordingly, TVA will track and document removal of potentially suitable summer roost trees and include in annual reporting in accordance with Section 7(a)(2) consultation.

In April 2018, TVA completed a Programmatic Consultation under Section 7 of the ESA with the US FWS through which potential impacts to federally listed bats for actions such as this landfill were considered. Conservation Measures were developed as a part of this consultation to minimize potential impacts to these species and will be implemented during this project. While mitigation was not a requirement that came from this Programmatic Consultation, TVA does undergo many stewardship projects associated with recovery of federally listed bats. Projects are located in biologically relevant areas where they are most likely to benefit the species. Recent projects include installing artificial bat roosting structures, installing gates at known bat roosts to protect hibernating bats, and partnering with other agencies to protect lands with known maternity roosting sites.

Aquatic Wildlife

The proposed action could affect aquatic life either directly by the alteration of habitat conditions or indirectly due to modification of riparian zones and stormwater runoff resulting from construction activities associated with the vegetation removal efforts. Potential impacts due to removal of streamside vegetation within the riparian zone include increased erosion and siltation, loss of in-stream habitat, and increased stream temperatures. Other potential construction impacts include alteration of stream banks and stream bottoms by heavy equipment and runoff of herbicides into streams.

The streams documented within the proposed project footprint would be protected by BMPs as defined in TDEC (2012) or as required by standard permit conditions. These categories of protection are based on the variety of species and habitats that exist in the streams as well as the state and federal requirements to avoid harming certain species. No suitable habitat was documented occurring within the identified streams within the landfill and borrow site area. Therefore, with appropriate implementation of BMPs and adherence to permit conditions, no impacts to federal or state-listed aquatic species are anticipated to occur as a result of the proposed TVA actions.

Vegetation

Construction, operation, and maintenance on the KIF property has resulted in significant disturbance that makes the laydown area, borrow areas, and haul road options incapable of supporting threatened or endangered plant species. Portions of Haul Road Option 2 do support intact plant communities, but no habitat for listed species was observed during field surveys of the site. Adoption of Alternative B would result in some additional disturbance on the KIF property, but the action would not affect federal or state-listed plants because those species are not present.

3.9 Cultural Resources

3.9.1 Affected Environment

Federal agencies are required by the National Historic Preservation Act (NHPA) and NEPA to consider the possible effects of their undertakings on historic properties. The term "undertaking" means any project, activity, or program that is funded under the direct or indirect jurisdiction of a federal agency or is licensed, permitted, or assisted by a federal agency. An agency may fulfill its statutory obligations under NEPA by following the process outlined in the implementing regulations.

Under the regulations implementing Section 106 of the NHPA (36 CFR Part 800), considering an undertaking's possible effects on historic properties is accomplished through a four-step review process: (1) initiation (defining the undertaking and the area of potential effects (APE), and identifying the consulting parties); (2) identification (studies to determine whether cultural resources are present in the APE and whether they qualify as historic properties); (3) assessment of adverse effects (determining whether the undertaking would damage the qualities that make the property eligible for the National Register of Historic Places (NRHP)); and (4) resolution of adverse effects (by avoidance, minimization, or mitigation). Throughout the process the agency must consult with the appropriate State Historic Preservation Officer (SHPO), federally-recognized Indian tribes that have an interest in the undertaking, and any other party with a vested interest in the undertaking.

Cultural resources include prehistoric and historic archaeological sites, districts, buildings, structures, and objects, and locations of important historic events that lack material evidence of those events. Cultural resources that are included or considered eligible for inclusion in the NRHP maintained by the National Park Service are called historic properties. To be included or considered eligible for inclusion in the NRHP, a cultural resource must possess integrity of location, design, setting, materials, workmanship, feeling, and association. In addition, it must also meet one of four criteria: (a) association with important historical events; (b) association with the lives of significant historic persons; (c) having distinctive characteristics of a type, period, or method of construction, or representing the work of a master, or having high artistic value; or (d) having yielded or having the potential to yield information important in history or prehistory.

An undertaking may have effects on a historic property that are not adverse, if those effects do not diminish the gualities of the property that identify it as eligible for listing on the NRHP. However, if the agency determines (in consultation) that the undertaking's effect on a historic property within the APE would diminish any of the qualities that make the property eligible for the NRHP (based on the criteria for evaluation at 36 CFR 60.4), the effect is said to be adverse. Examples of adverse effects would be ground disturbing activity in an archaeological site, or erecting structures within the viewshed of a historic building in such a way as to diminish the structure's integrity of feeling or setting. Federal agencies are required to resolve the adverse effects of their undertakings on historic properties. Resolution may consist of avoidance (such as choosing a project alternative that does not result in adverse effects), minimization (such as redesign to lessen the effects), or mitigation. Adverse effects to archaeological sites are typically mitigated avoiding the site, or by means of excavation to recover the important scientific information contained within the site. Mitigation of adverse effects to historic structures sometimes involves thorough documentation of the structure by compiling historic records, studies, and photographs. Agencies are required to consult with SHPOs, tribes, and others throughout the Section 106 process and to document adverse effects to historic properties resulting from agency undertakings.

The APE is the geographic area or areas within which as undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist. The APE consists of the Project Area as shown in Figure 1-1, where direct effects to historic properties could occur, and areas within a 0.805-km (0.5 mile) radius surrounding the proposed landfill and borrow areas from which the proposed facilities would be visible.

Three previous cultural resources surveys have been conducted within parts of the APE. In 2003, TRC Companies, Inc. (Wild et al. 2003) conducted a cultural resources survey (including an archaeological survey and survey of historic architectural properties) associated with the 120-acre tract of land proposed for a disposal area. The survey

identified three isolated finds, all of which were recommended ineligible for the NRHP. TRC revisited the area in 2005 (D'Angelo 2005) and conducted an archaeological investigation for the proposed scrubber site and barge loading facility for KIF. This survey identified eight isolated finds and revisited four previously unrecorded archaeological sites. Three of the previously recorded sites were relocated. TRC recommended that two of these (40RE142 and 40RE143) have been disturbed and are ineligible for the NRHP, and that 4RE45 is potentially ineligible. Avoidance or additional investigations were recommended for 40RE45. All three sites are located outside the APE. TVA consulted with the TN SHPO and federally-recognized Indian tribes. The SHPO agreed with TVA's finding of "no historic properties affected" by letter dated March 9, 2006, and no consulted tribe objected or identified resources of concern.

In 2017, Tennessee Valley Archaeological Research (Rosenwinkel 2017) conducted a cultural resources investigation over the proposed borrow area and haul road over a portion of the APE. Three previously unrecorded architectural resources (IS-1 to IS-3) and one previously unrecorded archaeological site (40RE612) within the APE, and all of these resources were determined to be ineligible for the NRHP by TVA in consultation with the Tennessee SHPO. The SHPO agreed with TVA's finding of "no historic properties affected" by letter dated February 15, 2018, and no consulted tribe objected or identified resources of concern.

Two areas that are part of the landfill expansion APE were not included in the three prior cultural resources surveys: an approximately 5.2-acre area largely within the transmission line corridor, and an approximately 20.2-acre area encompassing two alternate haul roads and a proposed stormwater runoff basin. Therefore TVA carried out additional investigations to determine if archaeological sites or historic architectural resources are located in these parts of the APE.

In September of 2018, TVA conducted a phase I archaeological survey (Manning et al. 2018) of the approximately 20.2-acre area encompassing two alternate haul roads and a proposed stormwater runoff basin. One previously identified archaeological site, 40RE612, is located in the survey area. The field survey consisted of pedestrian survey and systematic shovel testing and included a re-visit of site 40RE612. The survey identified one artifact associated with 40RE612, and TVA expanded the site boundary to include the area from which the artifact was recovered. Based on analysis of the collected data, TVA determined that 40RE612 is ineligible for inclusion in the NRHP due to a lack of research potential. The survey also identified a previously unrecorded site (40RE618) and five isolated finds of artifacts. Site 40RE618 is associated with the location of a non-extant structure shown on the 1935 and 1940 editions of the USGS Elverton, TN 7.5-minute topographic quadrangle, and as "ruins" on the 1968 edition of that quadrangle. The site consists of a scatter of historic artifacts associated with the early-to-mid-twentieth-century homestead of Edgar Mahoney; remains of some structures are still visible at the site but there are no standing structures. The investigation did not indicate that the site has research potential or is associated with any persons or events significant in history. Based on this investigation TVA determined that 40RE618 and all five isolated finds are ineligible for inclusion in the NRHP. TVA consulted with the TN SHPO and federally-recognized Indian tribes. The SHPO agreed with TVA's finding of "no historic properties affected" by letter dated December 17, 2018, and no consulted tribe objected or identified resources of concern. The UGSS guadrangle maps indicate that a cemetery associated with the Mahoney homestead is located southwest of the APE. A cemetery is also indicated on TVA's ca. 1940 land acquisition map for Melton Hill Reservoir, less than 50 feet east of the mapped location of the Mahoney Cemetery and labelled "Green Cem. (Public), 40 ±

graves". The archaeological survey did not include a visit to either cemetery location because these locations are outside the area where direct effects resulting from the undertaking could occur. Both historic cemetery locations are currently covered by a thick stand of vegetation and would have no direct line of site to the haul roads, landfill, or borrow areas.

TVA archaeologists conducted a field review of the 5.2-acre area in December 2018. This survey consisted of a pedestrian survey, the excavation of five shovel test pits (STP) within the APE, and a visual examination of above-ground resources within a half mile radius. These opportunistic STPs confirmed that the area had been previously disturbed. The soils encountered consisted of shallow top soil underlain by clay loam subsoil. No archaeological sites were identified by the field review.

Based on all the previous cultural resources investigations in the APE, TVA finds that no historic architectural properties or archaeological sites eligible for inclusion in the NRHP are located in the APE.

3.9.2 Environmental Consequences

3.9.2.1 Alternative A – No Action

Under the No Action Alternative, TVA would not expand the project area boundary for the on-site landfill or develop a laydown area, borrow area, and haul road. Borrow material would have to come from an off-site source to construct the second phase of the landfill. Additionally, there would be insufficient laydown room to efficiently construct the landfill. Construction equipment and materials would be stored on other portions of the KIF property. Impacts to cultural resources would not occur as TVA would select an established off-site source for borrow material because there would be no physical change to existing conditions at the proposed borrow and laydown areas.

3.9.2.2 Alternative B – Action Alternative

Under Alternative B, TVA would expand the project area boundary for the on-site landfill and develop a laydown area, borrow area, stormwater ponds, and haul road to facilitate construction of Phase 2 of the landfill.

The entire APE has been surveyed for both archaeological and architectural resources. TVA has determined, in consultation with the TN SHPO and federally-recognized Indian tribes, that the proposed laydown area, borrow areas and haul roads would not affect any archaeological sites or historic properties included in or eligible for inclusion in the NRHP. The relevant correspondence is provided in Appendix A.

3.10 Cumulative Effects

The 2006 and 2010 EAs evaluated impacts to the environment as a result of the construction and operation of the landfill at KIF. The proposed action, when added to impacts from the construction and operation of the landfill and the ongoing operation of KIF, would contribute minor impacts to the cumulative air, noise, surface water, wastewater, and floodplain impacts from the other aspects of the project in its entirety. The proposed action would only contribute to these impacts temporarily, while Phase 2 of the landfill is being constructed. The proposed project would not contribute cumulatively to impacts related to aquatic ecology, groundwater quality, solid and hazardous waste, transportation, visual resources, terrestrial ecology, or threatened and endangered species.

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

Development of the proposed borrow area would alter the land use. However, the shortterm use of the land for this purpose would not significantly alter long-term productivity of other natural resources because the land would be revegetated once the borrow area has been exhausted.

3.12 Irreversible and Irretrievable Commitments of Resources

The proposed action would support the construction of Phase 2 of the landfill at KIF. The 22-acre proposed Borrow Area Option 1/laydown area contains vegetation that may need to be removed once an exact location for the borrow/laydown area is selected. Vegetation would be removed in order to develop the 21-acre Borrow Area Option 2 and Haul Road Option 1. If this vegetation is removed, it could remove roosting and foraging habitat for the Indiana bat and northern long-eared bat. Both areas would be revegetated once they are no longer in use; however, roosting habitat could not be replaced. Mitigation for these impacts is discussed in Section 3.8.2. The proposed action would have no other irreversible or irretrievable commitments of natural resources. Impacts from the construction and operation of the landfill were evaluated in the 2006 and 2010 EAs. The construction of the landfill, borrow sites, laydown area and haul road would result in approximately 0.91 acre of permanent impacts to wetlands. TVA would offset these impacts by the restoration activities TVA undertook for the development of the 27-acre Drowning Creek Mitigation Site. The proposed action would have no additional irreversible or irretrievable commitments of negative and haul road would result in approximately 0.91 acre of permanent impacts to wetlands. TVA would offset these impacts by the restoration activities TVA undertook for the development of the 27-acre Drowning Creek Mitigation Site. The proposed action would have no additional irreversible or irretrievable commitments of resources to the impacts described in those EAs.

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CHAPTER 5 – LIST OF PREPARERS

5.1 NEPA Project Management

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5.2 Other Contributors

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Appendix A – Correspondence

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TVA'S ENDANGERED SPECIES ACT - BAT PROGRAMMATIC CONSULTATION PROJECT SPECIFIC CONSERVATION MEASURES

From:	Hamrick, Elizabeth Burton
То:	robbie_sykes@fws.gov; ross_shaw@fws.gov
Subject:	RE: Notification in accordance with TVA Programmatic Consultation for Routine Actions and Federally listed bats
Date:	Monday, May 20, 2019 12:48:00 PM
Attachments:	Completed_KIFLandfill_SEA_PwrPlants_TVA-Bat-Strategy_5.20.2019.pdf

Good afternoon,

TVA's programmatic ESA consultation on routine actions and bats was completed in April 2018. For projects with NLAA or LAA determinations, TVA is providing project-specific notification to relevant Ecological Service Field Offices. This notification also will be stored in the project administrative record. For projects that utilize Take issued through the Biological Opinion, that Take will be tracked and reported in TVA's annual report to the USFWS by March of the following year.

The attached form is serving at TVA's mechanism to determine if project-specific activities are within the scope of TVA's bat programmatic consultation and if there is project-specific potential for impact to covered bat species, necessitating conservation measures, which are identified for the project on page 5. The form also is serving as the primary means of notification to the USFWS and others as needed.

Project: Kingston Landfill Supplemental EA, Roane County, TN – TVA proposes to expand the project area for the on-site landfill at KIF. Actions include construction of Phase II of the landfill, development of a new 21 acres borrow site, development of 22 acres for possible laydown areas, and the development of one of two possible haul routes. At this time, the haul route is proposed to stay within the transmission line ROW. 4.6 acres of potential bat habitat would be removed in winter. No known caves occur within 3 miles. No Indiana bat or NLEB records in Roane county. Wetland and stream impacts would be appropriately mitigated. Best Management Practices would be used.

Thank you.

Liz Hamrick

Terrestrial Zoologist Biological Compliance

400 W Summit Hill Dr. WT 11C-K Knoxville, TN 37902

865-632-4011 (w) ecburton@tva.gov

Project Review Form - TVA Bat Strategy (12/2018)

This form should **only** be completed if project includes activities in Tables 2 or 3 (STEP 2 below). This form is not required if project activities are limited to Table 1 (STEP 2) or otherwise determined to have no effect on federally listed bats. If so, include the following statement in your environmental compliance document (e.g., add as a comment in the project CEC): "Project activities limited to Bat Strategy Table 1 or otherwise determined to have no effect on federally listed bats. Bat Strategy Project Review Form NOT required." This form is to assist in determining required conservation measures per TVA's ESA Section 7 programmatic consultation for routine actions and federally listed bats.¹

Project Name:	Kingston Landfill Supplemental EA			May 6, 2019	
Contact(s):	Doug White CEC#:		Projec	t ID:	2017-28
Project Locatio	n (City, County, State):	Kingston Fossil Plant - Kingston, TN			

Project Description:

The purpose of the project is to expand the project area for the on-site landfill at KIF. Actions include construction of Phase II of the landfill, development of a new 21 acres borrow site, development of 22 acres for possible laydown areas, and the development of one

of two possible haul routes. At this time, the haul route is proposed to stay within the transmission line ROW.

SECTION 1: PROJECT INFORMATION - ACTION AND ACTIVITIES

STEP 1) Select TVA Action. If none are applicable, contact environmental staff or Terrestrial Zoologist to discuss whether form (i.e., application of Bat Programmatic Consultation) is appropriate for project:

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, 2, and 3 below that are included in the proposed project.

TABLE 1. Activities with no effect to bats. Conservation measures & completion of bat strategy project review form NOT required.								
1. Loans and/or grant awards	8. Sale of TVA property	 19. Site-specific enhancements in streams and reservoirs for aquatic animals 						
2. Purchase of property	9. Lease of TVA property	20. Nesting platforms						
3. Purchase of equipment for industrial facilities	10. Deed modification associated with TVA rights or TVA property	41. Minor water-based structures (this does not include boat docks, boat slips or piers)						
4. Environmental education	11. Abandonment of TVA retained rights	42. Internal renovation or internal expansion of an existing facility						
5. Transfer of ROW easement and/or ROW equipment	12. Sufferance agreement	☐ 43. Replacement or removal of TL poles						
6. Property and/or equipment transfer	13. Engineering or environmental planning or studies	44. Conductor and overhead ground wire installation and replacement						
7. Easement on TVA property	14. Harbor limits	49. Non-navigable houseboats						

TABLE 2. Activities not likely to adversely affect bats with implementation of conservation measures. Conservation measures and completion of bat strategy project review form REQUIRED; review of bat records in proximity to project NOT required.

18. Erosion control, minor	57. Water intake - non-industrial	79. Swimming pools/associated equipment
24. Tree planting	58. Wastewater outfalls	81. Water intakes – industrial
30. Dredging and excavation; recessed harbor areas	59. Marine fueling facilities	84. On-site/off-site public utility relocation or construction or extension
39. Berm development	60. Commercial water-use facilities (e.g., marinas)	85. Playground equipment - land-based
40. Closed loop heat exchangers (heat pumps)	61. Septic fields	87. Aboveground storage tanks
45. Stream monitoring equipment - placement and use	66. Private, residential docks, piers, boathouses	88. Underground storage tanks
46. Floating boat slips within approved harbor limits	67. Siting of temporary office trailers	90. Pond closure
48. Laydown areas	68. Financing for speculative building construction	93. Standard License
50. Minor land based structures	72. Ferry landings/service operations	94. Special Use License
51. Signage installation	74. Recreational vehicle campsites	95. Recreation License
53. Mooring buoys or posts	75. Utility lines/light poles	96. Land Use Permit
56. Culverts	76. Concrete sidewalks	

Table 3: Activities that may adversely affect federally listed bats. Conservation measures AND completion of bat strategy project review form REQUIRED; review of bat records in proximity of project REQUIRED by OSAR/Heritage eMap reviewer or Terrestrial Zoologist.

15.	Windshield and ground surveys for archaeological resources	34.	Mechanical vegetation removal, includes trees or tree branches > 3 inches in diameter	69.	Renovation of existing structures
16.	Drilling	35.	Stabilization (major erosion control)	70.	Lock maintenance/ construction
17.	Mechanical vegetation removal, does not include trees or branches > 3" in diameter (in Table 3 due to potential for woody burn piles)	36.	Grading	71.	Concrete dam modification
21.	Herbicide use	37.	Installation of soil improvements	73.	Boat launching ramps
22.	Grubbing	38.	Drain installations for ponds	77.	Construction or expansion of land-based buildings
23.	Prescribed burns	47.	Conduit installation	78.	Wastewater treatment plants
25.	Maintenance, improvement or construction of pedestrian or vehicular access corridors	52.	Floating buildings	80.	Barge fleeting areas
26.	Maintenance/construction of access control measures	54.	Maintenance of water control structures (dewatering units, spillways, levees)	82.	Construction of dam/weirs/ levees
27.	Restoration of sites following human use and abuse	55.	. Solar panels	83.	Submarine pipeline, directional boring operations
28.	Removal of debris (e.g., dump sites, hazardous material, unauthorized structures)	62.	Blasting	86.	Landfill construction
29.	Acquisition and use of fill/borrow material	63.	. Foundation installation for transmission support	89.	Structure demolition
31.	Stream/wetland crossings	64.	Installation of steel structure, overhead bus, equipment, etc.	91.	Bridge replacement
32.	Clean-up following storm damage	65.	Pole and/or tower installation and/or extension	92.	Return of archaeological remains to former burial sites
33.	Removal of hazardous trees/tree branches				

STEP 3) Project includes one or more activities in Table 3?
STEP 4) Answer questions a through e below (applies to projects with activities from Table 3 ONLY)

- a) Will project project involve continuous noise (i.e., ≥ 24 hrs) that is greater than 75 decibels measured on the A scale (e.g., loud machinery)?
- NO (NV2 does not apply)
- YES (NV2 applies, subject to records review)
- **b)** Will project involve entry into/survey of cave, bridge, other structure (potential bat roost)?
- NO (HP1/HP2 do not apply)
 YES (HP1/HP2 applies, subject to review of bat records)

N/A

and timeframe(s) below;

 $\bigcirc N/A$

c) If conducting prescribed burning (activity 23), estimated acreage:	

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 - May 31, Aug 1 – Sept 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 - May 31, Aug 1 – Sept 30	🔲 Jun 1 - Jul 31

d) Will the project involve vegetation piling/burning?

O NO (SSPC4/ SHF7/SHF8 do not apply)

• YES (SSPC4/SHF7/SHF8 applies, subject to review of bat records)

●ac ∩trees

e) If tree removal (activity 33 or 34), estimated amount: 4.6

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 - May 31, Aug 1 – Sept 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 - May 31, Aug 1 – Sept 30	🔲 Jun 1 - Jul 31

If warranted, does project have flexibility for bat surveys (May 15-Aug 15): MAYBE YES NO

SECTION 2: REVIEW OF BAT RECORDS (applies to projects with activities from Table 3 ONLY)

STEP 5) Review of bat/cave records conducted by Heritage/OSAR reviewer?

• YES O NO (If NO and includes Table 3 activities, submit project / relevant information [e.g., maps] for review by Terrestrial Zoologist.)

Info below completed by: Heritage Reviewer (name)	Date			
OSAR Reviewer (name)	Date			
Terrestrial Zoologist (name) Elizabeth Hamrick	Date	May 20, 2019		
Gray bat records: 🗌 None 🗌 Within 3 miles* 🛛 Within a cave* 🖂 With	in the County			
Indiana bat records: 🛛 None 🗌 Within 10 miles* 🗌 Within a cave* 🗌 Capt	ure/roost tree* 🛛 Within	n the County		
Northern long-eared bat records: 🛛 None 🔄 Within 5 miles* 📄 Within a cave* 📄 Capture/roost tree* 📄 Within the County				
Virginia big-eared bat records: 🛛 🕅 None 🔄 Within 10 miles* 🔄 Within the County				
Caves: 🔀 None within 3 mi 🗌 Within 3 miles but > 0.5 mi 📄 Within 0.5 mi but > 0.25 mi* 📄 Within 0.25 mi but > 200 feet*				
Within 200 feet*				
Bat Habitat Inspection Sheet completed? NO YES 				
Amount of SUITABLE habitat to be removed/burned (may differ from STEP 4e): 4.6 (@ac Otrees)* ON/A				

STEP 6) If reviewed by Heritage/OSAR reviewer, does records review trigger need for additional review by Terrestrial Zoologist (noted by * in Step 5)?

 \bigcirc

○ NO (Go to Step 13) ● YES (Su Zoolog

• YES (Submit for Terrestrial Zoology review) YES, however, based on Heritage Data review guidelines (or discussion with Terrestrial Zoology), project does not need to be submitted to Terrestrial Zoology for review. (Go to Step 13)

	Notes (addition	al information	from field	l review o	r explanation	of no ir	npact)
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STEPS 7-12 To be Completed by Terrestrial Zoologist (if warranted):

STEP 7) Project will involve:

	Removal of suitable trees within 0.5 mile of P1-P2 Indiana bat hibernacula or 0.25 mile of P3-P4 Indiana bat hibernacula or any NLEB hibernacula.
\square	Removal of suitable trees within 10 miles of documented Indiana bat (or within 5 miles of NLEB) hibernacula.

Removal of suitable trees > 10 miles from documented Indiana bat (> 5 miles from NLEB) hibernacula.

Removal of trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity roost tree.

Removal of suitable trees within 2.5 miles of Indiana bat roost trees or within 5 miles of Indiana bat capture sites.

Removal of suitable trees > 2.5 miles from Indiana bat roost trees or > 5 miles from Indiana bat capture sites.

Removal of documented Indiana bat or NLEB roost tree, if still suitable.

🗌 N/A

STEP 8) Presence/absence surveys were/will be conducted: 🔿 YES 💿 NO 🔗 TBD						
STEP 9) Presence/absence survey results, on ONEGATIVE OPOSITIVE INVA						
STEP 10) Project WILL WILL NOT require use of Incidental Take in the amount of 4.6 acres or tree				es or 🔿 trees		
proposed to be used during the WINTER VOLANT SEASON N/A N/A						
STEP 11) Available Incidental Take (prior to accounting for this project) as of May 20, 2019						
TVA Action	Total 20-year	Winter	Vola	nt Season	Non-Vola	int Season
5 Operate, Maintain, Retire, Expand, Construct Power Plants	2,200	1,454.45	2	249.47	72	2.48
STEP 12) Amount contributed to TVA's Bat Conservation Fund upon activity completion: \$				pletion: \$ 0		OR ON/A

SECTION 3: REQUIRED CONSERVATION MEASURES	
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STEP 13a) **If answer to STEP 3 is NO**, (*Project Lead* or *OSAR/Heritage Reviewer*) is to review Conservation Measures in Table 4 and ensure these selected Conservation Measures are relevant to project. If not manually override and uncheck. **Step 14**

STEP 13b) If answer to STEP 3 is YES, and answer to STEP 6 is NO, OSAR/Heritage Reviewer is to review Conservation	Cata
Measures in Table 4 that and ensure these selected Conservation Measures are relevant to project. If not manually	Go lo Stop 1/
override and uncheck.	Step 14

STEP 13c) If answer to STEP 3 is YES, and answer to STEP 6 is YES, <u>Terrestrial Zoologist</u> is to review Conservation	Cata
Measures in Table 4 and ensure these selected Conservation Measures are relevant to project. If not manually override and	G0 t0
uncheck.	Step 15

Table 4. TVA's ESA Section 7 Programmatic Bat Consultation Required Conservation Measures

The Conservation Measures in Table 4 are automatically selected based on your choices in Tables 2 and 3 but can be manually overridden, if necessary. To Manually override, press the button and enter your name.

Manual Override

Name: Elizabeth Hamrick

Check if applies to Project	Activities Subject to Conservation Measure	Conservation Measure Description
	15, 16, 17, 18, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 45, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 90, 91, 92, 93, 94, 95, 96	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.
	33, 34	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.
	33, 34	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.
	33, 34	TR9 - If removal of suitable summer roosting habitat occurs when bats are present on the landscape, a funding contribution (based on amount of habitat removed) towards future conservation and recovery efforts for federally listed bats would be carried out. Project can consider seasonal bat presence/absence surveys (mist netting or emergence counts) that allow for positive detections without resulting in increased constraints in cost and project schedule. This will enable TVA to contribute to increased knowledge of bat presence on the landscape while carrying out TVA's broad mission and responsibilities.
	16, 17, 18, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 48, 50, 51, 52, 53, 54, 55, 58, 59, 60, 61, 62, 63, 64, 65, 67, 70, 71, 73, 76, 77, 78, 80, 81, 82, 83, 86, 87, 88, 89, 90	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.

Check if applies to Project	Activities Subject to Conservation Measure	Conservation Measure Description
Check if applies to Project	Activities Subject to Conservation Measure	 SPC3 (Power Plants only) - Power Plant actions and activities will continue to implement standard environmental practices. These include: Best Management Practices (BMPs) in accordance with regulations: Ensure proper disposal of waste, ex: used rags, used oil, empty containers, general trash, dependent on plant policy Maintain every site with well-equipped spill response kits, included in some heavy equipment Conduct Quarterly Internal Environmental Field Assessments at each sight Every project must have an approved work package that actonatins an environmental checklist that is approved by sight Environmental Health & Safety consultant. When refueling, vehicle is positioned as close to pump as possible to prevent drips, and overfilling of tank. Hose and nozzle are held in a vertical position to prevent spillage Construction Site Protection Methods Sediment basin for runoff - used to trap sediments and temporarily detain runoff on larger construction sites Storm drain protection device Check dam to help slow down silt flow Siti fencing to reduce sediment movement Storm Water Pollution Prevention (SWPP) Pollution Control Strategies Minimize storm water contact with disturbed solis at construction site Protect disturbed soil areas from erosion Minimize storm water contact with disturbed solis of waste, ex used rags, used oil, empty containers, general trash, depending on size of land disturbance (>1ac) Every site has a Spill Prevention and Control Countermeasures (SPCC) Plan and requires training. Several hundred pieces of equipment often managed at the same time on power generation properties. Goal is to Minimize sequipment the amatement 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 Minimize sediment i
		 construction and substance (>1ac) construction 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
	16, 26, 36, 37, 38, 39, 48, 50, 52, 59, 60, 62, 66, 67, 69, 72, 75, 77, 78, 79, 86	L1 - Direct temporary lighting away from suitable habitat during the active season.
	16, 26, 36, 37, 38, 39, 48, 50, 52, 59, 60, 62, 66, 67, 69, 72, 75, 77, 78, 79, 86	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).
	i	

¹Bats addressed in consultation (02/2018), which includes gray bat (listed in 1976), Indiana bat (listed in 1967), northern long-eared bat (listed in 2015), and Virginia big-eared bat (listed in 1979).

Hide All Unchecked Conservation Measures

HIDE

○ UNHIDE

STEP 14) Save completed form in project environmental documentation (e.g., CEC, Appendix to EA) AND send a copy of form to **batstrategy@tva.gov.** Submission of this form indicates that Project Lead/Applicant:

(name) is (or will be made) aware of the requirements below.

- Implementation of conservation measures identified in Table 4 is required to comply with TVA's Endangered Species Act programmatic bat consultation.
- TVA may conduct post-project monitoring to determine if conservation measures were effective in minimizing or avoiding impacts to federally listed bats.

STEP 15) For Use by Terrestrial Zoologist if Project and Form are Submitted for Review

🔀 Terrestrial Zoologist acknowledges that Project Lead/Contact (name)	Doug White	has been informed on

May 20, 2019

(date) of any relevant conservation measures and/or provided a copy of this form.

For projects that require use of Take and/or contribution to TVA's Bat Conservation Fund, Terrestrial Zoologist acknowledges that Project Lead/Contact has been informed that project will result in use of Incidental Take 4.6 ac trees and that use of Take will require 0 contribution to TVA's Conservation Fund upon completion of activity (amount entered should be \$0 if cleared in winter).

Finalize and Print to Noneditable PDF. Changes to form cannot be made after this button is selected.

KIF Landfill/Borrow Site Conservation Measures (Required to meet in order to use Bat Programmatic Consultation)

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 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.

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.

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 longeared bat.
- 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.
- 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.

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:

- 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.
- 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.

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 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).

Additional Avoidance and Minimization Measures <u>TVA would implement the following measures to avoid or minimize the stressors listed</u> <u>above.</u>

- 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.

NATIONAL HISTORIC PRESERVATION ACT – SECTION 106 CONSULTATION



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902

February 15, 2018

Mr. E. Patrick McIntyre, Jr. Executive Director Tennessee Historical Commission 2941 Lebanon Pike Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA), KINGSTON FOSSIL PLANT (KIF), LANDFILL EXPANDSION, WATTS, ROANE COUNTY, TENNESSEE

TVA is proposing an approximate 120 acres (48.6 hectares) expansion of the landfill project boundary at the Kingston Fossil Plant (KIF) in Roane County, Tennessee (35.897539°, - 84.499807°) (Figure 1). This expansion is to include a laydown area, borrow site, and access road. The proposed expansion is so TVA can adequately and effectively construct the second phase of the landfill.

TVA considers the archaeological APE for the proposed undertaking to be all ground disturbing activities associated with the aforementioned expansion (Figure 1). TVA has determined the area of potential effects (APE) for the above ground architectural resources to be areas within 0.5-mile radius of the proposed undertaking and have a direct line of sight to the undertaking (Figure 2).

TVA has conducted three previous Cultural Resources surveys within the APE. In 2003 TRC (Wild et al 2003) conducted a Cultural Resources survey associated with the 120 acre (48.5 hectares) tract of land proposed for a disposal area and identified two isolated finds. Approximately 58.7 acres (23.8 hectares) of the 120 acres are situated within the current archaeological APE. TRC revisited the area in 2005 (D'Angelo 2005) and conducted an archaeological investigation for the proposed scrubber site and barge loading facility for the Kingston Steam Plant and identified one previously unrecorded archaeological site. This survey encompassed approximately 105 acres (42.5 hectares), of which 35 acres (14.2 hectares) are situated within the current archaeological APE. Both isolated finds and the previously unrecorded archaeological resource identified during these two surveys were determined ineligible for the NRHP.

In 2017, Tennessee Valley Archaeological Research (Rosenwinkel 2017) conducted a Cultural Resources investigation over the proposed borrow area and haul road over a portion of the APE, encompassing approximately 21 acres ((8.5 hectares), all of which are within the

Mr. E. Patrick McIntyre, Jr. Page 2 February 15, 2018

current archaeological APE. Three previously unrecorded architectural resources (IS-1 – IS-3) and one previously unrecorded archaeological site (40RE612) within the APE, and all of these resources were determined to be ineligible for the NRHP.

In December 2017, TVA Cultural Compliance staff conducted a reconnaissance survey of the remaining 5.2 acres (2.1 hectares) of the current archaeological APE. This survey consisted of a pedestrian survey, the excavation of five shovel test pits (STP) within the APE (Figure 3), and a visual examination of architectural APE (Figures 4 - 7). These opportunistic STPs confirmed that the area had been previously disturbed (Figure 8). The soils encountered consisted of shallow top soil underlain by clay loam with no cultural material recovered or cultural deposits identified. Two soil associations are present within the APE: Waynesboro loam, 6 to 25 percent slope, found on stream terraces, back slopes, and side slopes consisting of a clayey alluvium derived from limestone, sandstone, and shale (Natural Resources Conservation Service 2018).

The soils encountered in STP 1 were a dark brown (7.5YR 3/3) silty clay loam (0-4 cmbs), underlain by a brownish yellow (10YR 6/8) clay loam (4-23 cmbs), underlain by a yellowish red (5YR 5/8) clay (23+ cmbs). The soils encountered in STP 2 were a dark brown (7.5YR 3/3) silty clay loam (0-6 cmbs), underlain by a brownish yellow (10YR 6/8) clay loam (6-18 cmbs), underlain by a yellowish red (5YR 5/8) clay (18+ cmbs). The soils encountered in STP 3 were a dark brown (7.5YR 3/3) silty clay loam (0-4 cmbs), underlain by a brownish yellow (10YR 6/8) clay (23+ cmbs), underlain by a yellowish red (5YR 5/8) clay (23+ cmbs). The soils encountered in STP 4 were a dark brown (7.5YR 3/3) silty clay loam (0-6 cmbs), underlain by a brownish yellow (10YR 6/8) clay loam (0-6 cmbs), underlain by a brownish yellow (10YR 6/8) clay loam (21+ cmbs). The soils encountered in STP 5 were a dark brown (7.5YR 3/3) silty clay loam (0-4 cmbs), underlain by a brownish yellow (10YR 6/8) clay loam (0-4 cmbs), underlain by a brownish yellow (10YR 6/8) clay loam (0-6 cmbs), underlain by a brownish yellow (10YR 6/8) clay loam (4-23 cmbs), underlain by a yellowish red (5YR 5/8) clay (21+ cmbs). The soils encountered in STP 5 were a dark brown (7.5YR 3/3) silty clay loam (0-4 cmbs), underlain by a brownish yellow (10YR 6/8) clay loam (4-23 cmbs), underlain by a yellowish red (5YR 5/8) clay (21+ cmbs). The soils encountered in STP 5 were a dark brown (7.5YR 3/3) silty clay loam (0-4 cmbs), underlain by a brownish yellow (10YR 6/8) clay loam (4-23 cmbs), underlain by a yellowish red (5YR 5/8) clay loam (0-4 cmbs), underlain by a brownish yellow (10YR 6/8) clay loam (4-23 cmbs), underlain by a yellowish red (5YR 5/8) clay loam (0-4 cmbs), underlain by a brownish yellow (10YR 6/8) clay loam (4-23 cmbs), underlain by a yellowish red (5YR 5/8) clay (23+ cmbs).

The entire APE has been surveyed for both archaeological and architectural resources and there were no resources either included or eligible for inclusion in the National Register of Historic Places (NRHP) identified with the APEs.

Based on the results of the aforementioned Cultural Resources surveys, TVA has determined that the proposed desulfurization landfill expansion would not affect any historic properties included in or eligible for inclusion in the NRHP.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding properties within the proposed project's APE that may be of religious and cultural significance to them and eligible for the NRHP.

Pursuant to 36 CFR Part 800.4(d)(1), we are seeking your concurrence with TVA's findings that the undertaking would not affect any historic properties eligible or listed on the NRHP.

Mr. E. Patrick McIntyre, Jr. Page 3 February 15, 2018

If you have any questions, please contact Marianne Shuler by phone, (865) 632-2464 or by email, mmshuler@tva.gov.

Sincerely,

Clinton E. Jones Manager Cultural Compliance

BAC:ABM Enclosures cc (Enclosures): Ms. Jennifer Barnett Tennessee Division of Archaeology 1216 Foster Avenue, Cole Bldg. #3 Nashville, Tennessee 3721

References

D'Angelo, James D.

2005 Phase I Archaeological Survey of an Approximately 105-Acre Tract and 2.6 Miles of Shoreline for proposed Scrubber Site and Barge Loading Facility for Kingston Steam Plant in Roane County, Tennessee. Report Submitted to Tennessee Valley Authority, Knoxville, Tennessee.

National Resources Conservation Service

2018 Web Soil Survey. <u>https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx</u>. Accessed February 5, 2018.

Rosenwinkel, Heidi, Ted Karpynec, Megan Weaver, Cassie Medeiros, and Elinor Crook.

2017 A Phase I Cultural Resources Survey of a Proposed Borrow Pit and Associated Access Road in Roane County, Tennessee. Report Submitted to Tennessee Valley Authority, Knoxville, Tennessee.

Wild, Michael J., Ted Karpynec, Kristin Wilson, and Jeffery Holland.

2003 Cultural Resources Survey of an Approximately 120-Acre Tract for Proposed Storage/Disposal Area Near Kingston Steam Plant in Roane County, Tennessee. Report Submitted to Tennessee Valley Authority, Knoxville, Tennessee. INTERNAL COPIES ONLY, NOT TO BE INCLUDED WITH OUTGOING LETTER:

A. Michelle Cagley, KFP 1T-KST Bradley A. Creswell, WT 11C-K Marty M. Gamble, WT 11C-K Susan R. Jacks, WT 11C-K Marianne M. Shuler, WT 11D-K M. Susan Smelley, BR 4A-C Lori A. Whitehorse, WT 11D-K W. Douglas White, WT 11D-K ECM, WT CA-K



Figure 1. Aerial view of the archaeological APE.



Figure 2. 0.5-mile architectural APE.



Figure 3. Archaeological APE and STP locations of TVA 2017 reconnaissance survey.



Figure 4. Viewshed, north.



Figure 5. Viewshed, south.



Figure 6. Viewshed, east.



Figure 7. Viewshed, west.



Figure 8. Typical soil profile across the APE (STP 1).



TENNESSEE HISTORICAL COMMISSION STATE HISTORIC PRESERVATION OFFICE 2941 LEBANON PIKE NASHVILLE, TENNESSEE 37243-0442 OFFICE: (615) 532-1550 www.tnhistoricalcommission.org

March 1, 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, Kingston Fossil Plant Landfill Expansion, Watts Bar Reservoir, Kingston, Roane County, TN

Dear Mr. Jones:

In response to your request, we have reviewed the previously submitted cultural resources survey report and accompanying documentation submitted by you regarding the abovereferenced 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,

Pateril Midity, R.

E. Patrick McIntyre, Jr. Executive Director and State Historic Preservation Officer

EPM/jmb



Absentee Shawnee Tribe of Oklahoma

Cultural/Tribal Historic Preservation Department 2025 S. Gordon Cooper Dr. Shawnee, Oklahoma 74801 Phone: (405) 275-4030 ext 6340

2/26/18

RE: KINGSTON FOSSIL PLANT, LANDFILL EXPANSION, WATTS, ROANE 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 February 15, 2018. We find after review of this information that we concur with your findings of no adverse affects.

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 eligible 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 <u>ethompson@astribe.com</u>



THE MUSCOGEE (CREEK) NATION

JAMES R. FLOYD PRINCIPAL CHIEF

LOUIS A. HICKS SECOND CHIEF



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

December 7, 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), KINGSTON FOSSIL PLANT (KIF), LANDFILL EXPANSION, RE-DETERMINED AREA OF POTENTIAL EFFECTS (APE), ROANE COUNTY, TENNESSEE (35.897539° N, 84.499807° W)

TVA proposes to expand the boundary of the on-site landfill at KIF in Roane County, Tennessee. The proposed expansion is to include additional acreage for a new laydown area, borrow site, haul road, and stormwater management. The proposal is needed so TVA can adequately and effectively construct the second phase of the landfill (our letter to your office dated February 15, 2018 and your response dated March 8, 2018). To date, TVA has conducted three archaeological surveys (Wild et al. 2003, D'Angelo 2005, and Rosenwinkel 2017) of various parts of the APE. In addition, TVA staff conducted a field review of a 5.2-acre area within the APE that was not included in those surveys, as we described in our February 15, 2018 letter. Our offices have agreed that the undertaking would not affect historic properties.

The proposed boundary expansion would include two haul road alternatives to access the proposed borrow site. One option incorporates additional width to the existing haul road design. A second option would be a new haul route located south of the transmission line corridor. In addition, TVA is considering the use of a soil borrow in connection with construction of the proposed CCR landfill. Although nearly the entire soil borrow would be within areas that were surveyed previously, and where no archaeological sites were identified, a small portion of the affected area would extend outside the previously-defined APE. Therefore, TVA has redetermined the undertaking's APE to include this latter area as well as the haul road alternatives.

TVA contracted with Tennessee Valley Archaeological Research (TVAR) for a Phase I Archaeological survey of these additional areas, which cumulatively total approximately 20.2 acres. Two bound copies of the draft report, titled, *A Phase I Archaeological Survey for the Tennessee Valley Authority's Planned Storm Water Basin and Associated Haul Roads in Roane County, Tennessee*, are enclosed along with electronic copies on CD.

Background research performed prior to the field survey revealed that one previously identified archaeological site, 40RE612, is located in the survey area. The field survey consisted of

Mr. E. Patrick McIntyre, Jr. Page 2 December 7, 2018

pedestrian survey and systematic shovel testing and included a re-visit of site 40RE612. The survey identified one artifact associated with 40RE612, and TVAR expanded the site boundary to include the area from which the artifact was recovered. Based on analysis of the collected data TVAR recommends that 40RE612 is ineligible for inclusion in the National Register of Historic Places (NRHP). The survey also identified a previously unrecorded site (40RE618) and five isolated finds of artifacts. TVAR recommends that 40RE618 and all five isolated finds are ineligible for inclusion in the NRHP. TVAR recommends no further archaeological investigations in connection with the proposed undertaking.

We have read the enclosed report and agree with the authors' findings and recommendations. TVA finds that the expanded portion of the APE contains no historic properties. TVA continues to find that the proposed landfill expansion project will result in no effects on historic properties.

Pursuant to 36 CFR Part 800.4(d)(1), we are seeking your comment on the enclosed report and on TVA's finding that no historic properties are located in this additional portion of the APE.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding historic properties within the APE that may be of religious and cultural significance and eligible for listing in the NRHP.

Should you have any questions or comments, please contact Steve Cole in Knoxville by email, sccole0@tva.gov or by phone, (865) 632-2551.

Sincerely,

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

D'Angelo, James D.

- 2005 Phase I Archaeological Survey of An Approximately 105-Acre Tract and 2.6 Miles of Shoreline for Proposed Scrubber Site and Barge Loading Facility for Kingston Steam Plan in Roane County, Tennessee, Phase I Archaeological Survey of a 4-Acre Borrow Area at the Bull Run Fossil Plant in Anderson County, Tennessee. Submitted to TVA, Norris, Tennessee. Submitted by TRC, Atlanta, Georgia.
- Rosenwinkel, Heidi, Ted Karpynec, Megan Weaver, Cassie Medeiros, and Elinor Crook. 2017 *A Phase I Cultural Resources Survey of a Proposed Borrow Pit and Associated Access Road in Roane County, Tennessee*. Report Submitted to Tennessee Valley Authority, Knoxville, Tennessee. Report submitted by Tennessee Valley Archaeological Research, Huntsville, Alabama.

Wild, Michael J., Ted Karpynec, Kristin Wilson, and Jeffery L. Holland

2002 Cultural Resources Survey of an Approximately 120-Acre Tract for Proposed Storage/Disposal Area Near Kingston Steam Plant in Roane County, Tennessee. Submitted to TVA, Norris, Tennessee. Submitted by TRC, Atlanta, Georgia. INTERNAL COPIES, NOT INCLUDED WITH OUTBOUND LETTER:

Lana D. Bean, WT 10 C-K Stephen C. Cole, WT 11B-K Patricia B. Ezzell, WT 7C-K Susan R. Jacks, WT 11C-K Paul J. Pearman, BR 4A-C M. Susan Smelley, BR 4A-C Dana M. Vaughn, WT 11B-K W. Douglas White, WT 11B-K Lori A. Whitehorse, WT 11B-K ECM, WT CA-K A Phase I Archaeological Survey for the Tennessee Valley Authority's Planned Soil Borrow and Proposed Haul Roads in Connection with a Proposed Landfill Expansion at Kingston Fossil Plant in Roane County, Tennessee



chnessee chaeological Research



TENNESSEE HISTORICAL COMMISSION STATE HISTORIC PRESERVATION OFFICE 2941 LEBANON PIKE NASHVILLE, TENNESSEE 37243-0442 OFFICE: (615) 532-1550 www.tnhistoricalcommission.org

December 17, 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, Kingston Fossil Plan, Landfill Expansion, Re-Determined Area of Potential Effects, Kingston, Roane 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).

In the final report, and future reports submitted by archaeological consultants, please remove eligibility notations from maps and figures. Inclusion of the consultant's eligibility recommendations in maps and figures can be misconstrued as eligibility determinations reached through consultation between your agency and our office.

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, Chty-

E. Patrick McIntyre, Jr. Executive Director and State Historic Preservation Officer

EPM/jmb

Appendix B – Responses to Comments on the Draft EA and Revised Draft EA

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An initial draft of the EA was released for public review and comment on February 14, 2018. Notice of availability of the initial draft EA was transmitted to state, federal, and local agencies and federally recognized tribes. It was also posted on TVA's Web site. The availability of the initial draft SEA was announced through a media release and direct mailings. The initial draft SEA was also posted on TVA's website. Comments were accepted through March 15, 2018 via TVA's Web site, mail, and e-mail. Five comments were received during the public and agency comment period. Three comments were received from the general public, one comment was received from the Roane County Environmental Review Board, and one comment was received from the U.S. Environmental Protection Agency. Responses to all comments received are found below. A complete copy of each of the comments is included in Appendix A.

 Comment TVA sprayed under the power lines in back of my house - they also sprayed the bank at the side of my house. Now it is caving in on me. I had it planted with flowers vines and bushes so it wouldn't wash away. I have lived here over 30 years. Never any trouble. I think TVA should come out and see what they have done and fix it. I am all alone and I can't get out there shovel dirt. (Commenter: Dorothy Wright)

Response: Comment noted however, this comment is outside the scope of this EA.

2. Comment: Update the wording (and the reference) of this SEA to reflect the Final (2018) TDEC NPDES Permit TN0005452 for TVA-KIF effluents. (Commenter: Lynne Roberson)

Response: Comment noted. This draft SEA was drafted prior to the 2018 update of the KIF TDEC NPDES permit. Update of the text to reflect the reissued permit will be reflected in the final document.

3. Comment: Make clear that although the TVA-KIF site was delisted from the TDEC 303(d) list, TVA plans to monitor this site for 30 years and for as long as the CCR and Effluent permits require it. (Commenter: Lynne Roberson)

Response: Comment Noted. TVA will comply with monitoring requirements of the NPDES permit, the CCR Rule and any other monitoring agreed upon with TDEC and/or the EPA.

4. Comment: Update information about mercury in the narrative so it is clear that the TVA-KIF site is a source of mercury in the environment that needs to be monitored over time.

With respect to mercury, the long-standing belief that methylmercury in fish is from DOE-Oak Ridge sources alone needs to be updated. The 2018 NPDES Permit TN0005452 includes concepts that pertain to mercury in effluents from the TVA-KIF site. I've also attached an article by Pracheil, et al. to show why mercury and other contaminants that bioaccumulate in the food web need to be acknowledged in this SEA narrative. [Note there are additional sources of mercury upstream on the Emory River though it is not clear that the paper and pulp mill is one of them (mentioned as a possibility in Pracheil's article). The paper and pulp mill site (ERM 11.5) is being assessed now by TDEC, TDH, ATSDR and EPA in a Superfund cleanup.] (Commenter: Lynne Roberson)

Response: The text has been updated in Section 3.4 to reflect the updated 2018 TDEC NPDES Permit monitoring requirements.

5. Comment: I have no additional comments about this SEA other than to say that the rationale for using the floodplain ("no practicable alternative") is disquieting. (Commenter: Lynne Roberson)

Response: Comment noted.

6. **Comment:** Is there a draft Environmental Assessment available for us to review and to provide comments? Or is this just a request for the public to respond generally?

The Roane County Environmental Review Board (RCERB), consisting of members with environmental and scientific backgrounds, serves the county in reviewing documents and issues that impact the environmental health of our county. Our members are appointed by the Roane County Commission, and the RCERB is a recognized county government entity. (Commenter: Mary Anne Koltowich, RCERB)

Response: An email was sent to Ms. Koltowich on February 22, 2018 indicating where the document can be downloaded from the TVA website, as well as indicating that a hard copy can be provided if requested. The initial draft EA was available on TVA's website at https://www.tva.gov/Environment/Environmental-Stewardship/Environmental-Stewardship/Environmental-Stewardship/Environmental-Reviews

7. Comment: I performed the first comprehensive hydrogeologic evaluation of the Peninsula Site (Site) as documented in Julian and Boggs (2005). It is important to note that I was not as a preparer for the 2006 Final Environmental Assessment (EA) which preceded the KIF dredge cell failure and promulgation of the Environmental Protection Agency (EPA) Coal Combustion Residuals (CCR) Rule.

As indicated in Julian and Boggs (2005), the FGD facility is situated in karst terrain and underlying bedrock is the Knox Group. This is the most problematic bedrock formation in East Tennessee with regard to adverse impacts associated with sinkhole development and potential catastrophic failures. With regard to the Site, there have been numerous problems associated with sinkhole development and groundwater contamination.

I had serious reservations with siting of a CCR facility at this location due to potential karst-related issues and had voiced these concerns to others (including TVA NEPA staff and fossil engineering staff). During Site characterization and report development, we were informed that design plans for the disposal facility would include i. a low-permeability liner and under-drain system, and ii. a groundwater monitoring system with monitoring ports beneath the landfill. This is documented in Julian and Boggs (2005) and our report language is include in the Final EA, although uncited. However, original construction of the FGD disposal facility did not include these features. Soil buffers are relatively inexpensive compared to synthetic liners and under-drain systems. Hence, environmental protection was sacrificed for cost reductions.

What type of liner and leachate system will be utilized for the Phase 2 portion of the FGD landfill - there is no description in the SEA? The SEA indicates that the Phase I portion of the landfill will be capped. Please provide a detailed description of methods and materials to be used in capping. (Commenter: Hank Jullian)

Response: Permit modifications, redesign and retrofit of the Phase 1 portion of the landfill occurred between 2011 and 2015 with a major permit modification of the solid

waste permit for the Phase 1 and 2 areas approved on September 29, 2015. The TDEC approved liner and leachate collection system for the entire Phase 1 and Phase 2 area consists of a minimum 2-feet of compacted low permeable clay, 60 mil synthetic liner, a double sided geocomposite cushion layer, and graded granular drainage layers. The drainage layers are sloped to a leachate collection piping system. Once final grades of the landfill are reached, the final cap system will consist of a minimum 1-foot compacted low permeable soil layer, a double sided geocomposite drainage layer, 40 mil textured geomembrane, minimum 1 foot protective soil cover, and 1-foot soil cover to support vegetative cover.

8. Comment: During construction of the FGD disposal facility, at least ten sinkholes developed within and adjacent to the facility. The term "construction drop-out" was used to identify the sinkholes. This required development of a sinkhole mitigation plan for construction (Geosyntec, 2008). At this time, design plans did not include an artificial liner or underdrain system. Furthermore, wet sluicing was planned for delivery of CCRs rather than dry handling. Infiltration associated with hydraulic loading can produce soil saturation, unraveling, and erosion into deeper bedrock fractures and solution features. The SEA should describe plans for mitigation of sinkholes associated with expansion, laydown and borrow areas. (Commenter: Hank Jullian)

Response: The commenter has good points regarding hydraulic infiltration. Following the installation of dewatering equipment for CCRs at Kingston Fossil Plant, all CCRs are now delivered to the landfill in a dry state. Wet sluicing to the original Phase 1A area ceased in May 2013. As part of the retrofit and permitting of the site described in the response to the previous comment, a subgrade investigation and remediation plan was developed and implement. In 2014-2015 during the major permit modification for the addition of fly ash as an approved waste stream to the landfill, extensive public comment was received which resulted in additional revisions to the remediation plan. This plan includes extensive undercutting, investigation (including geophysical methods), recompaction, and mitigation of any karst features encountered with third party engineer quality control and TDEC verification/approval of the subgrade. The final approved plan is included in the modified permit for the site dated June 2014 which was approved by TDEC on September 29, 2015.

9. Comment: During initial filling of the Site stormwater pond and pump testing in 2009, leakage was suspected by TVA. An evaluation of the stormwater pond was performed and is documented in Geosyntec (2009). The report indicated that it was impossible to account for observed leakage losses with average (bulk) calculations using a mean hydraulic conductivity value. Calculations suggested that a very small fracture aperture (approximately 0.34 inches) could produce the differences observed between observed and predicted seepage rates. Mitigation recommendations in the report were targeted toward minimizing hydraulic loading on soils beneath the stormwater pond using an impermeable barrier (e.g., geomembrane liner). TVA installed a geomembrane liner for the stormwater pond. However, original construction of the FGD disposal facility did not include s synthetic liner or leachate collection system. (Commenter: Hank Jullian)

Response: The commenter is correct, the original landfill design and construction did not include a synthetic liner or leachate collection system. However, as described in the response to previous comments, subsequent permit modifications rectified this. The entire Phase 1 area is constructed with a composite liner system which includes a synthetic liner, and a leachate collection system. These same components are included in the design for the Phase 2 area.

10. Comment: The stormwater pond is recipient to water from the FGD disposal facility and this water is has been directly discharged (via pipeline) to the KIF discharge channel (Outfall 01a). I recall that concentrations of selenium from the stormwater pond did not meet National Water Quality criteria. Historically, inflow and outflow selenium concentrations at the stormwater pond have been observed to be two orders of magnitude higher than TDEC water quality criteria. The SEA does not discuss this issue, nor is selenium even mentioned in the document. What are current discharge permit requirements and is TVA in compliance? Is TVA in compliance with all local, state, and federal water quality and aquatic life water quality criteria since the FGD facility has been in operation?

Is any treatment of FGD leachate and/or stormwater being conducted at the Site? If so, there should be a clear description in the SEA. The SEA indicates that "mitigation methods such as the use of waste water treatment or off-site disposal of leachate, could be implemented if impacts dictate they would be necessary". How would impacts be determined? A clear description of monitoring methods, protocols, metrics and criteria should be included in the SEA. (Commenter: Hank Jullian)

Response: State and Federal Water Quality Criteria are applicable in the receiving stream (Clinch River) after wastewater is discharged and mixed. The FGD waste stream and landfill leachate stream receive treatment through the FGD Process Water Basin and is then discharged to the Condenser Cooling Water Channel through an internal monitoring point (IMP)01A, where it is conveyed and discharged from Outfall 002 to the Clinch River. TVA submitted an updated NPDES renewal application in 2016, which included updated wastewater analytical data from surface water sampling collected at all applicable Outfalls and IMPs. The concentrations of selenium being discharged into the Clinch River were below detection (<0.002 mg/L) and below the current TDEC WQC.

Furthermore, per the rational of the reissued KIF NPDES permit (TDEC, effective April 1, 2018), it was found that no exceedances of published TDEC WQC for metals in the water column were evident in the mixing zone downstream of KIF at Clinch RM 2.3 and metals concentrations measured at the KIF intake of combined Emory and Clinch River waters closely match upstream concentrations at Clinch RM 10.0, which is the DWR ambient monitoring station. Additionally, annually conducted chronic NPDES Permit-required Whole Effluent Toxicity (WET) testing for KIF Fossil Plant from Outfall 002 has not resulted in permit exceedances, which further reinforces that the discharge does not cause or contribute to aquatic toxicity.

Wastewater treatment facility upgrades are planned for the discharges from the FGD process in order to comply with the 2015 Effluent Limitation Guidelines (ELGs) Update Rule in accordance with the applicability date schedule set in the reissued NPDES permit; however, those treatment technologies will be addressed in future NEPA evaluations and do not pertain to the proposed action in this SEA.

11. Comment: After completion of the FGD disposal facility, sluicing operations began and a large pond formed within the interior of the facility. On December 15, 2010, a sinkhole was confirmed at the Site during a routine inspection. The sinkhole occurred beneath the current
pond water surface and a drainage vortex was an indicator of the feature – i.e., water from the interior pond was discharging via the sinkhole. Diffuse flow associated with the sinkhole was observed on the northern bank of the Clinch River (approximately 291 ft south of the sinkhole). TDEC issued a Consent Order and TVA complied with the Order.

A Root Cause Analysis associated with the sinkhole was prepared by Geosyntec (2011) and the recommendation for an enhanced liner system for the facility (including a flexible membrane liner) was approved by TVA. To my knowledge, this is the first synthetic liner system ever installed at a TVA CCR disposal facility. TVA's decision to install the liner was also driven by the sinkhole collapse, the massive December 2008 Dredge Cell failure on the northern portion of the KIF plan site, and regulatory pressure.

Discharge into the subsurface (via the sinkhole) contaminated groundwater at the Site and the primary constituent of concern is selenium. As noted in the SEA, TDEC-mandated assessment monitoring has been performed. However, there has been no active remediation to reduce contaminant concentrations. Groundwater movement is to the Clinch River. Hence, the Clinch River is recipient to a continuous contaminant flux. Has there been any further consideration to remedy this situation or is dilution considered the solution? (Commenter: Hank Jullian)

Response: As a result of the noted subgrade drop out in the Phase 1 area, Root Cause analysis did result in a redesign and permit modification of the landfill. A subgrade mitigation plan was approved by TDEC and implemented. The landfill was retrofitted with a composite liner system consisting of compacted low permeable clay and synthetic liner along with a leachate collection system. The monitoring wells downgradient of and in close proximity to the dropout did begin to indicate elevated levels of constituents with selenium being detected above the regulatory maximum contaminant level (MCL). As a result, TDEC placed the site in Assessment Monitoring. Groundwater samples collected since 2011 have shown a steady decline in the detected levels of selenium with the levels now significantly below the MCL and approaching laboratory minimum detection limits. In accordance with State regulations, the site is sampled and reported on a quarterly basis.

12. Comment: Has recent groundwater monitoring been performed to determine if groundwater contamination extends beneath the Phase II disposal area? If so, what mitigation methods are proposed to handle this water if encountered during construction? (Commenter: Hank Jullian)

Response: Groundwater sampling has been conducted in wells downgradient of the Phase 2 area. Based on the data generated to date, there is no indication impacts from the previous dropout has impacted groundwater in the Phase 2 area.

13. Comment: Several sinkholes were observed in the proposed project laydown area when it was used as a borrow area for original construction at the Site. What mitigation efforts are proposed for sinkhole development in this area? (Commenter: Hank Jullian)

Response: Sinkhole areas would be avoided if possible and adequate BMPs including buffer zones would be implemented as needed to reduce impacts. Those resources that can not be avoided a Class V Injection Well Permit would be applied for and once approvals are in place mitigation would take place similar to those detailed in the *Work*

Plan for Identification and Mitigation of Drop-outs for the Peninsula Site and Phase II Area.

14. Comment: Has an assessment been performed to determine if a sinkhole of certain dimensions might result in breaching of the underlying liner? Given that FFGD waste has unique properties, if the liner is breached by a sizeable sinkhole, is there is a likelihood that it might not be observed at the upper FGD waste surface? Could this result in catastrophic collapse with time? (Commenter: Hank Jullian)

Response: During the development of the subgrade investigation and mitigation plan during the Major Permit Modification approved in 2015, the issue regarding potential sinkhole size and correlation to landfill liner damage was raised by TDEC and the public. An engineering study was undertaken by a third party consulting firm with the results reviewed and approved by TDEC staff specialists. The current subgrade investigation and mitigation plan and landfill design addressed this issue.

15. Comment: EPA's concerns with impacts to air, water, wetlands and noise are not significant and were adequately addressed in this SEA. EPA requests that this proposed action to construct and operate the laydown area, haul road and burrow pit adhere to the list of required permits or licenses (Section 1.7) and best management practices necessary for the implementation of these proposed actions. (Commenter: Larry Gissentanna, EPA)

Response: Comment noted.

Comments received on the revised Draft EA

A revised draft of the EA was released for public review and comment on April 5, 2019. Notice of availability of the initial draft EA was transmitted to state, federal, and local agencies and federally recognized tribes. The availability of the revised draft SEA was announced through a media release. The revised draft SEA was also posted on TVA's website. Comments were accepted through April 19, 2019 via mail, and e-mail. Three comments were received during the public and agency comment period. One comment was received from TDEC, one comment was received from the Roane County Environmental Review Board, and one comment was received from the U.S. Environmental Protection Agency. Responses to all comments received are found below. A complete copy of each of the comments is included in Appendix A.

1. Comment: TDEC believes the Draft SEA adequately addresses potential impacts to cultural and natural resources within the proposed project area (Kendra Abkowitz, PhD, TDEC).

Response: Comment noted.

2. Comment: Emissions are anticipated from machinery and equipment. There are no emissions estimates provided or modeling analysis of the possible mobile emissions associated with the heavy equipment and trucks/work crews potentially involved with the project. There are no estimates of fugitive dust emissions likely to be generated during the project. TDEC recommends that TVA consider including estimates or discussion of machinery and fugitive dust emissions in the Final SEA (Kendra Abkowitz, PhD, TDEC).

TVA Response: While TVA does not know the specific equipment the contractor would use, it is assumed that standard grading and earthmoving equipment such as bulldozers, excavators, off-road dump trucks, sheeps-foot rollers and motor-graders would be utilized. While, fugitive dust would be expected during construction activities, impacts are

expected to be minor as best management practices (BMPs) such as watering for dust suppression would be implemented. These BMPs would be described in detail in the project specific SWPPP.

3. Comment: Additionally, TDEC recommends implementing on-site vehicle emissions mitigation planning to insure that excessive vehicle idling is minimized. TDEC recommends the Final SEA reflect these recommendations (Kendra Abkowitz, PhD, TDEC).

TVA Response: While there are no specific regulations regarding vehicle idling, TVA does request that the contractor not idle equipment if not in use.

4. Comment: KIF is required to maintain a current Title V air permit in order to continue to operate. Fugitive dust control measures are required to be followed by Title V permitted sources. No modifications to the permit would be required if the specified measures to control fugitive dust are followed and potential fugitive dust emissions are of an insignificant nature (Kendra Abkowitz, PhD, TDEC).

TVA Response: Comment noted.

5. Comment: The approximately 43 acres identified in the proposed project are described as vegetated areas that will be cleared of vegetation before use. The resulting debris "would be disposed of in accordance with all federal, state, and local regulations". Open burning is not discussed in the SEA. If open burning is being considered for disposal of tree or vegetative growth, TDEC recommends that other methods of disposal be investigated and that open burning only be employed if no other suitable disposal methods are available. When considering open burning, TDEC recommends avoiding burning on days with poor smoke dispersion, not burning on air quality alert days, use of good smoke management practices when planning the open burning and insuring coordination with local and state air pollution control agencies, forestry agencies and local fire agencies prior to conducting any planned burning (Kendra Abkowitz, PhD, TDEC).

TVA Response: While burning wood debris is an option that could be utilized by the construction contractor, the construction contractor would most likely chip up any woody debris.

6. Comment: TDEC recommends that any wastes associated with the proposed action or its alternatives be managed in accordance with the Solid and Hazardous Waste Rules and Regulations of the State of Tennessee. TDEC recommends that the Final SEA reference that any wastes that are generated during the construction process or uncovered during site preparation are subject to the Solid and Hazardous Waste Rules and Regulations of the State of Tennessee (Kendra Abkowitz, PhD, TDEC).

TVA Response: The beginning of Chapter 3 of the Final SEA has been updated to discuss potential waste streams that could be generated during site preparation and landfill construction. All wastes will be disposed of in accordance with the U.S. EPA and the Solid and Hazardous Waste Rules and Regulations of the State of Tennessee.

7. Comment: TDEC concurs with TVA that an Aquatic Resource Alteration Permit (ARAP) permit will be necessary for the expansion of the project boundary area associated with the Action Alternative. The Action Alternative will also require a Construction Stormwater Permit with its Stormwater Pollution Prevention Plan. TDEC also anticipates that there will need to

be an update to the General NPDES Storm Water Multi-Sector General Permit for Industrial Activities. TVA needs to confirm that hydrologic determinations were done by a Tennessee certified hydrologic professional. TDEC encourages TVA to include these considerations in the Final SEA (Kendra Abkowitz, PhD, TDEC).

TVA Response: TVA confirms that the stream assessments performed in 2017 and 2018 were conducted by a Tennessee certified hydrologic professional.

In 2019, TDEC implemented a new model, the Tennessee Stream Quantification Tool (TN SQT) to ensure proposed mitigation projects adequately offset aquatic losses. In April 2019, a certified hydrologic professional conducted a stream quantification analysis within the project area to determine mitigation requirements related to stream impacts. Section 3.4 of the Final EA has been updated to reference the TN SQT data collection model.

8. Comment: The EPA understands that this proposed action will adequately support the construction of the second phase of the landfill. This current review is an amendment to the original proposal which was reviewed in TVA's 2006 Flue Gas Desulfurization System at Kingston Fossil Plant Environmental Assessment (EA). TVA has prepared this SEA to address the proposed construction support areas, and any changes to environmental conditions within the footprint of Phase 2 of the landfill, as described in the preferred alternative in the 2006 EA. The rest of KIF's flue gas desulfurization system has been constructed and is operational, and those actions were not addressed in this SEA. This proposed action is to expand the project area boundary for the on-site landfill at KIF and will include the laydown area, borrow site, and haul road. EPA's concerns with impacts to air, water, wetlands and noise are not significant and were adequately addressed in this SEA.

EPA requests that this proposed action to construct and operate the laydown area, haul road and burrow pit adhere to the list of required permits or licenses and best management practices necessary for the implementation of these proposed actions.

Also, please provide us with a copy of the TVA's final Finding of No Significant Impact or other final documents pertaining to current project changes at the Kingston Fossil Plant (Larry O. Gissentanna, EPA – Region 4).

TVA Response: Comment noted. TVA will provide the EPA with copies of the final documents associated with this SEA.

9. Comment: The SEA does not state specifics or even estimates dates of project initiation nor duration of the impacts; therefore, the public and stakeholders are not informed of the timing and duration of impacts such as noise; visual, traffic, etc (John Shaw, RCERB Chair).

TVA Response: Existing Phase 1A and 1B landfill has been in operation for 8 years. Based on past CCR material production and future projections, including CCR material that is marketed, Phase 1A and 1B has an estimated 5 years remaining capacity. That would be an approximate life span of 14 years. The new Phase 2 Landfill expansion is permitted (TDEC Solid Waste) for 4 cells. Phase 2, Cell 1 is scheduled to begin construction between fall of 2019 or spring of 2020 with an approximate construction duration of 2 years. Based on the probability for the change in CCR production along with the demand of marking CCR material, it is prudent to keep the construction for the Phase 2, Cell 1 construction ahead of projected Phase 1A/B volume capacity. Below is an estimated schedule.

- 2011 Phase 1A landfill began accepting dry CCR material.
- 2015 Phase 1B landfill began accepting dry CCR material.
- 2016 CCR Material from the Ballfield area was placed.
- 2025 Existing Phase 1A and 1B expected to reach capacity.
- 2029 Expected capacity for new Phase 2 (cell 1).
- 2033 Expected capacity for new Phase 2 (cell 2).
- TBD Expected capacity for new Phase 2 (cell 3).
- TBD Expected capacity for new Phase 2 (cell 4).
- 10. Comment: Why is TVA not more proactive in disposing or recycling the gypsum to commercial users; e.g., road construction, drywall construction? It has been proposed a couple of times to TVA and Department of Energy (DOE) that this material could be used as "clean" fill needed in the Environmental Management Waste Management Facility (EMWMF) landfill, and possibly the Environmental Management Disposal Facility (EMDF) landfill, particularly for relocation/extension of haul road sections, access points, and laydown areas (John Shaw, RCERB Chair).

TVA Response: TVA currently markets dry coal byproducts from its generating facilities throughout the valley. Gypsum generated from the KIF facility is currently marketed for use in the manufacture of cement and for use in wallboard. Fly Ash generated from the Kingston facility is marketed for use as a replacement for Portland cement in concrete. Between 2013 and 2018, TVA marketed over 450,000 tons of coal combustion products generated from KIF alone.

11. Comment: What is the capacity of the Phase 1 area? What is the capacity of the Phase 2 area? Will Phase 2 fill also in 4-5 years, then another landfill will be needed? How will these landfills support operation of KIF until plant retirement and shutdown (projected for 2032?) (John Shaw, RCERB Chair).

TVA Response: Please see response to Comment 9.

12. Comment: Nomenclature for Phase 1 and Phase 2 are also depicted as Phase I and Phase II in this document. This needs to be reviewed, edited, and corrected to be consistent and accurate (John Shaw, RCERB Chair).

TVA Response: The EA has been reviewed and corrected to be Phase 1 and Phase 2, where necessary, to be consistent and accurate.

13. Comment: Numerous locations in this SEA include references to justifications for construction, expansion, alteration of plans, etc., for the Phase 2 landfill. Any reference to Phase 2 landfill expansion or changes should be removed from this SEA (John Shaw, RCERB Chair).

TVA Response: As stated in the purpose and need, the purpose of the proposed action is to expand the project area boundary for the on-site landfill at KIF to include adequate room for a laydown area, borrow areas, a haul road, and stormwater management. The proposed action is needed so TVA can adequately and effectively construct the second

phase of the landfill. Therefore, this SEA was written to analyze the impacts from the proposed action.

14. Comment: Title Page: Is this a February 2018 or February 2019 document? Correct to 2019 if needed, then check references to dates within to match. If February 2018, why has it just come to light that Tennessee Valley Authority (TVA) is taking comments now (why did it take so long) (John Shaw, RCERB Chair)?

TVA Response: TVA initially released a copy of the draft SEA for a 30-day public comment period on February 14, 2018. After that comment period had closed, design constraints were identified which resulted in increasing the project's boundaries. Specifically, the limits were adjusted under the transmission lines and an additional haul road option was proposed which would allow for sufficient width for two articulating dump trucks to pass. Additionally, the limits were adjusted in two locations to ensure for sufficient room for stormwater management and a portion of the proposed lay down area was also analyzed as an additional source of borrow material. After the draft EA was revised to capture the impacts of these changes, TVA released the amended draft supplemental EA for public comment on April 5, 2019. The date on the title page has been updated to reflect the completion of the Final Supplemental EA.

15 Comment: Section 1.1: Find it difficult to believe the current Phase 1 landfill constructed in 2015 is already approaching its full capacity (in only 4 years) (John Shaw, RCERB Chair).

TVA Response: Please see response to Comment 9.

16. Comment: Section 1.6: Should add and involve DOE for the possibility of disposing gypsum as much as possible to DOE in Oak Ridge for use as fill in landfills and for road/laydown area construction (John Shaw, RCERB Chair).

TVA Response: While TVA doesn't directly partner with DOE, TVA does currently market gypsum and other dry coal byproducts from KIF. These byproducts are reused in various construction materials by companies in the surrounding communities.

17. Comment: Section 1.7: Why is TVA proposing discharge of fill material into waters of the State of Tennessee – utilizing an Aquatic Resource Alteration Permit/Water Quality Certification from the Tennessee Department of Environment and Conservation (TDEC) (John Shaw, RCERB Chair)?

TVA Response: As stated in Section 3.4.2.2, the requirement of a state 401 water quality certification, either an individual or general ARAP permit, and federal 404 permits must be obtained for any stream/wetland alteration and the terms and conditions of these permits would likely require mitigation from these proposed activities. Construction of the borrow sites, haul road, and laydown, along with the actions in Alternative B could temporarily impact 5 ephemeral streams (wet weather conveyances) and one intermittent streams. These impacts would be permitted under the applicable CWA Section 401 and 404 permitting processes and the state permitting process. And with the implementation of appropriate BMPs, only temporary minor, indirect impacts to surrounding surface waters would be expected from construction activities associated with the actions under Alternative B.

18. Comment: Section 2.1.2: Laydown, borrow, and haul road areas – could some gypsum be used as roadbed underlayment for all three areas, thus reducing the amount of gypsum needing to be stored (John Shaw, RCERB Chair)?

TVA Response: The CCR Rule contains prescriptive language and guidelines regarding the beneficial use of CCR materials. Encapsulated beneficial uses, such as wallboard and cement additives, are less restrictive. However, unencapsulated uses, such as for road bed underlayment or structural fill, are more restrictive. TVA has taken a more conservative approach with the beneficial use of CCR materials to best ensure protection of the area's natural resources.

19. Comment: Table 2-1: Surface Water and Wastewater – It is stated there would be temporary impacts surface water runoff during construction of the landfill and during development of the laydown area, borrow site, and haul road. Permanent impacts to surface water features are expected to occur from construction of the Phase 2 area. Potential impacts from leachate and stormwater runoff are not considered significant. Note: The impacts from the current Phase 1 are not being addressed for Phase 2, when monitoring well results are showing significant increases and elevated readings for boron, calcium, chloride, fluoride, sulfate, total dissolved solids, radium (226 and 228), selenium, lithium, and arsenic compared to background readings. TVA is attributing these adverse results to the previous failure that occurred in the Phase 1 landfill area (drop-out) that allowed gypsum/ash to flow into the Clinch River and Watts Bar Reservoir (John Shaw, RCERB Chair).

TVA Response: Immediately following the development of a subgrade dropout in the Phase 1 area of the landfill in December 2010, CCR constituents were detected in down gradient wells. In accordance with TDEC regulations, the facility entered assessment groundwater monitoring, In addition, in concert with TDEC, TVA converted the facility from a wet ponded operation to dry disposal by removing all the waste in the cells, remediating the subgrade, and installing an EPA RCRA Subtitle D landfill liner (compacted clay with flexible membrane liner) and a leachate collection system. Subsequent groundwater results collected from the Phase I area indicate a precipitous decline in levels of constituents previously detected. Those constituents are now approaching asymptotic levels which are close to background and are below EPA and TDEC groundwater protection standards. To date, the Phase 2 area is undeveloped and waste has not been placed there. Sampling of wells in that area has been for the development of a background data set. Future groundwater sampling will take place and data will be evaluated after the expansion occurs.

The groundwater conditions associated with the dropout in 2010 are being addressed through the state assessment monitoring program. The lined, Phase 1 landfill, which is subject to the CCR Rule and is monitored by a groundwater monitoring well network in accordance with the CCR Rule, remains in detection monitoring under the CCR Rule as it is not the source of groundwater conditions which are being addressed through the state groundwater monitoring program. The lined, Phase 2 landfill is subject to the CCR Rule, and the groundwater will be monitored in accordance with the CCR Rule.

The Phase 1 portion of the landfill would be closed and capped as the Phase 2 is constructed and open. Once the Phase 1 is closed, the leachate production would be reduced to de minimus flow volumes and the leachate generation from Phase 2 would increase as the landfill accumulates CCR material. Therefore, the leachate production and discharges would not be expected to change significantly from current conditions.

Considering that these discharges are currently meeting both TDEC regulatory limits and Tennessee Water Quality Criteria and are expected to in the future, no significant adverse impacts are expected. Storm water due to construction actives may have minor, temporary impacts, which will be mitigated through best management practices and will be detailed in a project specific SWPPP.

20. Comment: Table 2-1: Threatened and Endangered Species – given the information stated in Comment #5 above, it should not be said that "no impacts would occur to aquatic wildlife or vegetation" under the Alternative B, Action Alternative column (John Shaw, RCERB Chair).

TVA Response: The SEA states in Section 3.8.2.2 that TVA reached a No Effect determination for aquatic and vegetative species listed as threatened or endangered per the Endangered Species Act.

21. Comment: Table 2-1: There is no discussion or evaluation for "Aquatic Ecology." This needs to be addressed (John Shaw, RCERB Chair).

TVA Response: Aquatic Ecology has been discussed in Chapter 3 under Section 3.8 Threatened and Endangered Species. Table 2-1 will be updated to reflect any impacts on aquatic ecology

22. Comment: Section 2.3, first paragraph, states that Best Management Practices (BMP) will be taken and references to the BMPs in the 2006 EA. TVA's BMPs practices were demonstrated to be significantly and consistently lacking and not adhered to throughout the ash spill recovery from 2008 to 2018. The proposed SEA does not provide any assurances that BMPs will be any better during the activities described in this EA (John Shaw, RCERB Chair).

TVA Response: Comment Noted. Best Management Practices, as it is referred to in this SEA, include sediment and erosion controls, stormwater management, waste material controls for chemical and solid waste and mitigation measures that would be utilized for the proposed project. These BMPs would adhear to the guidance provided by the Tennessee Erosion and Sediment Control Handbook, more site specific BMPs would be detailed in the site specific SWPPP and would comply with TDEC requirements.

23. Comment: Sections 2.3 and 3.3.2.2 Noise: Describe how residents across the river would be protected from the noise. If not protected, how would they be compensated for the permanent negative impacts of noise, particularly if operations occur during nights and weekends? The borrow area poses new noise impacts to residents across the Emory River. It is stated in 3.3.2.2 that 59 dBA noise levels would occur at the nearest residence 1,500 feet away. It is not stated how far it is to the residents across the Emory from the proposed borrow site. More evaluation and discussion are needed (John Shaw, RCERB Chair).

TVA Response: The residences across the Emory River are 1,000 or more feet away from proposed Borrow Area Option 2. As stated in the EA, development and use of the Borrow Area Option 2 and either haul road option would create noise that could be perceptible by residents across the Clinch and Emory Rivers; however, these activities would not cause a significant increase in average noise levels. Construction activities for both the landfill and proposed laydown area, borrow areas, and haul roads would involve site preparation which would involve

the use of compactors, front loaders, scrapers, excavators, and graders. This type of equipment is expected to generate noise ranging from 79 to 88 dBA at 50 feet (EPA 1971). Maximum construction noise of 88 dBA at 50 feet would be about 59 dBA at the nearest residence approximately 1,500 feet away. Therefore, with the nearest residence across the Emory River at 1,000 feet away, the maximum construction noise to be heard by those residences would be less than 88 dBA, but just slightly greater than 58 dBA. This audible sound level compares with similar common noise levels (see the table below for common sound levels).

Source	Sound Level (dBA)
Busy Road Traffic	80
Vacuum Cleaner	70
Normal conversation	60
Moderate rainfall	50

The EA further states that to minimize potential impacts from noise, construction would typically take place during normal weekday/daytime hours; however, construction could occur during nights or weekends, if necessary, to maintain schedule. No additional mitigation is proposed.

24. Comment: Section 2.3 Threatened and Endangered Species: A discussion of the replanting of suitable roosting trees for bat species in other KIF areas should be included to replace those being removed by Phase 2 activities (John Shaw, RCERB Chair).

TVA Response: As stated in Section 2.3 and in Section 3.8.2.2 of the EA, TVA will track and document removal of potentially suitable summer roost trees and include this information in annual reporting in accordance with Section 7(a)(2) consultation.

In April 2018, TVA completed a Programmatic Consultation under Section 7 of the Endangered Species Act with the US Fish and Wildlife Service through which potential impacts to federally listed bats for actions such as this landfill were considered. Conservation Measures were developed as a part of this consultation to minimize potential impacts to these species and will be implemented during this project. While mitigation was not a requirement that came from this Programmatic Consultation, TVA does undergo many Stewardship projects associated with recovery of federally listed bats. Projects are located in biologically relevant areas where they are most likely to benefit the species. Recent projects include installing artificial bat roosting structures, installing gates at known bat roosts to protect hibernating bats, and partnering with other agencies to protect lands with known maternity roosting sites.

25. Comment: Chapter 3, Groundwater Quality: The statement "Subsequent to the conversion from wet to dry and the lining of the entire landfill area, groundwater samples gathered during the TDEC mandated assessment monitoring program have shown steadily improving water quality" is no longer true and is, at a minimum, deceptive and inaccurate. Refer to Comment #5 above (John Shaw, RCERB Chair).

TVA Response: Comment noted. However, the data collected during assessment monitoring supports TVA's statements in Chapter 3. TVA has worked closely with TDEC during the entire assessment monitoring program.

26. Comment: Chapter 3, under Groundwater Quality, second paragraph, it is stated that groundwater quality would not be analyzed in detail but would rely on the monitoring done during Phase 2 construction and operation. With the elevation in contaminant levels in recent water sampling activities and the remoteness of portions, specifically the borrow area, of this project from the Phase 2 site, it would be prudent to monitor ground water quality during and after the project near the borrow area (John Shaw, RCERB Chair).

TVA Response: The groundwater sampling locations and frequency of sampling events have been developed in conjunction with TDEC in the permitting of the landfill. CCR waste are not proposed to be placed outside of the landfill. TVA does not believe that additional groundwater monitoring locations need to be developed due to the construction of a borrow site.

27. Comment: Chapter 3, under Natural Areas and Recreation, the SEA recognizes that all of the proposed affected areas are within the Tennessee Wildlife Resource Agency (TWRA) Wildlife Management Area (WMA) #319 where no public hunting, trapping, dog training, etc., is permitted. The SEA further states that basically that areas within the WMA have been "... undergone wholesale alteration, ... heavily disturbed, ... highly altered ..." to a point where this project would not change the already heavily disturbed area. It appears that TVA's position is that past damaged is what-it-is and is not following general practices of maintaining or preserving natural wildlife habitation. The TWRA is being complicit in this determination by not objecting to such an unfavorable position (John Shaw, RCERB Chair).

TVA Response: TVA operates an active power generation facility at Kingston whose operations have required greater use of the lands adjacent to the facility. This was anticipated when TVA purchased the land in the 1950's, acquiring considerably more land than was needed at initial construction and startup of the plant to accommodate future growth.

Early on, in 1962, TVA permitted TWRA (then known as the Tennessee Game and Fish Commission) to utilize some of the additional land that TVA was not using at the time to promote wildlife propagation. TVA has always maintained control of the property as planned for future use.

TWRA has had wildlife management use of the property for over 57 years and has lived up to its commitment to the people of Roane County and the State in being good stewards of (in this instance) lands they did not own or have control over. TVA now has the need for the land to meet its commitments for the dry handling and storage of coal combustion residuals and to achieve environmental protection and compliance goals.

28. Comment: Chapter 3, under Prime Farmland, it is stated that portions of the proposed project is designated as Prime Farmland by the United States Department of Agriculture (USDA) but the entire KIF is designated overall as having a farmland rating of less than 160, which indicates suitable farmland. The overall KIF does have a poor rating of 100 as a result of TVA activities throughout the site. However, as alluded in the SEA, parts of the proposed areas, including all of the borrow area, would have a rating of prime farmland. This SEA chooses to use the overall rating of 100 as justification to destroy the prime farmland

designation of the borrow area. Therefore, the proposed action will definitely adversely affect prime farmland within the TWRA WMA and KIF areas (John Shaw, RCERB Chair).

TVA Response: Form AD 1006, "Farmland Conversion Impact Rating," The EA states that the entire KIF site to be well <u>below</u> the critical score of 160. The 2006 EA states the affected land is in close proximity to the power plant; therefore, the site assessment score is 29 for a total impact rating of 129. Even though the relative value of the farmland is 100 percent, the total score falls significantly below the level, which suggests consideration of other locations.

29. Comment: Section 3.1.2.2 Alternative B – Action Alternative, second paragraph, it is stated that TVA plans to use the 21 acres borrow area as long as it contains usable borrow material beyond the construction of the Phase 2 landfill. This statement and related plans and issues needs to be removed from this SEA since work beyond the proposed action under the original 2006 and 2010 EAs do not address potential projects beyond the use of the proposed borrow area. The inclusion of these and similar statements, although seemly minor, may provide TVA a basis for continued use of the borrow area for any major or minor projects in the future (John Shaw, RCERB Chair).

TVA Response: As stated in the purpose and need, the purpose of the proposed action is to expand the project area boundary for the on-site landfill at KIF to include adequate room for a laydown area, borrow areas, a haul road, and stormwater management. The proposed action is needed so TVA can adequately and effectively construct the second phase of the landfill. Therefore, this SEA was written to analyze the impacts from the proposed action.

30. Comment: Section 3.2.2.2 Alternative B – Action Alternative, paragraph 1, same comment as #15 (John Shaw, RCERB Chair).

TVA Response: It is unclear as to the nature of the comment. Section 3.2.2.2 describes the impacts to Air Quaility. Comment 15 (comment 28 in Appendix B) is in regards to the Farmland Protection Policy Act.

31. Comment: Section 3.4.1 Current Water Quality: Other sources need to be researched and evaluated to include discussion on more recent water quality. Having reservoir health assessments with resulting data up to the year is considered inadequate to describe water quality today, when the Phase 2 activities are proposed (John Shaw, RCERB Chair).

TVA Response: Comment Noted. Water quality evaluations are performed on a regular basis as resources permit. However, due to the abundant surface water resources in the Tennessee Valley, these evaluations are performed by a rotating watershed approach. For example, TDEC evaluates resources every 4 years. When discussing the water quality in Section 3.4.1, intake and discharge monitoring, permit renewal monitoring information, and the permit rational were all taken into account as well as the most current water quality reports from TVA and TDEC.

32. Comment: Figure 3.1: Wetland 2 needs an arrow to show where Wetland 2 actually is (John Shaw, RCERB Chair).

TVA Response: Figure 3.1 depicts the streams, and their jurisdictional determination, which were identified on the project site. Wetlands identified within the project area depicted and labeled in a separate Figure 3.3 in Section 3.5.1.

33. Comment: Figure 3.2: Needs to be expanded to show and depict accurately where the Outfalls are in relation to all the proposed Phase 2 activities, including the laydown and new borrow areas (John Shaw, RCERB Chair).

TVA Response: Comment Noted. There are currently no process water outfalls within the proposed project boundary, however the map(s) have been updated to include TMSP permitted stormwater outfalls. Please note that for this project there would possibly also be construction stormwater outfalls that would be detailed in the project specific SWPPP.

34. Comment: Section 3.6.2 Floodplains – Affected Environment- Environmental Consequences – Alternatives and B – Action and Action Alternative: This section is considered inadequate as there are no methods described for protecting the area of the Phase 2 landfill from 100- and 500-year floods. As seen in the past two years, coal ash landfills in North Carolina were inundated by devastating floods, causing large amounts of coal ash to migrate to uncontaminated lands and waters. The use of dikes, flood walls, etc. needs to be included to prevent the gypsum and coal ash from escaping the landfill area into the Clinch River and subsequently the Watts Bar Reservoir and the Tennessee River. It is imperative to prevent another ash spill (John Shaw, RCERB Chair).

TVA Response: Construction of the Phase 1 and Phase 2 landfills was addressed in the 2006 EA. However, TVA is sensitive to concerns regarding ash disposal facilities, especially at KIF. Design of the toe of the Phase 2 berm would incorporate measures to minimize flooding impacts. The following mitigation measure will be included in the SEA:

• To minimize adverse flood impacts, the toe of the Phase 2 landfill berm will be designed to withstand flooding to at least the 500-year flood elevation of 749.2 feet.

The toe of the Phase 1 landfill is located outside the 100-year floodplain and several feet above the 500-year flood elevation, which would be consistent with EO 11988 for Critical Actions. A Critical Action is an action for which even the slight chance of flooding is too great.

Section 3.6.2.2 of the EA has been updated to include additional information.

35. Comment: Section 3.6.2.2 Alternative B – Action Alternative, first paragraph (and other sections of the SEA), it states that "TVA would expand the project area boundary for the onsite landfill and develop a laydown area, borrow area and haul road ...". This stated propose of this SEA was to address the laydown area, haul road, and borrow area. As stated in this section, and other sections in this SEA, it appears that an expansion of the Phase 2 landfill footprint, different from the 2006 and 2010 EAs, is justified in this SEA. Any reference to expansion of the landfill footprint should be removed from this SEA (John Shaw, RCERB Chair).

TVA Response: As stated in the purpose and need, the purpose of the proposed action is to expand the project area boundary for the on-site landfill at KIF to include adequate

room for a laydown area, borrow areas, a haul road, and stormwater management. (The limits of waste have not been expanded.) The proposed action is needed so TVA can adequately and effectively construct the second phase of the landfill. Therefore, this SEA was written to analyze the impacts from the proposed action

36. Comment: Section 3.9 Cultural Resource: There is no mention of the Mahoney Cemetery or the ruins site that are located in the planned borrow area. These two items need to be addressed appropriately (John Shaw, RCERB Chair).

TVA Response: As stated in the EA, TVA reviewed the proposed haul road modification in September of 2018, which included the area identified as "ruins" on the topographic map. This feature was a previously recorded as site, identified as 40RE612. In consultation with the SHPO, this site was determined to be ineligible for the National Register of Historic Places due to a lack of research potential.

While the Mahoney Cemetery is located within the vicinity of the proposed project, TVA has determined that it is outside of the projects affected area. Additionally, the forested setting immediately surrounding the cemetery would not be disturbed, which would result in minimal indirect project impacts.

Section 3.9 has been updated to provide additional clarification related to Site 40RE612 and the Mahoney Cemetery.