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FINAL ENVIRONMENTAL ASSESSMENT

KINGSTON DRY FLY ASH CONVERSION

Roane County, Tennessee

PREPARED BY:
TENNESSEE VALLEY AUTHORITY

JUNE 2010

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ACRONYMS, ABBREVIATIONS, AND SYMBOLS

<	Less Than
≤	Less Than or Equal To
$\mu g/m^3$	Micrograms per Cubic Meter
AADT	Average Annual Daily Traffic
APC	Air Pollution Control
APE	Area of Potential Effect
APHW	Air Preheater Washes
BACT	Best Available Control Technology
BMPs	Best Management Practices
CAA	*Clean Air Act*
CCP(s)	Coal Combustion Product(s)
CCW	Condenser Cooling Water
CO	Carbon Monoxide
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CRM	Clinch River Mile
CWA	*Clean Water Act*
DOE	United States Department of Energy
DSN	Discharge Serial Number
EA	Environmental Assessment
EO	Executive Order
FGD	Flue Gas Desulfurization
FMCSA	Federal Motor carrier Safety Administration
FRA	Federal Railroad Administration
GDA	Gypsum Disposal Area
I-	Interstate Highway
KIF	Kingston Fossil Plant
lb/day	pounds per day
lb/hr	pounds per hour
lb/yr	pounds per year
LCT	Leachate Collection System
LOS	Level of Service
MGD	Millions of Gallons per Day
mg/L	Milligrams per Liter
NAAQS	National Ambient Air Quality Standards
NEPA	*National Environmental Policy Act*
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxide
NPDES	National Pollutant Discharge Elimination System
NNSR	Nonattainment New Source Review
O_3	Ozone
Pb	Lead
PCBs	Polychlorinated Biphenyls
PM	Particulate Matter
pH	A scale used to measure the acidity or alkalinity of a substance
$PM_{2.5}$	Particulate Matter whose particles are less than or equal to 2.5 micrometers
PM_{10}	Particulate Matter whose particles are less than or equal to 10 micrometers
ppb	Parts per Billion
ppm	Parts per Million
PRB	Powder River Basin
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act

Acronyms, Abbreviations, and Symbols, continued.

RFPs	Request for Proposals
SCR	Selective Catalytic Reduction
SO_2	Sulfur Dioxide
SR	State Route
TCLP	Toxicity Characteristic Leaching Procedure
TDEC	Tennessee Department of Environment and Conservation
ton/yr	tons per year
TRM	Tennessee River Mile
TSP	Total Suspended Particulates
TVA	Tennessee Valley Authority
US	United States Highway
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds

CHAPTER 1

1.0 PURPOSE OF AND NEED FOR ACTION

1.1. The Decision

In July 2009, the Tennessee Valley Authority (TVA) Board of Directors passed a resolution to review and address systems, controls, and standards related to coal combustion products (CCPs; i.e., fly ash, bottom ash, and gypsum), which result from the burning of coal to produce electricity. TVA has subsequently reviewed its practices for handling and storing CCPs at its generating facilities, including its coal-fired Kingston Fossil Plant (KIF). An outcome of that review, to convert the wet fly ash handling and storage facilities at KIF to a dry system, is the subject of this environmental assessment (EA).

KIF is an important source of base load power to TVA in providing and maintaining safe, reliable, and cost-effective electricity for the people of the TVA Power Service Area. The proposed changes to dry storage at KIF would provide TVA with a state-of-the--art, secure storage system that leads the industry in the management of CCPs. The proposed changes would also allow for the future marketing of ash products that are not currently feasible with the wet ash storage system. TVA will decide whether to convert the wet fly ash handling system at the KIF to a dry fly ash handling system with the capacity to handle approximately 1,000 tons of fly ash per day. The proposed construction would require 14 months and be completed in September 2011.

TVA is studying long-term solutions for the disposal of CCPs, including the construction of new regional landfills. At this time, however, that study has not progressed to the stage of a proposed action that could be evaluated under the *National Environmental Policy Act* (NEPA). Therefore, for the short term, the dry fly ash from the proposed conversion would be disposed of either on site or at an offsite landfill. This EA evaluates several potential offsite landfills. Each of the identified offsite landfills is a state-approved site, permitted to receive CCPs and with adequate capacity to do so. At this time, TVA is not proposing to select among the short term disposal options but has evaluated the impacts of all such options.

1.2. Site Description and Location

KIF is located in Harriman, Roane County, Tennessee, at the base of a peninsula formed by the Clinch and Emory Rivers embayment of Watts Bar Reservoir, north of Interstate Highway (I-) 40, and about 30 miles west of Knoxville, Tennessee. A site locality map (Figure 1-1) provides details of the location and property boundaries. At KIF, TVA operates nine coal-fired boilers, which are fitted with electrostatic precipitators that remove fly ash from the exhaust stream. Selective catalytic reduction (SCR) systems are also in place to reduce nitrogen oxide (NO_x) emissions. Testing of the scrubbers that were installed to reduce sulfur dioxide (SO_2) emissions began in June 2010.

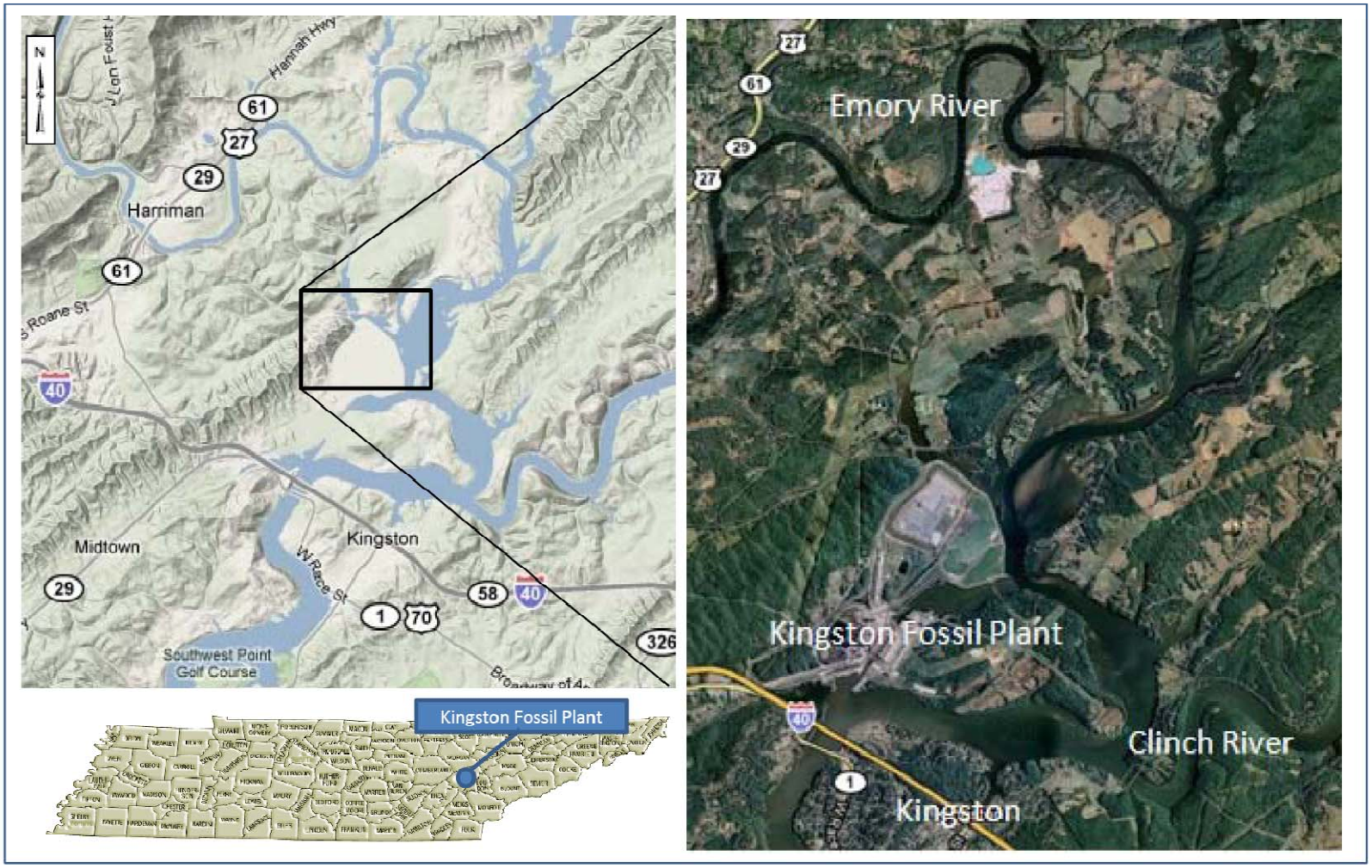

Figure 1-1. Kingston Fossil Plant Locality Map

1.3. Other Pertinent Environmental Reviews or Documentation

- *Coal Combustion By-Product Marketing Environmental Assessment* (TVA 1990) This EA discussed the environmentally acceptable options for the use and marketing of CCPs produced by TVA.

- *Emergency Dredging for the Kingston Fossil Plant Ash Dike Failure Final Environmental Assessment* (TVA 2009) This EA evaluated the dredging and disposal options for the ash that spilled into the Emory River because of the December 2008 ash dike failure at KIF. Because the affected environment for some resources evaluated in this EA is similar to the affected environment for the currently proposed action, this EA is incorporated by reference.

- *Installation of Flue Gas Desulfurization System on Kingston Fossil Plant Roane County , Tennessee Final Environmental Assessment* (TVA 2006) This EA evaluated the impacts of the installation and operation of scrubbers for the removal of sulfur dioxide, and the associated onsite landfill for this system's waste disposal

1.4. The Scoping Process

Because TVA is a federal agency, the proposed project constitutes a federal action subject to both the requirements of the NEPA and TVA's procedures implementing NEPA. Accordingly, TVA has prepared this EA in order to identify the alternatives for converting the fly ash handling system at KIF from a wet to dry system; to evaluate the potential environmental impacts associated with those alternatives; to describe any conditions or commitments to mitigate environmental impacts; and to communicate its findings to both the TVA decision makers and the public.

TVA staff conducted an internal scoping of the issues and determined that impacts to floodplains, wetlands, navigation, natural areas, recreation, and prime farmlands would be minor or absent. Due to the industrialized and highly disturbed nature of the site, and the proposed reductions in both water usage and in discharge volume, there would be no impacts to threatened and endangered aquatic and terrestrial species or to general terrestrial and aquatic biological communities. The TVA (2009) emergency dredging EA evaluated noise, socioeconomic, and environmental justice impacts from the hauling of recovered ash and determined that they would be insignificant. This 2009 evaluation bounds the potential impacts of the presently proposed action. No significant negative social or socioeconomic impacts are anticipated and the project is not in conflict with any known plan, existing land use, or zoning regulation. This EA addresses impacts to the following resources: air, water, solid and hazardous waste, transportation, cultural resources, and environmental justice.

1.5. Required Federal Permits or Licenses

The proposed action would be subject to the following environmental permit requirements and regulations.

- Air permitting regulations under the *Clean Air Act* (CAA) would require the project to secure an air construction permit prior to the start of new facility construction.

- The project would also require modifications to the Title V permit under the CAA.

- National Pollutant Discharge Elimination System (NPDES) permitting regulations under the *Clean Water Act* (CWA) would require modifications to the wastewater discharge permit for KIF.

- A Storm Water Construction Permit under the CWA would be required prior to commencement of construction.

- Modification of the on-site solid waste permit for the disposal of fly ash in the Phase II gypsum disposal area if this option is pursued.

CHAPTER 2

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1. Alternatives

This EA documents the evaluation of two reasonable alternatives: the No Action and Action Alternatives. The No Action Alternative would be a continuation of the current operation, and the Action Alternative would involve converting the wet fly ash handling system to a dry handling system.

2.1.1. Alternative A – The No Action Alternative

Under the No Action Alternative, TVA would continue to use the wet fly ash handling system and the existing impoundments (storage ponds). The ash generated from the operation of KIF would either be collected from the sluice channel prior to entering the existing ash pond facility or sluiced directly into the ash pond. The ash pond has been used as a settling basin for ash recovered from the Emory River. This ash, recovered from the river, would continue to be shipped off site to the Arrowhead Landfill in Perry County, Alabama for disposal. This disposal site has received regulatory approval from the United States Environmental Protection Agency (USEPA) and the Alabama Department of Environmental Management. TVA anticipates removal of the ash from the Emory River can be completed by the second quarter of 2010. Shipping all of the approximately three million cubic yards of recovered ash to appropriate facilities, however, will likely continue into the first quarter of 2011.

2.1.2. Alternative B – Action Alternative – Dry Fly Ash Conversion

Under the Action Alternative, TVA would remove the current wet fly ash handling system at KIF and convert the system into a dry collection system. This change would require the construction of dry ash silos and the supporting infrastructure in order to allow for disposal or the marketing of ash; the ash would be transported by either truck or rail. The addition and the layout of new equipment would be as shown in Figure 2-1.

The new system would convey ash from the precipitators, the SCRs, and the economizers to one of two storage silos at the storage collection facility located near the current coal pile (Figure 2-1). The system would be designed with a capacity to handle a range from 5 to 50 percent of Powder River Basin (PRB) blend ash, in order to provide flexibility in plant operational capabilities. Dry fly ash collected in the storage silos would be unloaded into pneumatic trucks, open trucks, or rail cars for transportation to disposal sites or for marketing purposes. The proposed new system has been estimated conservatively to handle a total process throughput of up to 600,000 tons per year of dry fly ash and would operate up to 8,760 hours per year.

The new dry ash system would include a negative pressure air system, which removes the ash from the ash collection hoppers to the proposed ash silos. The existing water-driven hydro-evacuators would be removed from service. A liquid ring vacuum system equipped with nine operating vacuum pumps, two standby vacuum pumps, and the corresponding filter separators for each of KIF's nine boiler units, would remove fly ash from the precipitators, from the SCRs, and from the economizers.

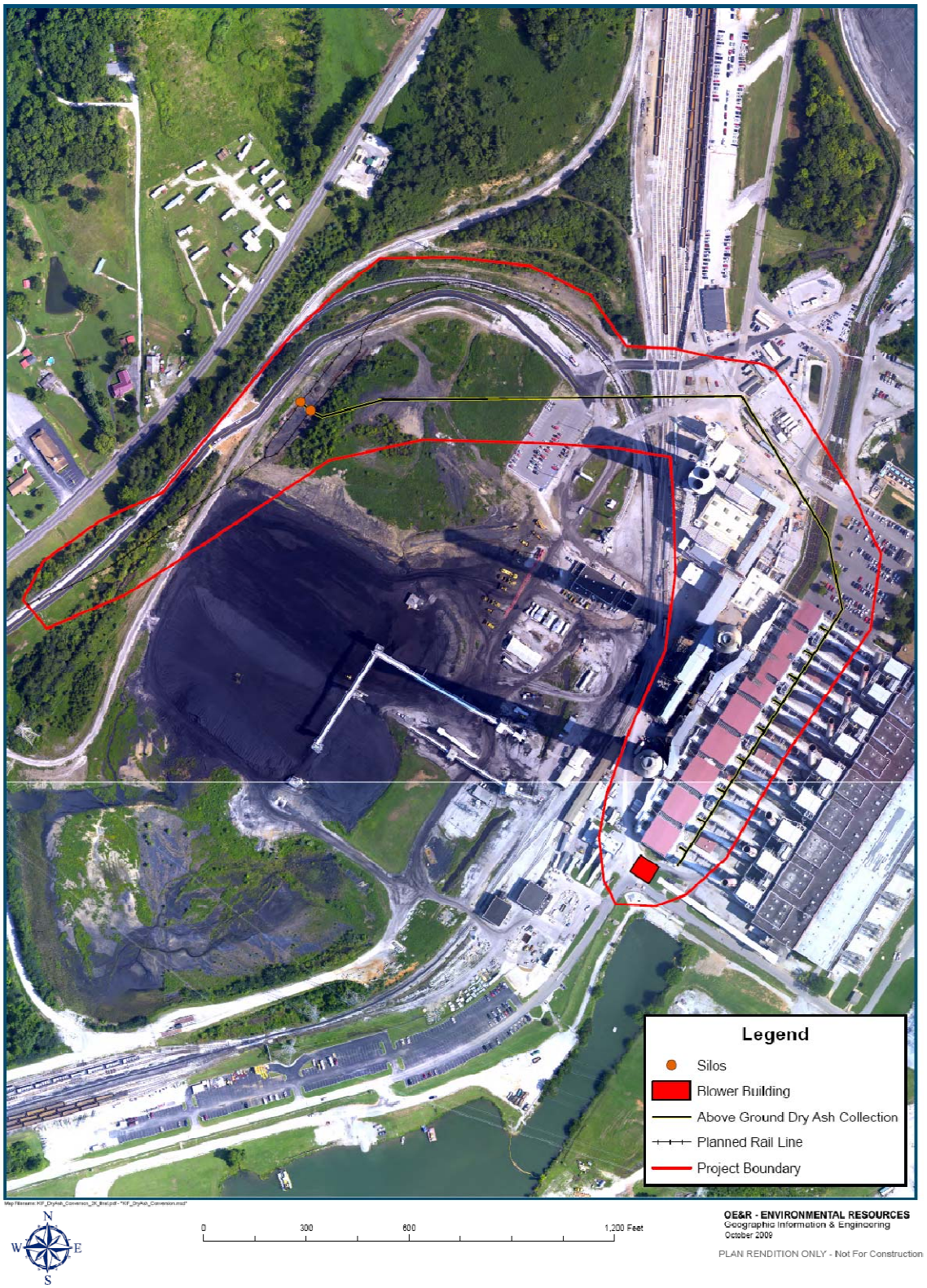

Figure 2-1. Project Boundary and Equipment to be Installed at KIF

Each vacuum pump and corresponding filter separator would be connected to an adjacent unit to allow for redundancy. Each filter separator would be sized at a 4:1 air to cloth ratio and would contain 65 Ryton® 16-ounce bags with a Teflon® membrane. All nine filter separators would have a FilterSense® dust detector in order to verify that all bags were performing as designed. The vacuum system would have a total air flow of 18,548 standard cubic feet per minute, and the clean air dust concentration exiting each filter separator would contain a maximum of of 0.005 grains of dust per standard cubic foot. The collected ash would then drop into a vacuum-pressure transfer system and be blown into one of the storage silos. The vacuum-pressure system would consist of five operating and two standby compressors that would convey ash to the silos through pressure piping. The total airflow entering the silo would be 24,037 standard cubic feet per minute.

Each of the ash storage silos would be sized to accommodate three days worth of storage. The storage silos would be used alternately; in other words, only one silo would be used at any given time. Each silo would also have one pin mixer ash unloader for unloading to trucks or rail cars, a bin vent for exhaust into the atmosphere, and provisions for future dry ash unloading. The new silos would be constructed in a manner to allow for the addition of a coal ash beneficiation system that would be used to remove excess carbon in order to enhance the potential marketability of future ash production. This is considered useful because the excess carbon in the ash causes it to have a darker color, which is less desirable by the concrete industry, which is the primary market for this material.

The new silos would have the capacity to load open or pressurized trucks and rail cars. Any ash loaded into open containers would be conditioned (moistened) with approximately 20 percent water in order to reduce fugitive emissions (i.e. dust blown off the top of the pile during transport). During fly ash unloading to open trucks or rail cars (batch drop operations), fly ash conditioners would also moisten the dust before discharge into the containers. The open bed trucks and rail cars would then be covered, and the material would be transported off site. The trucks would travel a total distance of one mile on paved roads within the TVA property boundaries between loading and unloading.

Railroad tracks and paved roads would be constructed for each silo in a layout to allow for pneumatic truck, open truck, or rail car loading. Each silo would also have a set of scales to weigh rail cars or trucks. During dry fly ash unloading to pneumatic trucks, the exhaust would feed back into the silo for discharge through the bin vent, which would be equipped with a filter to protect air quality.

2.2. Comparison of Alternatives

Table 2-1 compares the environmental consequences of the No Action and the Action Alternatives. The No Action Alternative would be a continuation of the current operation, and the Action Alternative would involve converting the wet handling fly ash system to a dry handling system and subsequent operation of the new dry ash system.

Table 2-1. Comparison of the Environmental Consequences of the No Action and Action Alternatives

Issue Area	No Action Alternative	Proposed Action Alternative
Air Resources	The plant may continue to sluice ash into the existing ash pond or it may operate with mechanical ash removal and dewatering of the ash to a moisture level sufficient to load the material for transport. This would result in emissions from operation of internal combustion engines and the potential for the continuation of current levels of fugitive emission from handling the recovered fly ash.	Construction activities would deposit less than five percent of the total fugitive emissions beyond the property boundary. Emissions from construction equipment internal combustion engines would be small and would result in minimal off-site impacts. The operation of the proposed project would not exceed federal and state prevention of significant deterioration (PSD) thresholds.
Water Resources	No potential reduction in water usage or mass loading of certain constituents to the ash pond.	Impacts to the Clinch River from construction activities would be minor and temporary. Operation of the new system would significantly reduce water usage by the plant and would also reduce mass loading of certain constituents to the ash pond by approximately 80 percent.
Solid Waste	Landfill space is available at KIF with a modification of the Phase II gypsum disposal area solid waste permit to allow for the onsite disposal of fly ash. TVA has identified six Subtitle D offsite landfill locations for disposal of substantive portions of KIF ash. Four of the landfills can be accessed by truck and the remaining two by rail. The only impacts to solid waste resources would be the utilization of existing capacity in the permitted Subtitle D landfills identified in this EA. There would be no opportunity for beneficial use marketing of ash.	Landfill space is available at KIF with a modification of the Phase II gypsum disposal area solid waste permit to allow for the onsite disposal of fly ash. In addition, TVA has identified four Subtitle D landfill locations with adequate capacity for disposal of substantive portions of KIF ash by truck and two by rail. The only impacts to solid waste resources would be utilization of existing capacity in the permitted Subtitle D landfills identified in this EA. If beneficial use marketing is established, some reduction in the amount of ash for disposal could occur.

Table continued on next page

Issue Area	No Action Alternative	Proposed Action Alternative
Transportation	Of the four identified Subtitle D landfills, which require transportation by truck, one roadway would experience a level of service (LOS) drop from LOS A to LOS B due to the delays resulting from following the approximately 90 trucks per day leaving the plant. Trucking accidents were calculated based on 100 million vehicle miles and depending on the location of the disposal rates ranged between 1.3 and 2.3 injuries per year and a fatality could occur between 28.7 and 51.8 years. For rail transportation, it is likely that some accidents may occur each year with one third of these accidents possibly resulting in an injury. Out of the possible accident each year, there a 9 percent chance that one would result in a fatality. The addition of rail traffic from the two offsite locations would not have any significant impact on the current LOS of the roads in the general vicinity of the two identified landfills for rail transportation. The on-site disposal option would not have any impact on public roadways.	Same as for the No Action Alternative

2.3. The Preferred Alternative

TVA's preferred alternative, Alternative B, is to add a dry fly ash collection system and to remove the current wet fly ash handling facility. At this time, TVA has no preference among the disposal options for the dry fly ash, six involving disposal offsite and one involving disposal onsite.

2.4. Summary of Environmental Commitments and Proposed Mitigation Measures for the Preferred Alternative

Permitting Commitments and Mitigation Measures

During construction, emissions from open construction areas and unpaved roads would be mitigated by spraying water on the roadways, as needed, to reduce fugitive dust emissions.

Operation of the on-site landfill for disposal of fly ash would require the following measures to reduce fugitive emissions:

- Use of paved roads
- Wet suppression
- Vacuum sweepers

Offsite disposal will require the use of wet suppression and paved roads to reduce fugitive emissions.

During dry fly ash unloading to pneumatic trucks, the exhaust from the trucks would feed back into the silo for discharge to the atmosphere through the bin vent fitted with a filter to protect air quality

During fly ash unloading to open trucks or rail cars (batch drop operations), fly ash conditioners would moisten the dust to a 20 percent moisture content. This would be used for dust control before discharge into the containers. The open trucks and rail cars would then be covered to further reduce the chance of fugitive emissions, and the material would be transported off site.

In the interim, prior to the completion of the construction of the dry fly ash handling system and the dry stacking area, TVA proposes to continue sluicing fly ash to the ash pond complex. The ash in the pond complex could also be recovered in the manner being used to recover the spilled ash, Material would be dredged using a suction system and then dewatered into piles that have a moisture content level that would prevent the separation of water and ash during transport. Off-site transport of this recovered, moist fly ash would be by either rail or by truck. Disposal of the ash would be in accordance with applicable state and federal regulations in landfills that meet or exceed the *Resource Conservation and Recovery Act* (RCRA) Subtitle D Class standards. The reclamation of ash from the pond system would have minimal impacts on air quality due to the high levels of moisture in the ash, which would keep the ash intact where it was placed during processing. In order to minimize the potential for fugitive emissions from the dredged material, water trucks would be used for dust suppression in the stacking and loading areas. Tires on vehicles leaving the ash stacking area would be washed before exiting the area in order to prevent the

tracking of ash outside of the ash-processing site, thus minimizing the silt levels on roads and the fugitive emissions associated with traffic on the paved roads adjacent to the ash handling areas

Special Commitments and Mitigation Measures

Portable toilets would be provided for the construction workers as needed. These toilets would be regularly pumped out, and the sewage transported by tanker truck to a publicly owned treatment works accepting sewage pump-out.

Depending on the types of coal being burned when the dry ash systems are implemented, the wastewaters entering the remaining CCP system and discharging through Discharge Serial Number (DSN) 001 could have a higher or lower pH. If the pH of DSN 001 fluctuates substantially, the installation of mitigating measures, such as a carbon dioxide diffuser to lower the pH, would be evaluated and implemented in order to ensure compliance with the NPDES permit limits.

Although the impacts of the trucks transporting ash materials would be minor on the transportation network, TVA's request for proposals (RFPs) would require potential bidders to consider reducing the potential impact of their KIF trucking activities upon the environment. The contractor would be required take into account such factors as air pollution, erosion control, noise control, solid waste disposal, and wastewater disposal. Truck owners would be required to maintain trucks properly, including tune-ups which improve fuel efficiency. Truck routes would avoid schools, historic districts, and downtown areas to the extent possible. Additional requirements such as the use of ultra-low sulfur diesel fuel and the minimizing of vehicle idling time would also be required.

For onsite disposal, operational monitoring of the fly ash storage area for constituents of concern in the leachate collection system (LCS) discharge would be required in order to ensure that the concentrations of these metals and other parameters do not exceed the NPDES permit limits

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CHAPTER 3

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Currently, two sources contribute ash to the ash pond facility: ash dredged from the Emory River as part of ongoing recovery and restoration efforts following the KIF ash spill of December 2008, and ash generated from the ongoing operation of the plant. The ash pond acts as a settling basin for both sources of ash. No developed landfill capacity for disposal of fly ash on the KIF Reservation is currently available but could be developed through modification of the Phase II gypsum disposal area.

3.1. Air Resources

3.1.1. Affected Environment

The KIF dry fly ash facility would be subject to both federal and state air quality regulations. These regulations impose permitting requirements and specific standards for expected air emissions. The standards and regulations that pertain to the proposed facility include:

- State of Tennessee Process and Fugitive Dust Regulation (Tennessee Department of Environment and Conservation [TDEC] 2001)
- State of Tennessee requirements for construction and operating permits

Air quality is a valuable environmental resource. Through its passage of the CAA, Congress has mandated the protection and enhancement of our nation's air quality resources. National Ambient Air Quality Standards (NAAQS) for the following criteria pollutants have been set to protect the public health and welfare:

- Sulfur dioxide (SO_2)
- Ozone (O_3)
- Nitrogen dioxide (NO_2)
- Particulate matter whose particles are less than or equal to 10 micrometers in diameter (PM_{10})
- Particulate matter whose particles are less than or equal to 2.5 micrometers in diameter ($PM_{2.5}$)
- Carbon monoxide (CO)
- Lead (Pb)

The primary NAAQS were established to protect the public and the secondary NAAQS to protect the public welfare from any known or anticipated adverse effects associated with the presence of air pollutants. Areas in violation of the NAAQS are designated as "nonattainment areas" and new sources of emissions to be located in or near these areas may be subject to more stringent air permitting requirements. Table 3-1 presents a listing of the NAAQS. National standards, other than annual standards, are not to be exceeded more than once per year (except where noted).

Table 3-1. National Ambient Air Quality Standards

Pollutant	Primary Standards[a]		Secondary Standards[b]	
	Level	Averaging Time	Level	Averaging Time
Carbon Monoxide (CO)	9 ppm (10,000 µg/m^3)	8-hour (1)	None	
	35 ppm (40,000 µg/m^3)	1-hour (1)		
Lead (Pb)	0.15 µg/m^3 (2)	Rolling 3-Month Average	Same as Primary	
	1.5 µg/m^3	Quarterly Average	Same as Primary	
Nitrogen Dioxide (NO_2)	0.053 ppm (100 µg/m^3)	Annual (Arithmetic Mean)	Same as Primary	
Particulate Matter (PM_{10})	150 µg/m^3	24-hour (3)	Same as Primary	
Particulate Matter ($PM_{2.5}$)	15.0 µg/m^3	Annual (4) (Arithmetic Mean)	Same as Primary	
	35 µg/m^3	24-hour (5)	Same as Primary	
Ozone (O_3)	0.075 ppm (2008 standard)	8-hour (6)	Same as Primary	
	0.08 ppm (1997 standard)	8-hour (7)	Same as Primary	
	0.12 ppm	1-hour (8) (Applies only in limited areas)	Same as Primary	
Sulfur Dioxide (SO_2)	0.03 ppm (80 µg/m^3)	Annual (Arithmetic Mean)	0.5 ppm (1300 µg/m^3)	3-hour (1)
	0.14 ppm (365 µg/m^3)	24-hour (1)		

ppm = parts per million
µg/m^3 = micrograms per cubic meter
Source: (40 CFR Part 50)
(a) Standards set to protect public health
(b) Standards set to protect public welfare
(1) Not to be exceeded more than once per year
(2) Final rule signed October 15, 2008
(3) Not to be exceeded more than once per year on average over three years
(4) To attain this standard, the three-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3.
(5) To attain this standard, the three-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m^3 (effective December 17, 2006).
(6) To attain this standard, the three-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective May 27, 2008).
(7) (a) To attain this standard, the three-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
(b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as USEPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
(8) (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is $\leq$ 1.
(b) As of June 15, 2005, USEPA revoked the 1-hour ozone standard in all areas except the 8-hour ozone nonattainment Early Action Compact Areas.

The feasibility of constructing a dry fly ash handling system at the given site may be affected by several air quality considerations. One of the factors is the regulatory, status of the impact area with respect to the attainment of the NAAQS. Sources must obtain a construction permit prior to commencing construction of an air emission source. Sources located in attainment areas may be subject to the prevention of significant deterioration (PSD) of air quality rules, whereas those located in or affecting nonattainment areas may be required to comply with a nonattainment new source review (NNSR). An overriding constraint in either program is that no source may cause or significantly contribute to a violation of an ambient air quality standard. Emissions from the proposed KIF project are below the thresholds that would trigger either PSD or NNSR. Emissions of $PM_{2.5}$ are also subject to a Best Available Control Technology (BACT) evaluation due to the partial county nonattainment designation of Roane County for $PM_{2.5}$.

The air quality near the KIF site is generally good. Table 3-2 shows the results of ambient air quality monitoring of criteria pollutants that are considered representative of the site. USEPA has designated Roane County as partial county nonattainment status for $PM_{2.5}$. Nearby Anderson, Knox, and Loudon Counties are all in nonattainment status for $PM_{2.5}$. Roane County is currently in attainment for all other criteria pollutants.

All areas in Tennessee had met attainment of the old 1-hour ozone standard. However, for some areas, attainment of an 8-hour ozone standard of 80 parts per billion (ppb) has been more difficult to achieve. Subsequently on March 27, 2008, USEPA made revisions to the primary and secondary NAAQS for ozone (40 CFR Part 50). The level of the 8-hour primary standard was revised to 75 ppb, and the secondary standard was revised making it identical to the revised primary standard.

3.1.2. Environmental Consequences

3.1.2.1. No Action Alternative

Under the No Action Alternative, TVA would continue to operate the current CCP handling system consisting of wet impoundments.

3.1.2.2. Action Alternative

Impacts of Construction

The project under consideration would have associated transient air pollutant emissions during the construction phase. Construction-related air quality impacts are primarily related to land clearing, site preparation, and the operation of internal combustion engines.

Land clearing, site preparation, and vehicular traffic over unpaved roads and the construction site result in the emission of fugitive dust particulate matter (PM) during site preparation and active construction periods. The largest fraction (greater than 95 percent by weight) of fugitive dust emissions would be deposited within the construction site boundaries. The remaining fraction of the dust would be subject to transport beyond the property boundary. Emissions from open construction areas and unpaved roads would be mitigated by spraying water on the roadways as needed to reduce fugitive dust emissions by as much as 95 percent.

Combustion of gasoline and diesel fuels by internal combustion engines (vehicles, generators, construction equipment, etc.) would generate local emissions of PM, nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOCs), and sulfur dioxide (SO_2) during the site preparation and construction period. The total amount of these emissions would be small and would result in minimal off-site impacts.

Table 3-2. Ambient Concentrations of Criteria Air Pollutants Compared With Air Quality Standards

Pollutant	Level of Standard (ppm)[a]	One-Year Maximum or Mean	
		Concentration (ppm)[a]	Percent of Standard (%)
Ozone (New Standard)	4th Highest 8-hour average (0.075)	0.073[c]	97
Sulfur Dioxide	Maximum 3-hour average (0.5) Maximum 24-hour average (0.14) Annual mean (0.030)	0.094[b] 0.025[b] 0.002[b]	19 18 6
Nitrogen Dioxide	Annual mean (0.053)	0.007[d]	13
Carbon Monoxide	Maximum 1-hour average (35) Maximum 8-hour average (9)	0.9[e] 0.5[e]	3 6
PM_{10} (Old Standard) $PM_{2.5}$ (New Standard)	(µg/m^3) Maximum 24-hour average (150) Annual average (15) 24-hour average (35)	(µg/m^3) 47[g] 13.7[f] 30.3[f]	 31 91 87
Lead	(µg/m^3) Quarterly mean (1.5)	(µg/m^3) 0.06[h]	 4

[a] ppm unless otherwise noted
[b] Sulfur dioxide values for Bull Run, Anderson County, Tennessee, 2006
[c] Ozone values for Oak Ridge, Anderson County, Tennessee, 2008
[d] Nitrogen dioxide values for Meigs County, Tennessee, 2006
[e] Carbon monoxide values for Look Rock, Blount County, Tennessee, 2007
[f] $PM_{2.5}$ values for Harriman, Roane County, Tennessee, 2008
[g] PM_{10} values for Rockwood, Roane County, Tennessee, 2008
[h] Lead value for Knox County, Tennessee, 2008

Air quality impacts from construction activities would be temporary and dependent on both manmade (e.g., intensity of activity, control measures) and natural factors (e.g., wind speed, wind direction, soil moisture). Even under unusually adverse conditions, these emissions would have, at most, a minor, transient impact on off-site air quality and be well below the applicable ambient air quality standard. Overall, the air quality impact of construction-related activities for the project would be minor.

Proposed Action Options

The proposed Action Options would remove the current wet fly ash handling system at KIF and convert it to dry collection. This would require the construction of dry ash silos and supporting infrastructure. For disposing of the dry fly ash, there are two options being considered:

1. Transporting all of the fly ash off site for disposal or for marketing.

2. Disposing fly ash in a dry stacking location that would be developed in the area currently planned for the second phase of gypsum disposal.

The two options will be designated “off-site disposal” and “on-site disposal”.

In the interim, prior to the completion of the construction of the dry fly ash handling system and the dry stacking area, TVA proposes to continue sluicing fly ash to the ash pond complex. The ash in the pond complex could also be recovered in the manner being used to reclaim ash from the ash spill using methods described in detail in section 2.4 of this document.

Off-site transport of this recovered, moist fly ash would be by either rail or truck. Disposal of the ash would be in accordance with applicable state and federal regulations in landfills that meet at least *Resource Conservation and Recovery Act* (RCRA) Subtitle D Class standards. The reclamation of ash from the pond system would have minimal impacts on air quality due to the high levels of moisture in the ash. To minimize the potential for fugitive emissions from the dredged material, water trucks would be used for dust suppression in the stacking and loading areas. Tires on vehicles leaving the ash stacking area would be washed to prevent the tracking of ash out of the ash area, thus minimizing the silt levels on roads and the fugitive emissions associated with traffic on the paved roads adjacent to the ash handling areas.

A network of particulate matter air monitoring systems around the ash recovery project has revealed that TVA’s dust suppression efforts have been successful; the levels of particulate matter are typically identical or even slightly lower than the levels measured by monitors near Knoxville and Chattanooga. Due to the lack of measurable fugitive emissions from the recovery of ash from the pond system, emission estimates are not needed for this interim method of ash handling.

Impacts of the Proposed Operation: Option 1 – Off-Site Disposal
Emission estimates have been prepared for KIF’s fly ash system, operating at maximum process weight throughput of 600,000 tons per year and 8,760 hours per year, and are presented in Table 3-3. The additional equipment would be as described in section 2.1.2 of this document.

The collected ash would drop into a vacuum-pressure transfer system and be blown into one of two three-day collection silos. The vacuum-pressure system would consist of five operating and two standby compressors, which would convey ash to the silos through pressure piping. The maximum total airflow entering the silo would be 24,037 standard cubic feet/minute. Each blower in the system would operate 50 percent of the time, which would be 4380 hours per year.

The storage silos would be used alternately; only one silo would be used at any given time. Each silo would be equipped with a pin mixer ash unloader for unloading to trucks or rail cars, and a bin vent for exhaust into the atmosphere. The maximum clean air dust concentration exiting each bin vent would be 0.005 grains/standard cubic foot. Railroad tracks and paved roads would be constructed for each silo to allow for pneumatic truck, open truck, or rail car loading.

The collected dry fly ash would be dropped into a vacuum-pressure transfer system and blown into one of two three-day storage silos. The ash would then be conveyed utilizing a total of five operating and two standby Atlas Copco screw compressors. Each compressor would convey ash to the silos through pressure piping. The total maximum airflow entering a silo would be 24,037 standard cubic feet/minute.

Table 3-3. Option 1 Potential Particulate Emissions From Fly Ash Handling System With Offsite Disposal

Source	Uncontrolled			Controls	Controlled	
	PM	lb/hr	ton/yr		lb/hr	ton/yr
Fly Ash Vacuum System	TSP	0.795	1.74	---	0.795	1.74
	PM_{10}	0.795	1.74		0.795	1.74
	$PM_{2.5}$	0.795	1.74		0.795	1.74
Storage Silo with Pressure System	TSP	1.03	2.26	---	1.03	2.26
	PM_{10}	1.03	2.26		1.03	2.26
	$PM_{2.5}$	1.03	2.26		1.03	2.26
Fly Ash Loadout to Trucks	TSP	0.0413	0.0430	None	0.0413	0.0430
	PM_{10}	0.0196	0.0203		0.0196	0.0203
	$PM_{2.5}$	0.00296	0.00308		0.00296	0.00308
Fly Ash Handling Haul Roads	TSP	48.3	50.2	Wet Suppression	2.41	2.51
	PM_{10}	9.4	9.8		0.471	0.490
	$PM_{2.5}$	1.41	1.47		0.0705	0.0733
Haul Roads Watering	TSP	53.4	11.11	Wet Suppression	2.67	0.556
	PM_{10}	10.42	2.17		0.521	0.108
	$PM_{2.5}$	1.56	0.325		0.0780	0.0162
Total Emissions				**TSP**	**6.95**	**9.36**
				PM_{10}	**2.84**	6.87
				$PM_{2.5}$	**1.98**	**6.35**

TSP = Total suspended particulates
PM = particulate matter
PM_{10} = particulate matter ≤10 µm in diameter
$PM_{2.5}$ = particulate matter ≤2.5 µm in diameter
lb/hr = pounds per hour
ton/yr = tons per year

Sources: Option 1 – Off-Site Disposal
All sources of air emissions for the proposed dry fly ash handling system at KIF are listed in Table 3-4.

Table 3-4. Option 1 Emission Sources

Source
Fly Ash Vacuum System
Storage Silo With Pressure System
Fly Ash Load out to Trucks
Fly Ash Handling - Haul Roads
Haul Roads - Watering

During fly ash unloading to open trucks or rail cars (batch drop operations), fly ash conditioners would moisten the dust for dust control before discharge. The open trucks and rail cars would then be covered to further reduce the chance of fugitive emissions, and the material would be transported off site. The trucks would travel a total distance onsite of 1 mile on paved roads.

Based on the estimates provided in Table 3-3, the project under Option 1 would be in compliance with the State of Tennessee process regulations[1] and fugitive dust regulations[2] and will have total particulate matter emissions below the PSD significant emission levels. Summaries of the proposed emission limits and the applicable emission standards are provided below.

Operations of the dry fly ash handling system are subject to specific State of Tennessee process regulations, fugitive dust regulations and a review for applicability of PSD regulations. The proposed Option 1 does not exceed federal and state PSD thresholds.

Project Scenario Emissions: Option 1 – Off-Site Disposal
Fugitive Dust
Each storage silo will transfer the dry fly ash through a pin mixer ash unloader into pneumatic trucks, open trucks, or rail cars for removal off-site. When transferring to open trucks or rail cars, fugitive emissions would occur from batch drop operations. The trucks would travel a total of 991 mile of paved on-site roads. Water suppression would be used as needed to control fugitive emissions during dry fly ash removal off site. Table 3-5 provides a summary of the fugitive emissions generated during dry fly ash hauling operations.

Table 3-5. Dry Fly Ash Handling Fugitive Emissions Summary

[1]Tennessee Department of Environment and Conservation (TDEC), Division of Air Pollution Control (APC); Chapter 1200-3-7, "Process Emissions Standards"
[2] TDEC APC; Chapter 1200-3-8, "Fugitive Dust"

Source	$PM_{2.5}$ Emissions* (ton/yr)	PM_{10} Emissions* (ton/yr)	TSP Emissions* (ton/yr)
Ash Loadout to Trucks	0.00308	0.0203	0.0430
Ash Hauling	0.0895	0.598	3.07
TOTAL	**0.0926**	**0.619**	**3.11**

TSP = Total suspended particulates
PM_{10} = particulate matter ≤10 µm in diameter
$PM_{2.5}$ = particulate matter ≤2.5 µm in diameter
ton/yr = tons per year
*Proposed actual emissions are controlled and provided in Table 3-3.

Process Emissions
The dry fly ash handling system is required to meet TDEC air pollution control (APC) process emission standards for particulate matter (Total Suspended Particles (TSP), PM_{10}, and $PM_{2.5}$). Table 3-6 provides a comparison between the emissions provided in Table 3-3 and the TDEC APC emission standard.

Table 3-6. Option 1 Dry Fly Ash Conveying System Emissions and Tennessee Department of Environment and Conservation Air Pollution Control (APC) Emission Standards

Emission Point	Emissions[1] (grains/standard-ft^3)	APC Limit [2] (grains/standard-ft^3)	Citation [2]
9 Operating Vacuum Pumps w/ filter separators	0.005	0.25	1200-3-7-.04(2)
Silo w/ Pressure System & Bin Vent Filter	0.005	0.25	1200-3-7-.04(2)

1 Proposed actual emissions are controlled and are provided in Table 3-3.
2 TDEC emission limits as of July 1, 1990.

The operation of the proposed project is not expected to exceed the TDEC APC emission standards provided in Table 3-6.; The emissions are 50 times lower than the standard.

Conclusions: Option 1 – Off-Site Disposal
Table 3-7 provides a comparison between the emissions presented in Table 3-3 with the applicable PSD thresholds. The estimated emission increases for this proposed project indicate that the pollutants would not exceed PSD significance levels; no further PSD analysis is required.

Table 3-7. Option 1 Emissions and PSD Limits From Ash Handling System With Off-Site Disposal

Pollutant	Emissions Rate (ton/yr)	PSD Threshold (ton/yr)
TSP	9.36	25
PM_{10}	6.87	15
$PM_{2.5}$	6.35	10

TVA has provided analyses demonstrating compliance with all federal and State of Tennessee requirements for air quality protection. .

Impacts of Proposed Operation: Option 2 – On-Site Disposal
Under the on-site disposal option, the fugitive emissions associated with the pneumatic conveyance of fly ash and the load out of fly ash into trucks would be identical. The hauling of ash from the storage silos to the on-site dry stacking area would have additional sources of fugitive emissions because of the increased distance. The distance to the landfill is greater than the distance associated with the transport of ash in the off-site disposal option (6.4 miles on a paved road roundtrip versus 1 mile). Due to this greater hauling distance, an additional control would be necessary to minimize fugitive emissions. A vacuum sweeper would be used for this additional control in order to remove silt from the haul road. This action would greatly reduce haul road emissions. Emissions would also be associated with the maintenance of the dry stacking area and with wind erosion from the frequently disturbed surface of the area. The emission sources associated with the on-site disposal option are shown in Table 3-8.

Table 3-8. Option 2 Emission Sources

Source
Fly Ash Vacuum System
Storage Silo with Pressure System
Fly Ash Load out to Trucks
Fly Ash Handling - Haul Roads
Haul Roads - Watering Truck
Haul Roads - Vacuuming Truck
Fly Ash Unloading at Dry Stacking Area
Pile Compacting (Roller)
Pile Spreading (Dozer)
Pile Watering
Dry Stacking Area Wind Erosion

Emission estimates for the handling and storage of fly ash under Option 2 are presented in Table 3-9. Based on the estimates provided in Table 3-9, the project would be in compliance with Tennessee process and fugitive dust regulations, and will have total particulate matter emissions below the PSD significant emission levels.

Table 3-9. Option 2 Potential Particulate Emissions From Fly Ash Handling System With On-Site Disposal

Source	Uncontrolled			Controls	Controlled	
	PM	lb/hr	ton/yr		lb/hr	ton/yr
Fly Ash Vacuum System	TSP	0.795	1.74	---	0.795	1.74
	PM_{10}	0.795	1.74		0.795	1.74
	$PM_{2.5}$	0.795	1.74		0.795	1.74
Storage Silo w/Pressure System	TSP	1.03	2.26	---	1.03	2.26
	PM_{10}	1.03	2.26		1.03	2.26
	$PM_{2.5}$	1.03	2.26		1.03	2.26
Fly Ash Loadout to Trucks	TSP	0.0413	0.0430	None	0.0413	0.0430
	PM_{10}	0.0196	0.0203		0.0196	0.0203
	$PM_{2.5}$	0.00296	0.00308		0.00296	0.00308
Fly Ash Handling Haul Roads	TSP	158.6	4.28	Wet Suppression Vacuuming	4.28	4.45
	PM_{10}	30.9	1.14		1.098	1.14
	$PM_{2.5}$	4.62	4.81		0.167	0.171
Haul Roads Watering	TSP	24.0	5.0	Wet Suppression Vacuuming	0.649	0.135
	PM_{10}	4.70	0.97		0.1664	0.0346
	$PM_{2.5}$	0.70	0.146		0.0249	0.00517
Vacuuming Haul Roads	TSP	2.6	0.5	Wet Suppression Vacuuming	0.069	0.014
	PM_{10}	0.5	0.1		0.018	0.004
	$PM_{2.5}$	0.07	0.015		2.61E-03	5.42E-04
Truck Unloading at Dry Stacking Area	TSP	1.40E-02	1.46E-02	None	1.40E-02	1.46E-02
	PM_{10}	6.62E-03	6.89E-03		6.62E-03	6.89E-03
	$PM_{2.5}$	1.00E-03	1.04E-03		1.00E-03	1.04E-03
Pile Maintenance Compacting (Roller)	TSP	109	56.8	Wet Suppression	5.46	2.84
	PM_{10}	51.1	26.6		2.56	1.33
	$PM_{2.5}$	5.11	2.66		0.256	0.133
Pile Maintenance Spreading (Dozer)	TSP	133	138	Wet Suppression	6.63	6.9
	PM_{10}	62.0	64.5		3.10	3.23
	$PM_{2.5}$	6.20	6.45		0.310	0.323
Pile Watering Truck	TSP	386	80.2	Wet Suppression	19.3	4.01
	PM_{10}	180	37.5		9.02	1.88
	$PM_{2.5}$	18.0	3.75		0.902	0.188
Dry Stacking Area Wind Erosion	TSP	0.383	1.68	None	0.383	1.68
	PM_{10}	0.383	1.68		0.383	1.68
	$PM_{2.5}$	0.383	1.68		0.383	1.68
Total Emissions				**TSP**	**32.6**	**24.1**
				PM_{10}	**18.2**	**13.3**
				$PM_{2.5}$	**3.87**	**6.50**

Conclusions: Option 2 – On-Site Disposal
Table 3-10 provides a comparison between the emissions presented in Table 3-9 with the applicable PSD thresholds. The emission increases for this proposed project indicate that the pollutants will not exceed PSD significance levels; therefore, no further PSD analysis is required.

Table 3-10. Option 2 Emissions and PSD Limits From Ash Handling System With On-Site Disposal

Pollutant	Emissions Rate (tons/year)	PSD Threshold (tons/year)
TSP	24.1	25
PM_{10}	13.3	15
$PM_{2.5}$	6.50	10

3.2. Water Resources, Surface Water, and Water Quality

3.2.1. Affected Environment

KIF is located in eastern Tennessee, and is situated on a peninsula formed by the confluence of the Clinch and Emory rivers at Clinch River Mile (CRM) 2.6. This area is in the upper portion of Watts Bar Reservoir. Watts Bar Dam is approximately 40.5 river miles below KIF (37.9 miles on the Tennessee River and 2.6 miles on the Clinch River) at Tennessee River Mile (TRM) 529.9. River reaches on the Clinch and Emory near KIF are impounded waters from Watts Bar Dam.

River flow rates past KIF are regulated by upstream dams on the Clinch River (Melton Hill and Norris dams) and downstream on the Tennessee River by Watts Bar Dam (Table 3-11). The flow rates are also influenced by upstream dam operations on the Tennessee River (Tellico and Fort Loudoun dams).

Table 3-11. Kingston Fossil Plant Area Watershed Average River Flows

Location	Watershed Area (square miles)	Average Annual Flow (cfs)	Average Summer Flow (cfs)	Average Winter Flow (cfs)
Emory River at River Mouth	865	1,778	504	2,675
CRM 2.6	3,540	5,226	4,306	6,221
Tennessee River at Watts Bar Dam (TRM 567.7)	17,310	26,873		

cfs = cubic feet per second
CRM = Clinch River mile
TRM = Tennessee River mile

Flow patterns can be complex in the Emory and Clinch rivers embayments. When Emory River flow is greater than the 2,100 cfs required by the cooling water system for KIF, the Emory River water provides all KIF cooling water. According to stream gauge records, this happens about 18 percent of the time and is most likely in the winter flood season, which occurs during December through March.

When Emory River flow is less than the 2,100 cfs needed by KIF, water flows upstream from the Clinch River through the Emory River embayment. This is encouraged by the presence of an underwater weir in the Clinch River just downstream of the Emory River

confluence. Under some conditions, the Emory River also flows backwards upstream of the plant. Water is pushed up the Emory River because of inflows that raise the pool elevation in Watts Bar Reservoir. Such inflow typically occurs when the reservoir is filling in the spring or during a spring 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 the potential for water from the Clinch River to flow upstream on the Tennessee River during the filling of Watts Bar Reservoir.

These flow patterns are further complicated by temperature and density differences in the water. Warmer water is less dense and therefore stays on the surface of a reservoir. In the summer, the sun and air temperatures warm the surface water, and this thermal layering becomes stable and does not mix with deeper, cooler, and denser water. This stable thermal layering of water is known as stratification. The Emory River water also warms during summer. Norris Dam and Melton Hill Dam discharges 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 intakes in the summer, this cooler water flows along the bottom of the embayment, and the warmer Emory River water can flow downstream over the top of the cooler Clinch River water.

Water Quality (Pre-December 2008)

The *Emergency Dredging for Kingston Fossil Plant Ash Dike Failure Final Environmental Assessment* (TVA 2009) describes the water quality prior to the December 2008 dike failure. The Emory River arm of Watts Bar Reservoir is on the state 303(d) list of impaired waters (TDEC 2008a) because of sediments contaminated with polychlorinated biphenyls (PCBs) and chlordane from industrial point sources. The section of the Emory above the influence of the Watts Bar impoundment is listed as impaired because of mercury from long-range atmospheric deposition (settling in the water from airborne sources). Several tributaries of the Emory River upstream of KIF are also listed as impaired because of manganese and iron concentrations, and low pH; these conditions have most likely occurred from historic coal mining activities. A few of these upstream tributaries are also impacted by sediment, by other causes such as development, or by pathogens from agriculture.

The Clinch River arm of Watts Bar Reservoir is also on the state 303(d) list because of PCBs and chlordane contamination of the sediment from legacy (historical) pollutants, industrial point source discharges, and from atmospheric deposition. Nearby tributaries to the Clinch River are also listed for PCBs, chlordane, and mercury; one nearby tributary is listed for arsenic. These nearby tributaries may be sources of contamination to the Clinch River. Some of this contamination occurs because of former United States Department of Energy (DOE) operations on the Oak Ridge Reservation (TDEC 2008a). Past DOE actions at Oak Ridge resulted in the contamination of sediments by radioactive and other wastes. The primary concern is PCB contamination in fish. Other contaminants include radioactive materials and metals.

TVA conducted the Vital Signs Monitoring Program on Watts Bar Reservoir annually from 1991 through 1994 to establish baseline data on the reservoir's ecological health under a range of weather and flow conditions. Since 1994, Watts Bar Reservoir has been evaluated every other year. The Vital Signs Program uses five metrics to evaluate the ecological health of TVA reservoirs: chlorophyll concentration, fish community health, bottom life, sediment contamination, and dissolved oxygen. Values of good, fair, or poor are assigned to each metric TVA monitored.

The reservoir ratings for Watts Bar have fluctuated between “high,” “fair,” and “poor,” and have generally followed reservoir flow conditions with the lowest ratings during droughts. . Of the indicators included in the Vital Signs Program, dissolved oxygen is the most responsive to flow rates.

Water Quality (Post-December 2008)
The December 2008 KIF dike failure released about 5.4 million cubic yards of coal ash and about 327 million gallons of water. This ash and water spread over nearly 300 acres of land and water adjacent to the plant and into the Emory River. USEPA, TDEC, and TVA crews have been sampling water to assess the quality of public drinking water supplies, private wells, in-stream river water (both near the slide and at multiple downstream locations), and local springs. As of December 7, 2009, TVA had taken more than 20,442 surface and utility water samples. Surface samples were taken from the Emory, Clinch, and Tennessee rivers. TDEC had also taken more than 130 water samples. Additionally, between December 23, 2008, and January 2, 2009, the USEPA took 28 samples.

In general, level of contaminants in water increase as flow increase and levels of contaminants decrease as flow recede. Higher flow rates and high water velocities cause small particles of solid materials to become suspended in the water column and therefore increase concentration. TDEC measured levels of aluminum, cadmium, iron, and lead concentrations during one sampling event in January 2009 that were above the water quality criteria adopted by TDEC. These exceedences were in the Emory River near the ash spill location and were a onetime occurrence. TDEC samples since that time have below the water quality criteria for aluminum, cadmium, iron, and lead. Criteria for thallium in waters that serve as both a source of drinking water and from which fish are eaten have also been exceeded in some TDEC samples from both the Tennessee and Emory rivers. There have been no exceedences of the Tennessee thallium standard for a water source that serves as a drinking water source only.

The chemical constituents of greatest concern are the metals contained in the ash. These trace constituents are chemically combined with the ash. Depending on the temperature, pH, and oxygen availability in the water, the metals may disassociate from the ash. As shown on the Web site http://www.tva.com/kingston/index.htm the maximum levels of arsenic, mercury, and selenium from all standard sampling locations on the Emory, Clinch, and Tennessee rivers have been below both the Tennessee Fish and Aquatic Life Criterions for Continuous Concentration and the Tennessee Domestic Water Supply Criterions.

Existing Wastewaters

Existing CCPs Wastewater Treatment Facilities
As detailed below in Section 3.3 of this EA, KIF currently produces two CCPs: fly ash and bottom ash and will produce a third CCP source soon: gypsum from the operation of the scrubbers. The CCP handling systems include the ash pond and the gypsum pond, that receive and treat the wastewater effluents. The ash pond currently receives all of the fly ash and bottom ash wastewater, and the gypsum pond will receive effluent from the scrubbers. The effluent from the gypsum pond will be routed to the condenser cooling water (CCW) channel.

Fly ash comprises approximately 80 percent of the by-product placed in the pond, and the remaining 20 percent consists of bottom ash. Currently, both the ash from power

production and the ash dredged from the river are discharged to a channel, dipped out, and dewatered. The ash is then loaded onto rail cars for disposal in a permitted Alabama landfill. The decanted water (produced when the ash is dewatered) goes through the remaining ash pond system and is discharged through DSN 001.

Cooling water for KIF's condensers is pumped from the Watts Bar Reservoir pool at Emory River Mile 1.9. At full operating capacity, cooling water flows through the condensers at a rate of 1,297 millions of gallons per day (MGD). Water from the ash pond is discharged into the plant intake channel.

Ash Pond Discharge (DSN 001)

Based on the current NPDES permit, on average, 40.5 MGD of ash sluice water and other constituent flows are discharged from the ash pond via DSN 001. Current inflow sources to the ash pond and their average annual daily flow are summarized below in Table 3-12. The largest source of flow other than the fly ash sluice is the station sump discharge (7.712 MGD). The station sump primarily receives equipment cooling water, unit leakage, etc. The constituents of interest in the station sump discharge are pH, total suspended solids, oil, and grease. The pH and alkalinity of the station sump discharge are usually near that of the KIF intake water.

Table 3-12. Inflow Sources to the Kingston Fossil Plant Discharge Serial Number 001

Ash Pond (DSN 001)	Inflow to Pond (MGD)
Fly Ash Sluice Wastewater	25.178
Bottom Ash Sluice Water and Groundwater	6.814
Station Sump Discharge	7.712
Precipitation	0.574
Water Treatment Plant Wastes	0.267
Coal Yard Runoff Pond Discharge	0.145
Miscellaneous	0.031
Evaporation	-0.238
Total	**40.483**

(Source of Flow Rates: Kingston Fossil Plant Storm Water and Wastewater Flow Schematic, NPDES Permit No. TN0005452)

Precipitation drives the amount of coal yard runoff. Following a 10-year, 24-hour rainfall event of 4.9 inches per day, the estimated coal yard runoff could increase to approximately 10.9 MGD.. Based on the NPDES permit flow schematic for KIF, the average annual daily flow for coal yard runoff is 0.145 MGD. This is less than 0.4 percent of the total flow through DSN 001. During a storm event, however, the daily coal yard runoff could increase to up to approximately 27 percent of the current flow through DSN 001. With the current coal blend being burned at KIF, the coal yard runoff is almost neutral (pH 6.8 standard units). The primary constituents of interest in the coal yard runoff are pH and total suspended solids.

Air pre-heater washes (APHW) are classified as nonchemical metal cleaning wastes because only water, with no additional chemicals, is used in these cleanings. The average annual daily flow for APHW is only 0.002 MGD, so they are included in the miscellaneous category in Table 3-12. APHW occur when the air pre-heater becomes fouled and impacts unit performance. These cleanings, therefore, are intermittent. When they do occur, APHW could generate flows of 0.1-0.2 MGD. Even though there are no chemicals added to

an APHW, the first flush (20-30 percent of the total flow) is usually acidic because of the sulfur and other compounds from flue gas that have accumulated on the air pre-heater surfaces. When some of these compounds dissolve in the wash water, they can make the APHW acidic.

These non-CCP sources currently receive treatment through neutralization with other wastewaters and sedimentation in the ash pond system. DSN 001 discharges directly into the 1,347 MGD plant intake. TVA is required to meet effluent characteristics for DSN 001 of a minimum pH of 6.0 and a monthly average total suspended solids concentration of 29.9 milligrams per liter (mg/L). DSN 001 also has to meet compliance of monthly average oil and grease concentrations of no greater than 14.4 mg/L.

Mass Balance of Current Operations

Mass balance is a mathematical accounting of the sources and sinks of a substance within a system, such as a water body. A mass balance model for a water body is useful to help understand the relationship between the loadings of a pollutant and the levels of that pollutant in the water, biota, and sediments. The ash pond, and therefore the potential impact of CCP operations, discharge into the intake channel. The potential impact of this discharge was evaluated using the metals mass balance analysis presented in Table 3-13. The purpose of the analysis was to estimate concentrations of ash-related contaminants in the intake channel (and ultimately in the Emory River downstream of the plant) resulting from current operations. The analysis accounts for ash-related contaminants associated with dredged ash supernatant, ash sluice water from plant operation, and background river water entering the intake channel. All dredged ash supernatant and ash sluice water were assumed to discharge into the ash pond and ultimately into the intake channel at DSN 001. All input data and assumptions used in the mass balance including initial concentrations of the ash leachate contaminants are given in Table 3-13.

The type of coal burned can have an effect on the constituency of wastewaters. KIF is currently burning a blend of eastern bituminous coal and PRB coal. The PRB coals contain less sulfur and more calcium than eastern bituminous coals. This could result in some of the wastewaters listed in Table 3-12 having a higher pH and more alkalinity than if only eastern bituminous coals were burned. Bohac (1990) stated that “If the ash contains more equivalent leachable sulfur compounds than alkaline metal oxides, the ash sluice water would tend to have a depressed pH compared to the intake water prior to the ash addition. If the alkaline metal oxides predominate, the sluice water would tend to have an elevated pH.”

After the planned flue gas desulfurization scrubber is placed into service, the makeup of the coals burned at KIF might change. If more eastern bituminous coals are burned in the future, some of the wastewaters, which are currently neutral, such as the coal yard runoff or an APHW, might become more acidic and contain different amounts of various metals than the present wastewaters. Historically, in the 1970s and 1980s KIF burned primarily eastern bituminous coal. At that time, the coal yard runoff and the APHW were substantively more acidic than they are currently.

Table 3-13. Metals Mass Balance Results

Element	Intake Conc. mg/L	River Loading lbs/day	Total Ash Pond + CCW lbs/day	Total Ash Pond + CCW mg/L	TDEC Water Quality Criteria

Aluminum	0.500	5411	5795	0.51	
Arsenic	<0.001	5.41	27.5	0.0024	0.010
Barium	0.041	444	589	0.052	2.00
Beryllium	<0.001	5.41	5.64	0.0005	0.004
Cadmium	<0.0005	2.71	2.85	0.0003	0.002
Chromium	<0.001	5.41	10.6	0.0009	0.100
Copper	0.0013	14.07	16.1	0.0014	0.013
Iron	0.300	3247	3323	0.295	
Lead	<0.001	5.41	6.73	0.0006	0.005
Manganese	0.049	1.08	530	0.0001	
Mercury	<0.0002	530	1.08	0.048	0.0001
Nickel	<0.002	10.82	13.8	0.0012	0.100
Selenium	<0.001	5.41	9.4	0.0008	0.020
Silver	<0.0005	2.71	3.37	0.0003	0.0032
Thallium***	<0.001	5.41	17.9	0.0016	0.00024
Zinc	<0.010	54.1	62.5	0.0055	0.130

mg/L = Milligrams per liter
lbs/day = Pounds per day
* River loadings were calculated using 0.5, the Minimum Detection Limit.
**TDEC Criteria, Rule 1200-4-3-.03 (TDEC 2008b)
***This is an estimated value where one half of the detection value is assigned as the value for estimating purposes per EPA guidance.

The Discharge 002 CCW is the primary stream that has the potential to be affected by the proposed option of disposal of fly ash onsite. At full operating capacity, cooling water flows through the condensers at a rate of 1,297 millions of gallons per day (MGD).

3.2.2. Environmental Consequences

3.2.2.1. No Action Alternative

Under the No Action Alternative, TVA would not convert the ash handling systems to a dry fly ash vacuum system, and the current CCP and other wastewater systems would not be changed.

3.2.2.2. Action Alternative

As detailed in Chapter 2, the proposed Action Alternative includes replacing the current wet sluicing fly ash system with a dry, vacuum fly ash handling system. The dry collected ash would be marketed, or disposed either offsite or on site in the Phase II gypsum disposal area. This would reduce the DSN 001 discharge by more than 62 percent.

Construction Impacts

Wastewaters generated during construction of the proposed KIF dry ash handling systems may include construction storm water runoff, domestic sewage, dewatering of work areas, non-detergent equipment washings, and hydrostatic test discharges.

Surface Runoff

Most construction activities related to the dry ash systems installation would be performed within the existing plant site. The proposed facilities would be constructed in accordance with appropriate best management practices (BMPs) and would result in only minor and temporary impacts to surface water. Appropriate BMPs would be adopted, and all construction activities would be conducted in a manner to ensure that waste materials were

contained and that the introduction of polluting materials into the receiving waters would be minimized. A Construction Storm Water Permit would be in effect that would require development of a project-specific Storm Water Pollution Prevention Plan. This plan would identify specific BMPs to address construction-related activities, which would be implemented to ensure that storm water impacts are minimized and that no sediment or other polluting materials were introduced into receiving waters. Only minor and temporary, if any, impacts to surface water would be expected from construction and installation of the proposed facilities.

Construction Workforce Domestic Sewage Disposal - Portable toilets would be provided for the additional construction workers as needed. These toilets would be regularly pumped out and the sewage transported by tanker truck to a publicly owned treatment works accepting sewage pump-out.

Equipment Washing – These discharges would be handled in accordance with BMPs developed in accordance with the Construction Storm Water Permit (that covers water only cleaning) and/or NPDES Permit TN0005452.

With the implementation of BMPs, impacts to the Clinch River from construction activities would be minor and within the existing permit limits.

Operational Impacts

Water Withdrawals for the Proposed Dry Ash Handling Systems – Converting to a dry fly ash handling system would reduce existing water needs for KIF by 25.178 MGD. While this would be a substantial reduction of the flow through DSN 001, it would be less than a 2 percent reduction in the overall KIF withdrawals (1,347 MGD).

Ash Pond DSN 001

NPDES permitting regulations would require modifications to the wastewater discharge permit for KIF. Changing the volumes of ash pond sources could affect the assimilative capacity currently used for treating storm water, APHW, coal yard runoff, and station sump discharges. Potential new effluent guidelines from USEPA may also require lower discharge limitations, which could require additional treatment for some waste streams.

Removing approximately 25.2 MGD of fly ash sluice waters from DSN 001 would reduce the average daily flow through DSN 001 from approximately 40.5 MGD to approximately 15.3 MGD. In general, reducing the flow through the existing ash pond system would provide additional time for mixing and settling of these wastewaters and would provide enhanced treatment, especially for neutral wastewaters such as general area storm water and station sump discharge. However, removing the fly ash sluice water would reduce the alkalinity in the system and thereby reduce its effectiveness in treating acidic wastewaters, such as coal yard runoff or APHW.

Metals and other constituents that are currently leached from the fly ash during the wet process would no longer be present in DSN 001. The literature suggests that arsenic, boron, chloride, fluoride, sulfur, and selenium are concentrated on the surface of fly ash at higher levels than in bottom ash (Ainsworth and Rai 1987). Thus, loadings of these constituents would be reduced beyond that expected, based only on the reduction in flow to DSN 001. Bohac (1990) concluded that removing the fly ash from the wet ash handling system could reduce the mass loading to the ash pond by approximately 80 percent. Under

current operations the change to dry ash handling would therefore substantially reduce the mass of metals presently discharged to the river.

Estimates of future operations are complicated because these systems would be impacted by possible changes in the types and amounts of coal burned in the KIF units. Depending on the types of coal being burned when the dry ash systems are implemented, the wastewaters entering the remaining CCP system and discharging through DSN 001 would have either a higher pH or a lower pH. If the pH of DSN 001 appears to increase or decrease substantially, installation of potential mitigating measures, such as a carbon dioxide diffuser to lower pH, would be evaluated and implemented. If determined to be necessary, appropriate mitigative measures would be evaluated and implemented to ensure that any NPDES limitations on DSN 001 were not exceeded. Additional details about potential further mitigating actions for the coal yard runoff and APHW, which could, and would, be implemented if needed to maintain KIF compliance with NPDES requirements, are given below.

Coal Yard Runoff

If the fly ash sluice (25.178 MGD) is removed from DSN 001, then the coal yard runoff would be approximately 1 percent of the total flow. During a design storm event, the daily coal yard runoff flow could reach 10.9 MGD. Without the fly ash sluice, the coal yard runoff from a design storm could reach over 70 percent of the flow through DSN 001.

With the current coal blend being burned at KIF, the coal yard runoff is almost neutral with a pH of approximately 6.8 standard units and is adequately treated in the CCP system. Therefore, with the current coal blend, removing the fly ash sluice water from the CCP should not result in a significant treatment problem for coal yard runoff. However, if the coal blend at KIF changes to more eastern bituminous coal and the coal yard runoff becomes more acidic, then additional treatment, such as a neutralization system, would be designed and implemented as necessary to ensure that all applicable NPDES permit limitations are met.

Air Pre-heater Washes

The purpose of the air pre-heater is to recover the heat from the boiler flue gas, which increases the thermal efficiency of the boiler by reducing heat loss. Consequently, the flue gases are also sent to the stack at a lower temperature; this lower temperature allows for sulfur compound deposition that can trap fly ash, causing clogging. APHWs occur at infrequent intervals based on the amount of clogging from fly ash in the air pre-heater baskets. Typically, baskets are washed at two- to five-year intervals, and units at KIF are next being washed in the winter of 2010. TVA would collect data from these washes; if potential impacts on DSN 001 were indicated, TVA would take appropriate actions to avoid impacts to the discharge. These actions could include capturing the first flush of the wash in holding tanks and neutralizing any acidity before discharge to DSN 001.

Onsite Fly Ash Disposal

TVA is currently assessing a plan to use the 43-acre area east of the GDA for dry fly ash storage. Surface runoff and the LCS discharge from the fly ash storage area would drain through the GDA and discharge to the CCW. The potential impact of this discharge was evaluated using the metals analysis presented in Table 3-14.

Table 3−14. KIF Scrubber Waste Water Plus CCW Mixed Concentration Estimates

	Project FGD Conc. mg/L	Project FGD Mass Discharge lb/day	Intake Conc. mg/L	River Loading lbs/day	Project Estimated Loading lbs/day	Project Estimated Conc. mg/L	TDEC Water Quality Criteria
Aluminum	0.3200	4.3068	0.500	5411	5415	0.50	
Antimony	0.0030	0.0202	<0.001	5.41	5.43	0.00050	0.0056
Arsenic	0.0030	0.0202	<0.001	5.41	5.43	0.00050	0.010
Barium	0.0400	0.5384	0.041	444	445	0.041	2.0
Beryllium	<0.0024	0.0162	<0.001	5.41	5.43	0.00050	0.004
Boron	12.00	161.5065	<0.020	1082	1244	0.11477	
Cadmium	0.0046	0.0619	<0.0005	2.71	2.77	0.000256	0.002
Chromium	0.0070	0.0942	<0.001	5.41	5.50	0.000510	0.100
Cobalt	<0.0024	0.0162	<0.010	54.1	54.12	0.004990	
Copper	0.0020	0.0135	0.0013	14.07	14.08	0.001300	0.013
Iron	0.67	4.5087	0.300	3247	3252	0.30	
Lead	0.0020	0.0135	<0.001	5.41	5.42	0.00050	0.005
Manganese	0.5200	6.9986	0.049	530	537	0.050	
Mercury	<0.00005	0.0007	<0.0002	1.08	1.08	0.00010	0.0001
Molybdenum	0.0800	1.0767	0.006	81.2	82.25	0.00759	
Nickel	0.4010	5.3970	<0.002	10.82	16.22	0.0015	0.100
Selenium	0.0860	1.1575	<0.001	5.41	6.57	0.0006	0.020
Silver	0.0001	0.0013	<0.0005	2.71	2.71	0.00025	0.0032
Thallium	0.0130	0.1750	<0.001	5.41	5.58	0.00052	0.00024
Tin	<0.0050	0.0336	0.036	400	400	0.03692	
Titanium	0.0250	0.3365	<0.010	54.1	54.44	0.00502	
Zinc	0.0500	0.6729	<0.010	54.1	54.77	0.0051	0.130

mg/L = milligrams per liter
lbs/day = pounds per day
FGD = flue gas desulphurization

The purpose of the analysis was to estimate concentrations of scrubber-related contaminants in the CCW (and ultimately the Emory River downstream of the plant) resulting from proposed operations evaluated in the Scrubber EA (TVA 2006). The analysis accounts for scrubber-related contaminants associated with proposed scrubber blow down and background river water entering the CCW. The projected flue gas desulfurization (FGD) concentrations were based on analyses of the Cumberland Fossil Plant FGD wastewater, the estimated KIF FGD concentration of 30 percent solids, and estimated maximum flow of 1.613 MGD. The projected river loadings were based on analyses of the KIF intake and a CCW flow of 1.296.87 MGD. Mercury data used in Table 3-13 and 3-14 are based on previously approved EPA analytical methods. EPA has recently approved (2009) a new Low Level Mercury analytical method that provides lower detection limits allowing the plant site to show lower mercury concentration in the intake / raw water. EPA's analytical method for thallium has a detection limit currently at <0.001. The TDEC Water Quality Criteria is a calculated value based on water organism and currently is below the EPA approved detection limit. The input data and assumption used in the mass balance including estimated concentrations of the scrubber blow down are given in Table 3-6.

Results of the mass balance analysis summarized in Table 3-14 show that all of the constituents meet the TDEC lowest criteria (i..e., the limit equal to minimum water quality criteria limits). The mass balance analysis indicates that the overall impact of the proposed scrubber operations on surface water quality would be insignificant. TDEC's NPDES Permit Rational confirms that the metal concentrations have insignificant impact on the water quality of Watts Bar Reservoir.

To estimate the concentration of metal in the CCW discharge channel after receiving discharges from the proposed fly ash storage area and the proposed scrubber operations, the maximum TCLP data from the KIF recovery project data set and the Johnsonville Coal Fired Plant fly ash landfill data set were used. Assumptions included no cap on the fly ash storage area and operations similar to the Johnsonville Plant landfill. The added loadings from the fly ash storage area LCS discharge would increase the metals concentration at the CCW discharge, but the concentrations would not exceed the lowest TDEC Water Quality criteria with the exception of cadmium (Table 3-15). This analysis represents the "worst case" review since the KIF and Johnsonville data sets had 64 data points for cadmium of which 56 data points were non-detection and 8 other cadmium concentrations ranged from 0.01 to 0.15 mg/L. Only one data point was exceptionally high with a concentration of 1.46 mg/L. This data point represents the worst case condition and was used in Table 3-15. In addition, Table 3-15 does not take into account storm water runoff, which would be expected to dilute the discharges and decrease the concentration at the CCW.

Operational monitoring of the fly ash storage area for constituents of concern in the LCS discharge would be required to ensure the concentrations of these metals and other parameters do not exceed the NPDES permit limits. Mitigation measures would be identified, as needed, to ensure the combined discharges from the proposed fly ash storage area and from the proposed scrubber operations have no significant impact on the receiving stream. Mitigation measures could include capturing the LCS discharge and treating it.

To ensure no significant impacts to the Clinch River, TVA would conduct an operational characterization of the waters of the gypsum disposal area including representative samples from the KIF intake, influent to the gypsum disposal area, influent to and effluent from the discharge pond, and from the CCW channel. The waters would be analyzed for potential CCP leachate contaminants of concern including arsenic, selenium, and mercury. If determined to be necessary, appropriate mitigating measures would be evaluated and implemented to ensure that the discharge NPDES permit requirements for the water quality parameters are met. The operational characterization monitoring would continue until the gypsum disposal area operations were stabilized, that is, during the initial filling of the gypsum disposal area, building of the rim ditches and storage area, and operation of the settling pool at its design size.

Table 3-15. FGD, CCW and Fly Ash Storage Leachate Total Mixed Concentration Estimates

Element	Project Fly Ash LCS Conc. mg/L	Project Fly Ash LCS Loading lbs/day	Project Total Mixed Loading lbs/day	Project Total Mixed Conc. mg/L	TDEC Water Quality Criteria
Arsenic	0.28	3.77	9.20	0.000849	0.010
Barium	4.28	57.6	503	0.0464	2.00
Cadmium	1.46	19.7	23.1	0.00213	0.002
Chromium	0.069	0.929	6.47	0.000597	0.100
Copper	0.149	2.01	16.1	0.00149	0.013
Lead	0.685	9.22	14.7	0.00135	0.005
Mercury	0.002	0.0269	1.53	0.000141	0.0001
Nickel	0.128	1.72	17.9	0.00166	0.100
Selenium	0.31	4.17	22.4	0.00206	0.020
Silver	0.05	0.673	3.39	0.000313	0.0032
Zinc	3.22	43.3	125	0.0115	0.130

mg/L = milligrams per liter
lb/day = pounds per day
River loadings were calculated using 0.5, the Minimum Detection Limit.
TDEC Criteria, Rule 1200-4-3-.03 (TDEC 2008b)

3.3. Solid and Hazardous Waste

3.3.1. Affected Environment

KIF has historically produced two CCBs: Fly ash and bottom ash. TVA expects to burn between 3.2 and 4.4 million tons of coal annually through at least 2015 at KIF. The coal averages 12.5 percent ash; therefore, total ash production would range from approximately 400,000 to 550,000 tons of ash per year. Fly ash comprises approximately 80 percent (320,000 to 440,000 tons per year) and bottom ash is the remaining 20 percent (80,000 to 110,000 tons per year). Physical properties of the ash are described in TVA (2009).

To date, all fly ash and bottom ash produced at KIF has been handled by wet sluicing to the active ash pond area. Bottom ash has been reclaimed for use in on-site dike and roadway construction primarily in the ash pond area. Prior to the 2008 dike failure, fly ash was periodically and hydraulically dredged from the active ash pond and conveyed into either of two active dredge cells. Decant water from the dredge cells drained by gravity back to the active ash pond for discharge. Between 320,000 to 440,000 tons of fly ash and 80,000 to 110,000 tons of bottom ash are normally handled in this manner annually.

The proposed dry ash handling system would have the capacity to handle approximately 1000 tons of fly ash per day. Ash collected from the plant's precipitators, economizers, and SCRs would be conveyed to dry ash storage silos, which would be located near the current coal pile. The new silos would have the capacity to load trucks and rail cars that would either be open or pressurized containers. The system would be constructed to allow the addition of a coal ash beneficiation system to enhance the potential marketability of ash.

3.3.2. Environmental Consequences

3.3.2.1. No Action Alternative

Under the No Action Alternative TVA would continue to operate the current CCP handling system consisting of wet impoundments.

3.3.2.2. Action Alternative

The Action Alternative would remove the current wet ash handling systems at the Kingston Fossil Plant and convert it to dry collection. This would require the construction of dry ash silos and supporting infrastructure to allow for the dry collection of CCPs. In the interim, prior to the dry ash collection becoming operational, TVA proposes to continue sluicing fly ash to the ash pond complex.

In the event the use of the ash pond no longer becomes a viable option for ash disposal during the interim period before dry ash collection begins, TVA would continue to recover fly ash and bottom ash by dipping from the sluice channel in an operation similar to that utilized following the ash dike failure. The recovered ash would then be either disposed of onsite or transported off-site for disposal or beneficial reuse.

Off-site transport of the recovered and dried ash would be by rail or truck. Disposal of the ash would be in accordance with applicable state and federal regulations in landfills that meet at least RCRA Subtitle D Class standards. In order to be acceptable for placement in a permitted disposal facility, TVA must regularly characterize and submit analytical and physical data of the CCB waste to the disposal site owners/operators. This documentation is specific and in accordance with regulatory permitting requirements for the disposal sites. Beneficial reuse of the ash would meet the criteria set forth in the *Coal Combustion By-Product Marketing Environmental Assessment* (TVA 1990). The cumulative impacts could be as much as 320-440 thousand tons of additional waste annually. to local or region landfills. This contribution to a local, regional, or on-site permitted Subtitle D landfills would only be for a short duration until TVA develops long-term disposal solutions. These sites have an estimated combined storage capacity exceeding 37 million tons.

Since there is limited space available for on-site disposal of CCPs, the placement of dry fly ash in the currently permitted Phase II gypsum disposal area is also being considered. To facilitate conversion of wet to dry CCP disposal the area would be redesigned and would also require modification of the facility's solid waste permit. The volume of the designed Phase II area is approximately 9.5 million cubic yards. If utilized in this manner, dry fly ash would be taken to the disposal area by truck and would be managed in accordance with an approved facility operation plan, which will be part of the solid waste permit.

KIF is considered a small quantity generator by TDEC for generation of hazardous waste. The types of these wastes 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 for moisture removal from oil); and liquid-filled fuses. The status of KIF as a conditionally exempt small quantity generator of hazardous waste would not change result because of either action alternatives described below in the next section.

3.4. Transportation

This information and analysis is provided to bound the potential for environmental impacts resulting from transporting the ash off site. As noted earlier, TVA is not proposing to select among those disposal options.

3.4.1. Affected Environment

Roadway, railway, and waterway modes of transportation can serve KIF. However, there are currently no barge facilities on site. Much of the property along the Clinch River a few miles upstream from KIF belongs to DOE; shoreline residential properties and recreational areas are also in close proximity to the site. As TVA is not proposing transportation of ash by barge, the affected environment described is that related to transport by rail and truck to the representative sites identified.

KIF adjoins Swan Pond Road just off United States Highway (US) 70. US 70 is a principal, four-lane divided highway with wide shoulders traversing a gently rolling suburban area in an east-west direction. Swan Pond Road is a rural, two-lane road. Trucks exiting the KIF Reservation by way of Swan Pond Road would travel west on US 70 to Pine Ridge Road and then to I-40 or State Route (SR) 27. Swan Pond Road, US 70, and Pine Ridge Road are the common routes considered and are identified as such in Table 3-16. Figure 3-1 illustrates the common routes.

Table 3-16. Annual Average Daily Traffic (AADT) from 2008 with Projected Data and Level of Service Data from the Analyses

Landfill	Route	Traffic Data 2008 AADT	Projected 2010 Traffic	LOS	Traffic 2010 With Increase	LOS	Comments
Common	Swan Pond Road	3,263	3,736	C	3,826	C	Common access road from plant
	US 70	10,194	11,671	A	11,761	A	Common access
	Pine Ridge Road	9,931	11,370	B	11,460	B	Access road common to I-40 or US 27
Anderson	SR 170	3,135 4,360	3,589 4,992	C C	3,679 5,082	C C	Low AADT High AADT
	Fleenor Mill Road	No data					
Athens	SR 30	11,980	13,716	D	13,806	D	Two lane
	SR 30	20,103	23,016	C	23,106	C	Four lane
	SR 750	2,141	2,451	C	2,541	C	
Dayton	US 27	4,622	5,292	A	5,382	A	
	US 27	4,622 8,463	5,292 9,689	A B	5,382 9,779	A B	Low AADT High AADT
	Smyrna Road	1,134	1,298	A	1,388	B	
Oneida	Ruitan Road	10,240	11,724	D	11,814	D	
	US 27_a[1]	16,983	19,444	B	19,534	B	
	US 27_b	12,001	13,740	C	13,830	C	
	US 27_a	8,148 9,564	9,329 10,950	A A	9,419 11,040	A A	Low AADT High AADT
	US 27_c	2,203 4,945	2,522 5,662	C D	2,612 5,752	C D	Low AADT High AADT
	US 27_d	5,528	6,329	D	6,419	D	
	US 27_b	12,134	13,892	B	13,982	B	
	US 27_c	8,709 16,120	9,971 18,456	D E	10,026 18,546	D E	Low AADT High AADT
	Bear Creek Road	(No data)					

[1]The subscripts for US 27 refer to the number of lanes. US 27_a indicates four-lane divided highway. US 27_b indicates four-lane undivided highway. US 27_c indicates two lanes, and US 27_d is for three lanes.

LOS = Level of service

AADT = Average annual daily traffic

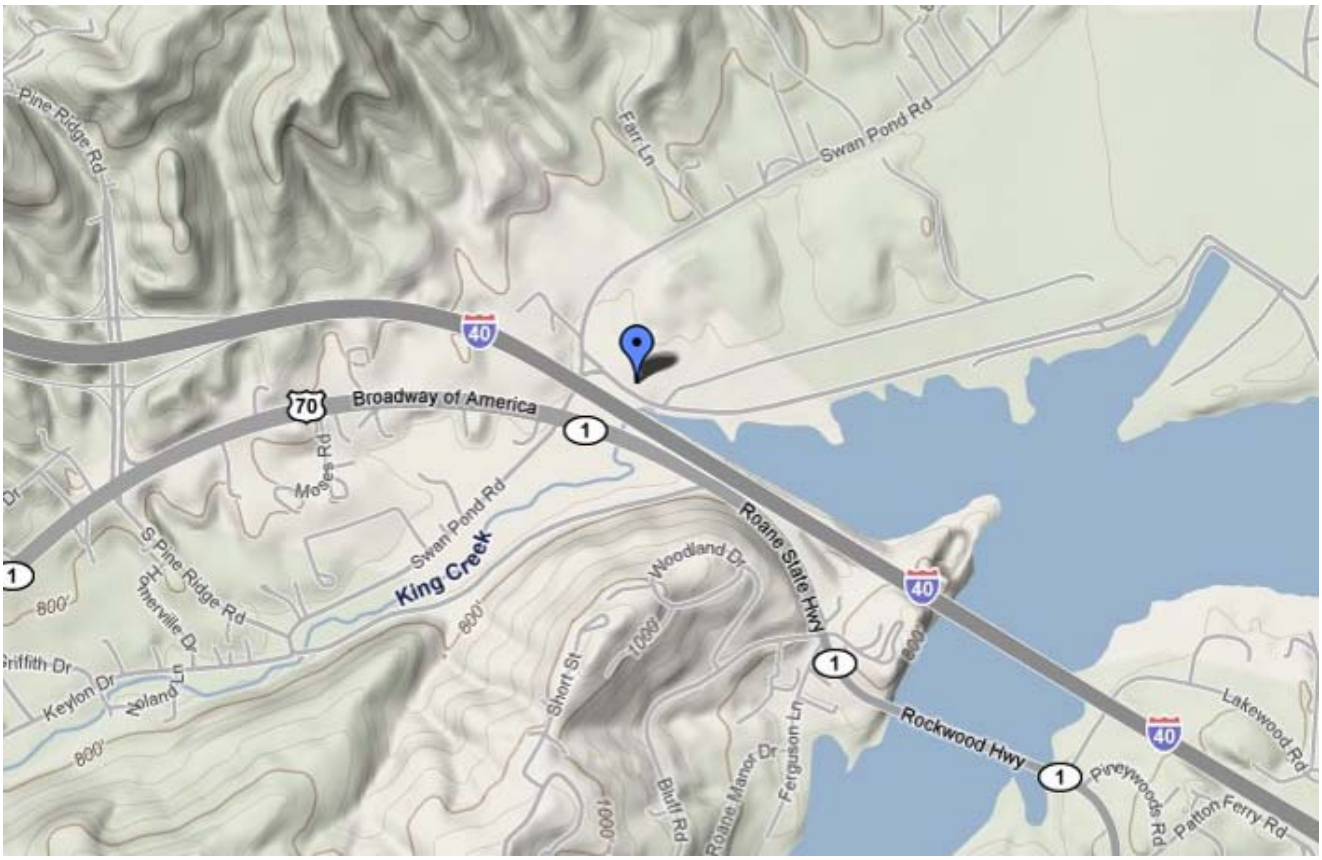

Figure 3-1. Kingston Fossil Plant Common Route

Four Subtitle D landfill locations are potential sites in Tennessee for ash removal placement: Anderson County, Athens, Dayton, and Oneida. If used, the Anderson County location (Chestnut Ridge Landfill) would be accessed by I-40 East, continuing to I-640 East/I-75 North to Exit 117 (SR 170) and right on Fleenor Mill Road. This route is approximately 50 miles one-way in length, and most of the route is interstate highway. The Athens landfill would be accessed by I-40 East to I-75 South Exit 49 (SR 30/Decatur Pike), turning right on SR 750/Piney Grove Road. This route is approximately 65 miles one-way. The Dayton landfill would be accessed by I-40 West to Exit 347 (SR 27), turning toward Harriman/Rockwood, to Smyrna Road. This route is approximately 36 miles one-way. The Oneida landfill would be accessed by SR29/Ruitan Road, to US 27, to Bear Creek Road. This route is approximately 62 miles one-way. Figures 3-2 through 3-5 depict the four proposed routes.

Two Subtitle D landfill locations are potential sites for ash removal placement by railcar. The Taylor County Landfill is located near Mauk, Georgia. The Perry County Landfill is located near Uniontown, Alabama. Figures 3-6 and 3-7 provide the general locations of the two proposed landfill locations in proximity to KIF.

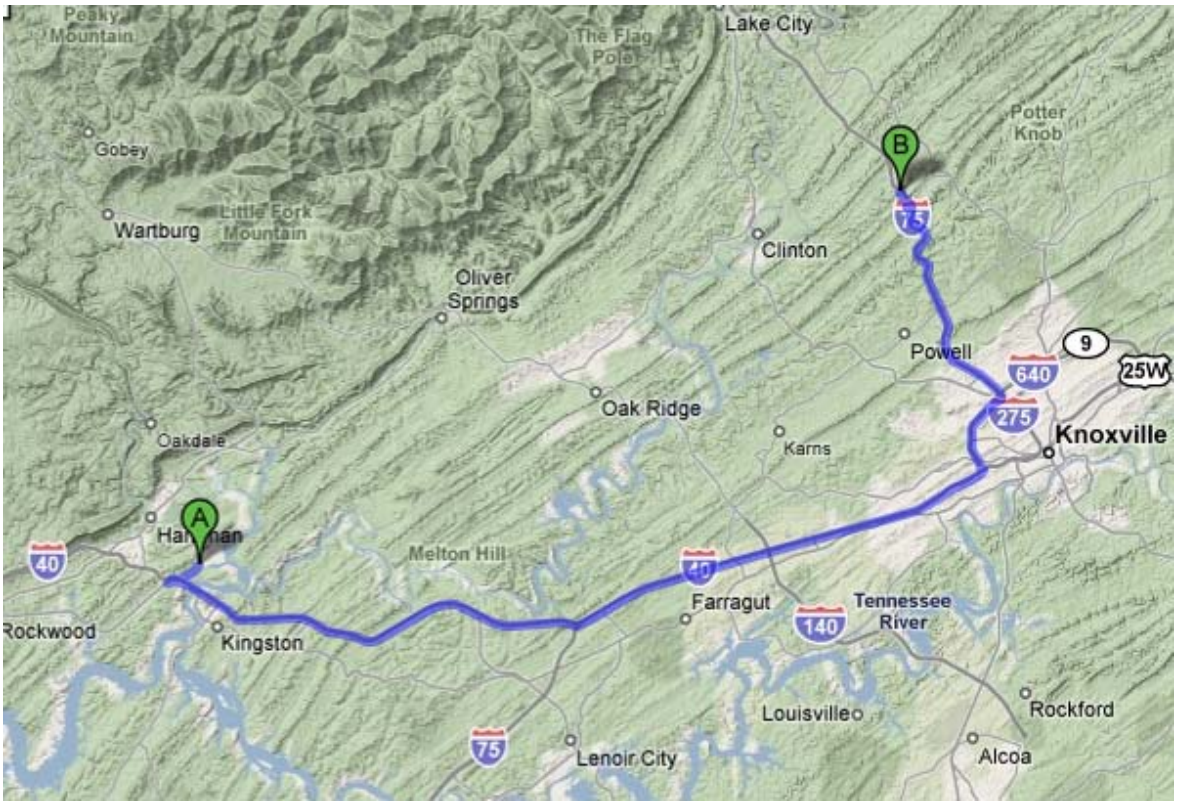

Figure 3-2. Area Map (Kingston to Anderson County Landfill)

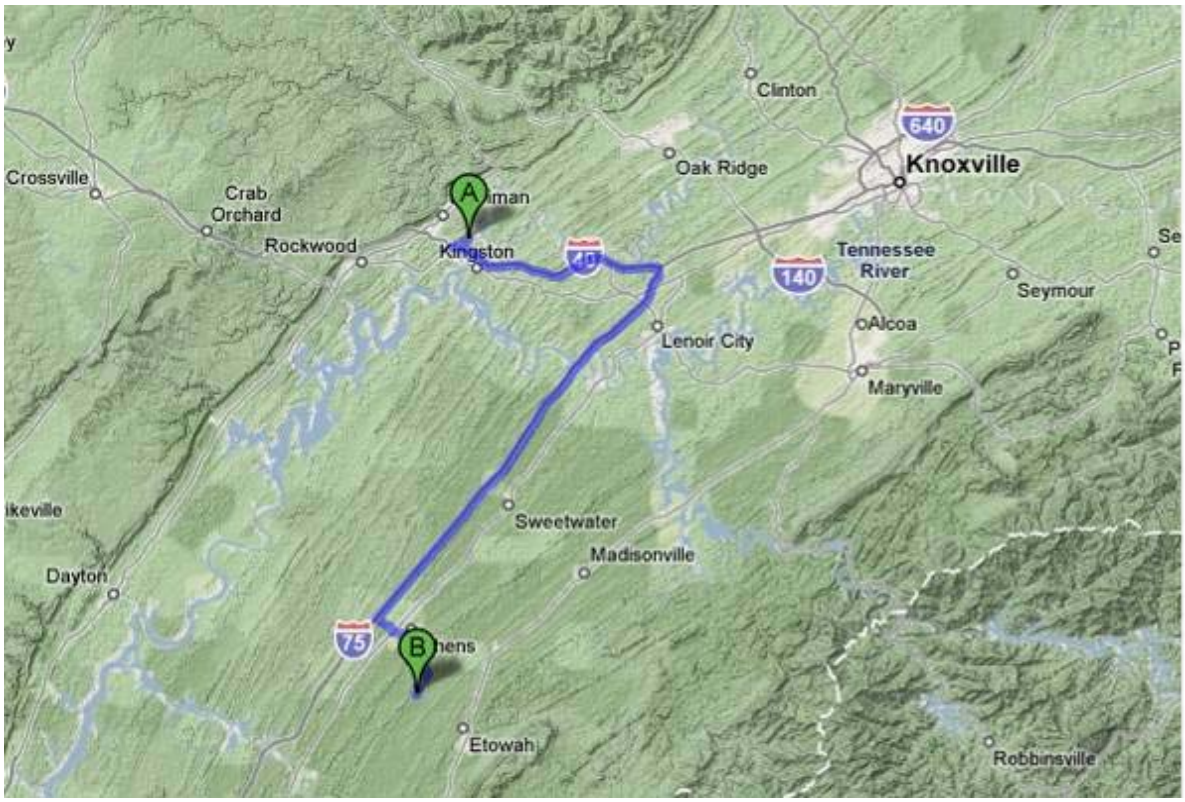

Figure 3-3. Area Map (Kingston to Athens Landfill)

Figure 3-4. Area Map (Kingston to Dayton Landfill)

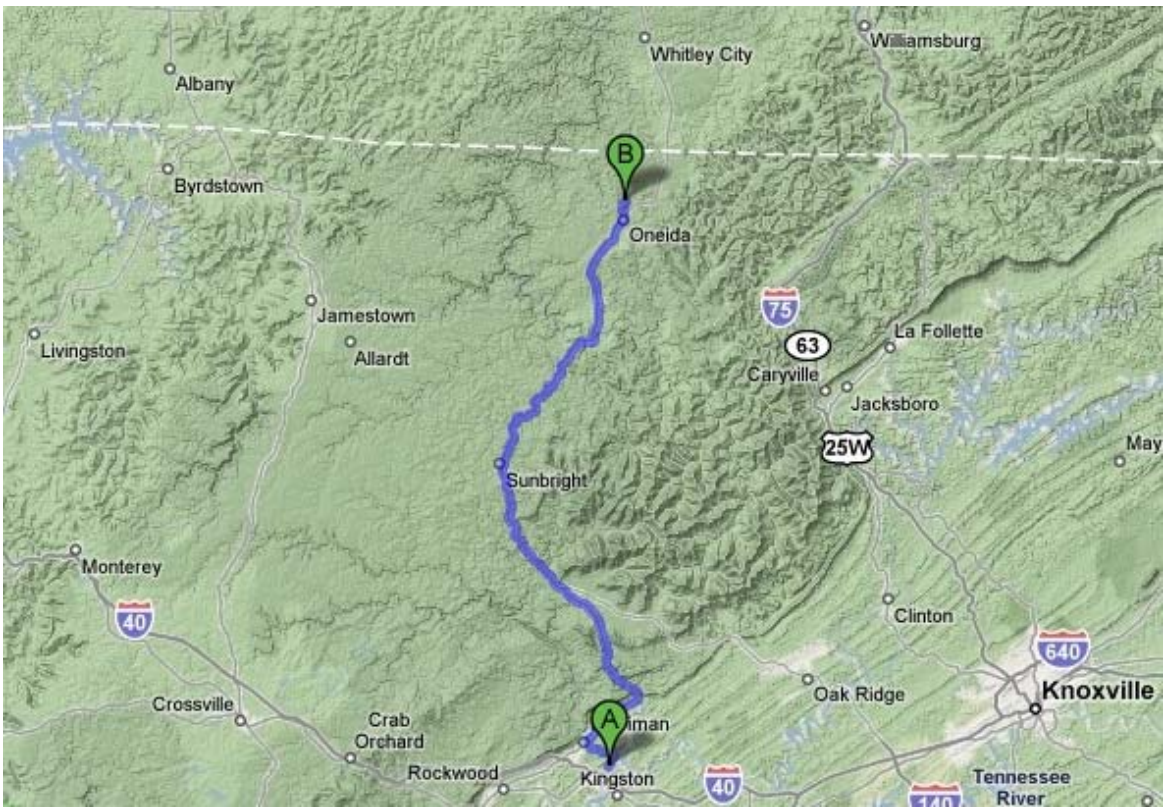

Figure 3-5. Area Map (Kingston to Oneida Landfill)

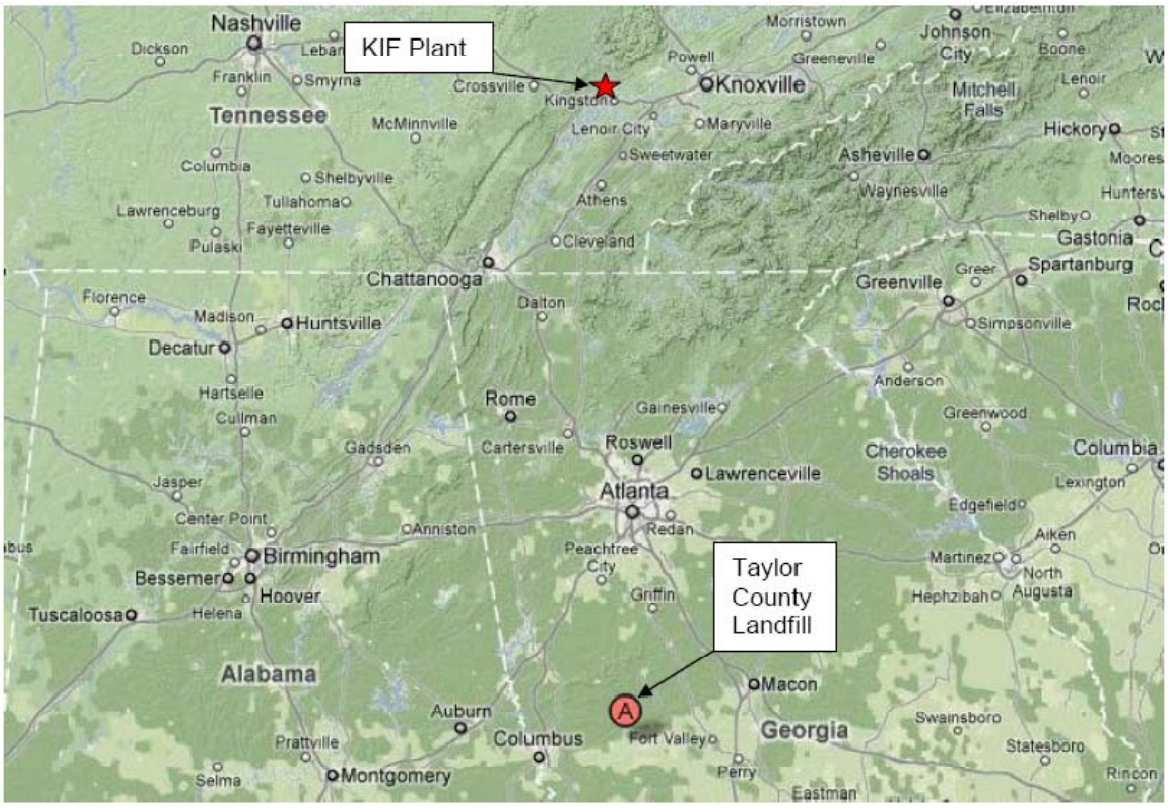

Figure 3-6. Area Map (General Location of Taylor County Landfill)

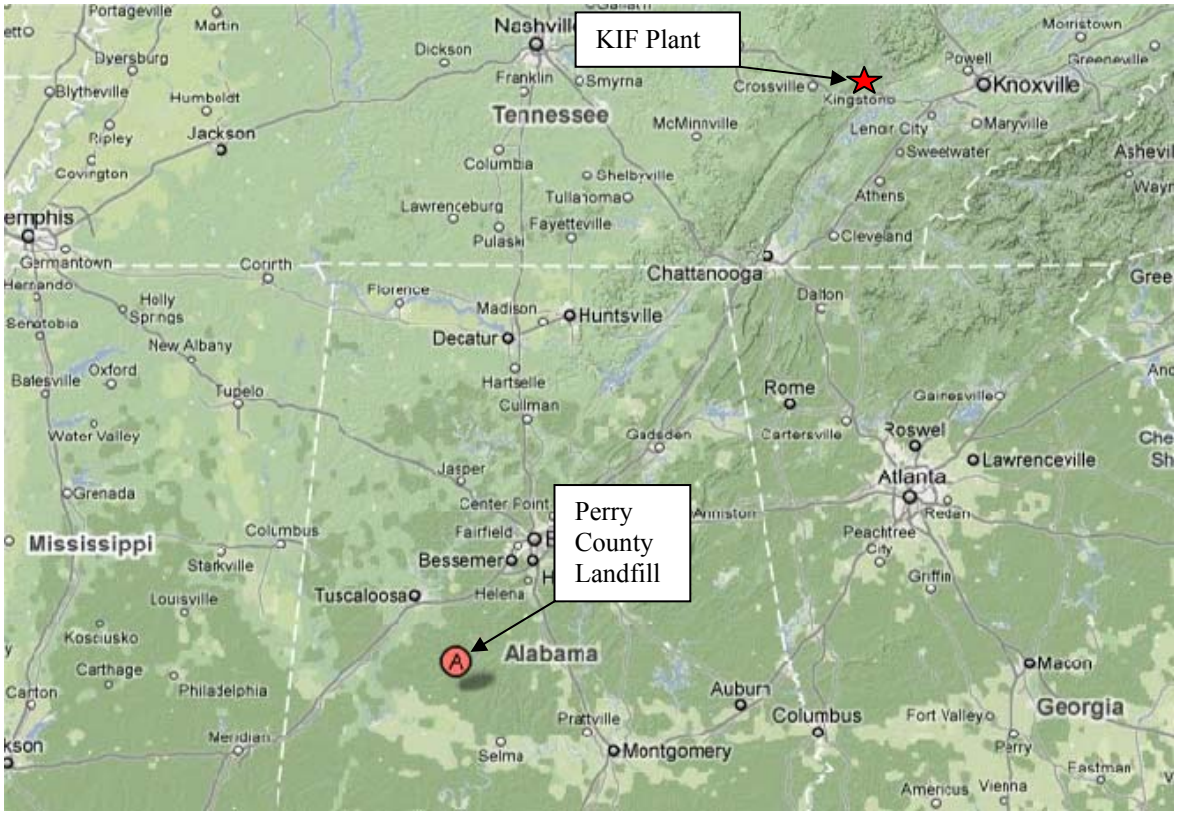

Figure 3-7. Area Map (General Location of Perry County Landfill)

3.4.2. Environmental Consequences

3.4.2.1. No Action Alternative

Under the No Action Alternative TVA would continue to operate the current CCP handling system consisting of wet impoundments. Ash would still have to be transported off site for disposal due to the lack of on-site disposal capacity for fly ash at KIF, resulting in similar impacts to transportation resources as described below for the Action Alternative.

3.4.2.2. Action Alternative

This analysis evaluates the impacts of transporting ash materials by trucks on roadways and rail, and includes the projected KIF annual production of 351,900 tons of dry fly ash material. Each truck has a 24-ton capacity, and the ash would have 20 percent moisture content once it was loaded into the truck. Based on 200 workdays per year, approximately 90 truck trips per day would be generated on days that the fly ash would be hauled. Likewise, for a 100-ton capacity railcar, 11 railcars per day would be needed for this amount of ash material.

Hauling dry ash material to locations off site of KIF, as stated above, would result in additional highway traffic. The *Highway Capacity Manual* (TRB 2000) outlines methods for evaluating the operational conditions within a traffic stream. These methods take into account average highway speed, lane widths, shoulder widths, and alignment among other inputs. These methods define six levels of service (LOS), using the letters A through F:

- LOS A is defined as the highest quality of service that a particular class of highway can provide. It is a condition of free flow in which there is little or no restriction on speed or maneuverability caused by the presence of other vehicles.
- LOS B is a zone of stable flow. The restriction on maneuverability is negligible, and there is little probability of major reduction in speed or flow.
- LOS C is a zone of stable flow, but at this volume and density level, most drivers are becoming restricted in their freedom to select speed, change lanes, or pass.
- LOS D approaches unstable flow. Tolerable average operating speeds are maintained, but could be subject to considerable and sudden variation. This condition is tolerable for short periods.
- LOS E is unstable with lower operating speeds and some momentary stoppages. There is little independence of speed selection and maneuverability. The upper limit of this level is the capacity of the facility.
- LOS F indicates forced-flow operations at low speeds. The level of density increases to the effect of a traffic jam

Table 3-16 contains the AADT from 2008 with projected data and LOS data from the analyses, based on 90 truck trips for the day's ash hauled from the plant (Tennessee Department of Transportation 2008). The projected values for 2010 include a 7 percent annual increase in AADT, and a 7 percent annual increase in AADT plus the additional traffic due to hauling ash. The analyses assume that 100 percent of the additional traffic would use Swan Pond Road, US 70, and Pine Ridge Road to reach SR 27 or I-40 and the final destinations.

As shown in Table 3-416, a drop in LOS occurs at Smyrna Road. Smyrna Road drops from a LOS of A to a LOS of B. The drop is due to an increase in the percent time spent following another vehicle, which increases from 37.8 percent to 40.6 percent. In this case, the increase in following time is relatively small, and the decrease in LOS is not substantial.

The remaining routes have varying LOS (A through E) with no other decreases in LOS. According to TRB (2000), most designing or planning efforts typically maintain service rates at LOS C or D, to ensure an acceptable operating service for facility users that minimizes the inconveniences resulting from traffic delays.

Two-lane portions of US 27 and SR 30 have the lowest LOS of any of the routes examined. In both cases, however, the increased trips generated would be less than 0.5 percent of the total AADT and would not result in an increased LOS rating.

It should be noted that the trips created from truck hauling are a relatively small component compared to the total increase in the projected AADT. In most cases, the truck trips account for less than 0.5 percent of the increase for all the proposed routes. The 7 percent annual increase in the AADT should be considered the major driver in the LOS change. A more detailed look at prior year AADT counts for most of the proposed routes would show that a 7 percent increase would not occur for all roads; some routes actually may decrease in traffic congestion. The additional estimated truck trips would therefore only have a minor impact on these transportation networks.

The typical hauling days for KIF dry ash material would only be on the weekdays. It is unlikely that hauling would be done on weekends or holidays, which tend to be the peak traveling days for any highway.

Although the impacts of the trucks transporting ash materials would be minor on the transportation network, TVA's RFPs nonetheless would require potential bidders to consider reducing the potential impact of their KIF trucking activities upon the environment. Contractors would need to take into account such factors as air pollution, erosion control, noise control, solid waste disposal, and wastewater disposal. The contract would also require that truck owners maintain trucks properly. Truck routes would avoid schools, historic districts, and downtown areas to the extent possible. Additional requirements such as use of ultra-low sulfur diesel fuel and the minimizing of idling time would also be required.

Railroads

As stated above, 11 rail cars per day would be needed to transport the ash at 20 percent moisture content. If rail were used to haul the dry ash, the current plan would be only to haul ash once a week by rail, which would generate approximately 80 railcars a week. Two sites have been determined to have both the capacity and the capability to accept ash by rail at this time; the Taylor County Landfill in Mauk, Georgia, and the Perry County Landfill in Alabama, which is currently receiving ash from the KIF recovery efforts. The rail lines that connect the KIF to these two landfills generally follow a rural route. Rural areas tend to have fewer railroad crossings than urban areas. These areas have a low AADT value, and traffic congestion is normally not an issue. The two suggested landfill sites already have rail capacity, so new rail crossings would not be added to the rail network and therefore not create a potential stopping point for traffic flow. The addition of rail traffic on existing lines would have a minor impact on the current LOS of the roads in the general vicinity of the two proposed landfills.

Accidents

In addition to the level of service analyses, an analysis of accidents was performed using information taken from a U.S. Department of Transportation (USDOT) and Federal Motor Carrier Safety Administration (FMCSA) report. The data used are for large trucks weighing more than 10,000 tons. Based on the information provided in this 2008 report, the projected truck traffic and landfill location, the following data (shown in Table 3-17) were obtained.

Table 3-17. Truck Hauling Fatality and Injury Data

Landfill Location	No. of Truck Trips per One Fatality	No. of Years for One Fatality	Injuries/Year
Anderson	671,141	37.3	1.8
Athens	516,262	28.7	2.3
Dayton	932,140	51.8	1.3
Oneida	541,243	30.1	2.2

To quantify the results, the number of truck trips needed to reach 100 million vehicle-miles was calculated in order to compare with the data provided in the USDOT/FMCSA report. Based on this analysis, it is extremely unlikely that there will be any fatalities. It is possible however, that accidents may occur that cause injuries. The traffic travelling to landfills closest to KIF (Anderson and Dayton) are the least likely to suffer from accidents, while traffic to the Athens and Oneida landfills are much more likely to generate accidents if fly ash is hauled to these locations by trucks.

Railcar accident analysis was performed with data used from the USDOT's and Federal Railroad Administration (FRA) latest report. The data in this report is based on all railway incidents that occurred in the United States in 2007. Results are presented in Table 3-18 for the accident rail car accident analysis, based on the anticipated number of rail cars needed and the landfill location.

Table 3-18. Rail Car Fatality and Injury Data

Landfill Location	Accidents per Year	Fatalities per Year	Injuries per Year
Perry County	6.5	0.6	2.3
Taylor County	6.5	0.6	2.3

To obtain the results, the total number of rail car miles needed to haul the dry fly ash each year was calculated for each landfill location. Rates calculated from the USDOT/FRA report were then used to obtain the per year value. Based on the above results, it is likely that some accidents may occur each year, with one third of the accidents possibly resulting in an injury. Out of the total possible accidents each year, there is a 9 percent chance that one will result in a fatality.

3.5. Cultural Resources

3.5.1. Affected Environment

East Tennessee has been an area of human occupation for the last 12,000 years. This includes five broad cultural periods: the Paleo-Indian (11,000-8000 B.C.), the Archaic (8000-1600 B.C.), the Woodland (1600 B.C.-A.D. 1000), the Mississippian (A.D. 1000-1700), and the Historic (A.D. 1700 to present). Prehistoric land use and settlement patterns vary during each period, but short- and long-term habitation sites are generally located on floodplains and alluvial terraces along rivers and tributaries. Specialized campsites tend to be located on older alluvial terraces and in the uplands. In East Tennessee, during the 17th and 18th centuries, Europeans and Native Americans began interacting through the fur trading industry. European-American settlement increased in the early 19th century as the Cherokee were forced to give up their land. Roane County was established in 1801. During the Civil War, the commercial potential of local mineral deposits was recognized in the county. Around the late 19th century, the county benefited from many diversified industries that came to the area (Hall and Parker 1998).

The archaeological area of potential effect (APE) was determined as the proposed elevated pressure pipe, railroad spur, blower building, and two storage silos. The APE for architectural resources includes a 0.5-mile area surrounding the proposed facilities as well as any areas where the project would alter existing topography or vegetation in view of a historic resource. A preliminary records search was conducted prior to the survey, and no previously recorded archaeological or architecturally resources were identified within the APE.

The archaeological survey (McKee and Karpynec 2009) identified no previously unrecorded archaeological resources within the APE. The architectural survey identified one previously unrecorded architectural resource at KIF within the APE.

3.5.2. Environmental Consequences

Under either alternative, the cultural resources investigations identified no previously recorded archaeological resources or architectural resources within the APE. The survey identified no previously unrecorded archaeological resources and one previously unrecorded architectural resource within the APE. The KIF facility does not retain a high degree of architectural integrity. It has undergone a series of modifications that have severely altered its appearance. Due to these alterations and modifications, KIF is recommended to be ineligible for the National Register of Historic Places.

Based on the above, TVA has determined that there will be no effect on historic properties. In a letter dated March 3, 2010, the Tennessee State Historic Preservation Officer concurred with this determination.

3.6. Socioeconomics and Environmental Justice

The information and analysis in this section bounds the potential for socioeconomic and environmental justice impacts resulting from construction and operation of the dry ash handling system and transporting the ash from KIF to an offsite disposal area. Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. It is typically analyzed by determining whether minority and low-income populations would be

disproportionately impacted by a proposed action. As noted, TVA is not proposing to select among the disposal options at this time.

3.6.1. Affected Environment

KIF is located in Roane County, Tennessee, and had a population of 53,508 in 2009 (U.S. Census Bureau 2009) with about 60 percent of the population outside incorporated cities and towns. In 2008, the civilian labor force of the county was 27,170. Of these, about 1,560 people were unemployed on average during the year yielding an unemployment rate of 5.7 percent (Tennessee Department of Employment Security 2008). Average income levels in Roane County are slightly lower than the state and national levels (See Table 3-19).

Table 3−19. 2008 Per Capita Personal Income Averages[1]

Roane County	Tennessee	National
$32,260	$38,615	$34,833

[1] http://www.bea.gov/regional/reis/

The minority population in the immediate vicinity of KIF (Census Tract 306, Block Groups 1 and 4) is 3.8 percent of the total and the minority population in Roane County was 5.7 percent of the total population, well below the 2008 state and national levels of 22.9 percent and 34.4 percent, respectively.. The poverty levels are higher than the 2008 county, state, and national levels. The poverty level in Block Group 1 is 28.2 percent, and 14.6 percent in Block Group 4. The estimated 2008 poverty level in the county was 15.5 percent, which is higher than the national average of 13.2 percent but the same as the state average (U.S. Census 2009).

Six off-site ash disposal sites are included in this analysis and each landfill is designed and permitted for handling dry fly ash waste. Four of the sites would be accessed by roadway in east Tennessee, and two would be accessed by railway and are located in north Georgia and north Alabama (See Figures 3-2 to 3-7). All of the minority population and poverty level information is from Census 2000 data (U.S. Census 2000).

The route to the proposed Athens site (Decatur County) proceeds from I-75 through Athens goes through a highly commercial area and proceeds through less densely populated areas below Athens. The minority population of this area is 2.9 percent of the total county population and has a poverty level of 4.4 percent; both are well below the county level of 8.1 percent minority and 14.5 percent below poverty levels.

The area of near the Dayton site (Rhea County) has a minority population that is 3.7 percent of the total county population, which is lower than the county level of 5.4 percent. The poverty level in this area is 14.2 percent. This rate is slightly higher than the Census Tract (9752), at 12.0 percent, but is slightly lower than the county poverty level average of 14.7 percent.

The Oneida (Scott County) disposal site is located in Census Tract 9750, Block Group 3, in Scott County. This block group's minority population is 1 percent. The entire census tract's minority population is 1.4 percent and the county population is 1.9 percent. The poverty level in the site's census tract is 18.7 percent, which is higher than the state average of 13.5 percent, and is slightly lower than the county average of 20.2 percent.

The sites in Marion County, Georgia, and Perry County, Alabama would be accessed by railway instead of roadway. According to the 2000 Census data, Marion County's minority population is 41.5 percent. The landfill is in Census Tract 9801 and the minority population is 14.0 percent of the total, and is 14.7 percent of the block group. The areas adjacent to the site are sparsely populated. The poverty level in the census tract is 18.0 percent and is 15.8 percent in the block group. The Marion County poverty level is 22.4 percent.

The minority population of Perry County is 69.3 percent. The landfill is in Census Tract 9870, Block Group 1. The minority population in the census tract is 60.4 percent of the total, and the block group minority population is 80.4 percent. The poverty level in Block Group 1 is 40.9 percent, well above the state and national levels of 16.1 and 12.4 percent, respectively.

3.6.2. Environmental Consequences

3.6.2.1. No Action Alternative

Under the No Action Alternative, TVA would continue use of the wet fly ash handling system, use of existing impoundments, and current disposal site (See Section 2.1.1). No jobs would be created or lost; therefore, there would be no impacts on the employment rate. Poverty levels in the vicinity of KIF are slightly higher than in the larger surrounding areas, but the minority population is small. Minority population levels are low compared to state and national levels. No concentrations of minority or low-income populations have been identified, and population in the area is generally dispersed. Any impacts to persons living in the area would be minor. Therefore, no disproportionate impacts to disadvantaged populations are expected to occur as a result of implementation of the No Action Alternative, and obligations under EO 12898 have been satisfied.

3.6.2.2. Action Alternative

Under the Action Alternative, human health impacts are not anticipated because the landfills are designed and permitted for handling waste of this type.

The minority population in the immediate vicinity around the KIF is very low but the poverty levels are higher than the county, state, and national levels. The traffic impacts in the vicinity of the site would be minor and the duration of the impacts would be temporary. Due to the short extent of the traffic common area and the small minority population in the area, disproportionate impacts to disadvantaged populations are not anticipated.

Should the Chestnut Ridge site be selected, the increased traffic would impact a wide range of motorists, not just specifically impact disadvantaged populations that would be using Interstates 40/75 and SR 170 and Fleenor Mill Road in the vicinity of the landfill. However, as discussed in the Transportation section of this document, the levels of service of the impacted roadways would remain the same and the duration of the impacts would be temporary. Therefore, no disproportionate impacts to disadvantaged populations are anticipated.

No disproportionate impacts to minority populations would be expected in the vicinity of the Athens site because the poverty levels and minority populations are near the site and along the haul routes to the disposal site and near the disposal site.

The route to the Dayton site would not have disproportionate impacts to disadvantaged populations because the minority population shares and the poverty rates in the area around the site are similar to or slightly lower than in the county and the census tract.

The Oneida site is located in a sparsely populated area. This area has a very small minority population that is well below the state and the national averages. Although the poverty level is slightly higher than the state and the national averages, it is lower than the county average. Because the site is located in a sparsely populated area and the disadvantaged population is low, no disproportionate impacts to disadvantaged populations are expected if this option were selected.

The Taylor County landfill is located in a sparsely populated area of Marion County, Georgia. Marion County has a large minority population, but the minority population near the site is much lower. The poverty level is lower than the county level but is slightly higher than the state and national levels. Because the site is located in a sparsely populated area and the disadvantaged population is low, no disproportionate impacts to disadvantaged populations are expected if this option were selected.

As previously discussed, the minority population in Perry County is high and the minority population near the Perry County landfill is also high. The block groups near the landfill are sparsely populated and mostly populated by minorities. The poverty level in the block group is well above the state and national levels. The ash would be unloaded from the rail cars at the site, and there likely would be only one shipment per week; therefore impacts to local residents would be minor. Because the area near the disposal site is sparsely populated and impacts to persons living in the area are anticipated to be minor, no disproportionate impacts to disadvantaged populations are expected.

3.7. Cumulative Impacts

Implementation of the Action Alternative could result in annual emission of approximately 9.36 tons of fine PM less than 10 microns in size for the offsite disposal option and 24.1 tons for the onsite disposal option. These estimates are under the 25-ton threshold established for PSD permitting. Water usage could be reduced by 25 MGD with an approximate 80 percent reduction in the discharge of arsenic, boron, chloride, fluoride, sulfur, and selenium from the ash pond. The contribution of fly ash from the dry fly ash conversion project could be as much a 320-440 thousand tons annually. This contribution to a local, regional or on-site permitted Subtitle D landfill would only be for a short duration until TVA develops long-term disposal solutions these sites have an estimated storage capacity exceeding 37 million tons. Impacts to landfills would be associated with reducing capacity for municipal waste in Subtitle D landfills under either the Action or No Action Alternatives. Traffic impacts would be similar under both alternatives since no LOS drops are expected with one exception: for Smyrna Road that could experience a LOS drop from A to B because of following distance. This roadway is located off US 27 near Dayton, Tennessee, and is the last road leading into the landfill. Trucking accidents were calculated based on 100 million vehicle miles and depending on the location of the disposal rates ranged between 1.3 and 2.3 injuries per year and a fatality could occur between 28.7 and 51.8 years. For rail transportation, it is likely that some accidents may occur each year with one third of the possibly resulting in an injury. Out of the possible accidents each year, there is a 9 percent chance that one would result in a fatality.

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CHAPTER 4

4.0 LIST OF PREPARERS

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CHAPTER 5

5.0 LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES ARE SENT

Federal Agencies

National Park Service
U.S. Department of Energy
U.S. Environmental Protection Agency

State Agencies

Tennessee Department of Environment and Conservation
Tennessee Wildlife Resources Agency

Individuals

The Honorable Mike Farmer
Mayor of Roane County
Kingston, Tennessee

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CHAPTER 6

6.0 LITERATURE CITED

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APPENDIX - RESPONSES TO PUBLIC COMMENTS

TVA accepted comments on a draft of this EA from March 5, 2010 until April 4, 2010. The draft EA was posted on the TVA website and copies were mailed to state and federal agencies. TVA also held an open house at the Roane County High School on March 16, 2010.

All comments received by TVA have been considered in finalizing this EA. These comments, along with TVA's responses, are listed below. Numerous changes have also been made to the text of the EA in response to these comments. The Environmental Integrity Project (EIP), Earthjustice, the Tennessee Chapter of Sierra Club and Tennessee Clean Water Network jointly submitted comments. Their comments are identified as "EIP" below.

NEPA Adequacy

Comment: TVA should prepare a supplemental EA for additional public comment and review, or an environmental impact statement to properly and more fully assess the environmental, public health, and environmental justice implications of the conversion, including a detailed analyses of all offside CCW disposal sites. (Comment by: EIP)

Response: Because ample opportunities were provided for submitting comments on the draft EA during the 30-day comment period as well as at the public meeting on March 16, 2010, further opportunities for public review are deemed unnecessary.TVA has discussed and addressed the issues raised by EIP in the final EA.

Comment: Assess the cumulative impacts of the Conversion and TVA's ongoing and future coal ash cleanup efforts at Kingston, which include the disposal of 2.5 - 6.8 million cubic yards of coal ash over the next several years to offsite landfills. (Comment by: EIP)

Response: This EA reviews six prospective offsite landfills, which could potentially accept Coal Combustion Products (CCP) one of which is the Perry County landfill which is currently accepting the recovery ash. The final EA also discusses the impact of on-site disposal. The contribution of fly ash from the dry fly ash conversion project could be as much as 320-440 thousand tons annually. This contribution to a local, regional, or onsite permitted Subtitle D landfill site would only be for a short duration until TVA develops long term disposal solutions. These sites have an estimated storage capacity for Coal Combustion Products (CCP) exceeding 32 million tons.

Comment: If TVA decides not to prepare an EIS or supplemental EA under NEPA, it must supply a convincing statement of reasons to explain why the Conversion's impacts are insignificant, and this statement of reasons is crucial to determining whether TVA took a hard look at the potential environmental impact of a project. As drafted, this EA does not take a "hard look" as NEPA requires, at the environmental effects of the Conversion, or at the cumulative impacts of the Conversion and other management activities at Kingston, such as the cleanup process and FGD waste management construction and operation. (Comment by: EIP)

Response: TVA has not identified any significant environmental issues associated with this project. The recovery of the spilled ash is a relatively short-term CERCLA activity

for which EPA and TDEC have provided the necessary approvals. Ambient, mobile and worker protection monitoring data to date does not show any significant impact on air quality from cleanup activities. Data from on-site and near-site monitoring stations showed the particulate levels to be far below the National Ambient Air Quality Standards for PM_{10} (150 µg/m^3) and $PM_{2.5}$ (35 µg/m^3) and were comparable to data from regional monitoring in areas well away from the site. Implementation of the Action Alternative could result in annual emission of approximately 9.36 tons of fine PM less than 10 microns in size for the offsite option and 24.1 tons for the onsite disposal option. This is under the 25-ton threshold established for PSD permitting. Likewise, water resources would not be affected since water usage could be reduced by 25 MGD, along with an approximate 80 percent reduction in the discharge of arsenic, boron, chloride, fluoride, sulfur, and selenium from the ash pond. Further, the cumulative impacts to waste would not be significant since the ash would be sent to a landfill with controls that meet the Subtitle D requirements. These offsite landfills have an estimated storage capacity exceeding 37 million tons.

Traffic impacts would be approximately similar under the off-site disposal options as compared to the no action alternative. There would be no traffic impacts with the onsite disposal option. As further explained in the EA, the cumulative impact of the conversion project when added to the impact of the ash recovery activity would not be significant. The impact of future CCP disposal activities will be assessed at the time any activity is proposed. Information on these other CCP disposal projects are still developing at this stage. At the time such projects are proposed, TVA will undertake additional NEPA reviews to assess their direct, indirect, and cumulative impacts.

Comment: TVA's NEPA procedures state that TVA may prepare an EA to "determine whether an EIS is necessary." In particular, an EA is designed to "briefly provide sufficient data and analysis for determining whether to prepare an EIS." However, this EA does not provide sufficient data and analysis, and TVA must either supplement the EA, or prepare an EIS to comply with NEPA requirements...TVA's NEPA procedures also require TVA to amend its environmental review of the Conversion if significant new information concerning probable environmental effects becomes available. (Comment by: EIP)

Response: The final EA includes additional information that addresses this comment.

Comment: The EA does not include the conversion of all wet CCW at the Kingston Fossil Plant, including flue gas desulfurization waste. (Comment by: EIP)

Response: While TVA acknowledges that it is planning future conversion projects for gypsum and bottom ash de-watering at Kingston, the planning for these other projects has not advanced to a stage where it has ripened into a proposal. TVA plans to provide public opportunities for comments on the impacts of these future proposals.

Comment: The EA fails to analyze how the conversion will impact the ongoing, time critical ash cleanup efforts, or the current Engineering Evaluation/Cost Analysis for non-time critical cleanup at Kingston Fossil Plant. (Comment by: EIP)

Response: This proposed project will facilitate the ash cleanup effort by removing future ash production from the ash pond system and allowing it to be disposed of or marketed separately.

Transportation

Comment: The EA does not assess environmental and public health risks, including accident risks and liability, associated with CCW transport by rail or truck. (Comment by: EIP)

Response: TVA has included the analysis of the risk associated with CCW transport in the Transportation section of the EA (see Section 3.4). The EA describes public safety risks and addresses environmental risks by evaluating compliance with air and water quality standards.

Comment: The site requires safe and reliable transportation access. (Comment by: Solar Valley Coalition)

Response: All 6 sites under consideration for the off-site disposal of fly ash are landfills that are permitted under Subtitle D for accepting this material. All of these landfills are open for business and have adequate rail or roadway infrastructure for safe and reliable access.

Comment: The EA does not address truck wheel wash at the coal ash sites to prevent carrying coal ash offsite. TVA needs to address this concern. (Comment by: Solar Valley Coalition)

Response: Best practices, including the use of water as a suppressant, would be used to control fugitive emissions.

Comment: TVA indicated at the 3/16/10 Kingston meeting that it prefers rail to truck transport. We support this preference. TVA should identify rail transport as the safety standard. (Comment by: Solar Valley Coalition)

Response: This comment appears to have been taken out of context from the conversation at the public meeting. TVA was referring to long term disposal options under consideration, one of which is the siting of a regional landfill. For this option, rail transportation of Coal Combustion Products is a possibility. More immediately, this EA is only considering short term transportation by truck or rail until long term disposal is proposed and evaluated. A separate environmental review will be conducted for any long term disposal option.

Comment: However, TVA at the same meeting indicated that if truck transport was chosen, then that process would be subject to existing state laws, namely a tarp cover of an open truck. This standard is clearly unsupportable in light of what we have all learned about the airborne release of coal ash. (Comment by: Solar Valley Coalition)

Response: TVA will follow Department of Transportation regulations and guidelines for transportation of any Coal Combustion Products and will commit to the use of tarps for open trucks and making appropriate measures to reduce fugitive emissions from open rail cars.

Comment: The hazards of spillage, airborne release, and transport accidents must be considered for each candidate site and prevented. TVA in its EA does not address transport accidents and the emergency protocol of such an incident. The EA does not address mitigating airborne release or financial responsibility for cleanup. (Comment by: Solar Valley Coalition)

Response: The risks associated with transport accidents (both rail and truck) were analyzed and the results incorporated in Section 3.4. The impact of airborne releases of 6 off-site options and the one on-site option are discussed in Section 3.1. As to the hazards of spillage, converting from wet to dry fly ash handling will greatly reduce the risk of an ash spill at the Kingston site. Further, following the TDOT regulations will minimize the risk of any spill during transportation.

Comment: TVA does not address the presence of school buses on road to be used for coal ash truck transport. The safety of having both school buses and large trucks on roads with inadequate capacity must be addressed. (Comment by: Solar Valley Coalition)

Response: The roadways that will be used in transporting the ash under the 6 off-site options have adequate lane widths and clearances.

Comment: The choice of transportation and the condition of the roads or rail to the landfill must be considered. Sites with inadequate and hazardous road or rail conditions must be eliminated. (Comment by: Solar Valley Coalition)

Response: Comment noted.

Comment: TVA needs to identify responsibility for the maintaining of the haul roads or rail. The responsible agency needs to sign-off that the road or rail can handle the safe transport of coal ash prior to site approval. (Comment by: Solar Valley Coalition)

Response: The states and counties are responsible for maintaining roadways in safe conditions. Likewise, individual rail companies are responsible for maintaining the safety standards for their tracks.

Comment: TVA should apply the same high standards it practiced for the transport of coal ash removal from the disaster site to all future transport of coal ash. TVA at the 3/16/10 Kingston meeting did not appear open to holding trucking contractors to a higher standard than required by the state for air pollution, erosion control, noise control, solid waste disposal, and wastewater disposal. (Comment by: Solar Valley Coalition)

Response: TVA and its contractors will abide by all applicable regulations for transportation and disposal of all CCP's.

Comment: TVA is able to conduct road safety analysis, and has conducted analysis for the transport of CCW for the Kingston cleanup in its EE/CA, yet has failed to assess these same risks for the offsite transport of CCW required under the Conversion. (Comment by: EIP)

Response: The risks associated with transport accidents (both rail and truck) were analyzed and the results incorporated in Section 3.4. The impact of airborne releases of 6 off-site options and the one on-site option are discussed in Section 3.1. As to the hazards of spillage, converting from wet to dry fly ash handling will greatly reduce the risk of an ash spill at the Kingston site. Further, following the TDOT regulations will minimize the risk of any spill during transportation.

Comment: Open trucking of CCW should not be allowed until TVA can assess the environmental and public health risks associated with CCW transportation...If TVA has decided on a mode of transportation that should be reported and properly assessed in a supplemental EA or EIS. (Comment by: EIP)

Response: No open trucking would occur. TVA would require tarps for all CCP's transported in open trucks.

Comment: TVA should specify what types of trucks it will use, and how CCW will be covered during transport to prevent wet CCW from leaking out of the bottom of trucks, or dry ash from blowing onto private property, schoolyards, or waterways. TVA only evaluated traffic conditions (i.e. how busy the roads are), but failed to evaluate road safety, or the protocols that will be followed to reduce risks and avoid accidents. In addition, TVA should fully explain who will bear responsibility and legal liability for rail or truck accidents, and the protocols that will be followed to cleanup CCW if spills or accidents occur. (Comment by: EIP)

Response: If a local landfill is chosen for disposal TVA would likely contract with tandem trucks for short hauls of the material. No open trucking would occur. TVA would require tarps for all CCP's transported in open trucks. Leakage is not expected to be a problem as the ash would be conditioned with water through a pug mill to an optimum moisture level to decrease fugitive emissions and aid compaction at the disposal site. For marketing, the material would likely be transported in a closed container to keep the moisture content at a minimum. All likely roadways transportation routes to the candidate sites have adequate lane width and clearances. Responsibility and legal liability for potential rail or truck accidents would depend on the specifics of any given incident and the contractual arrangement between TVA and the transportation vendor. The transportation vendor(s) is generally responsible for any accident resulting from their actions or inactions. While TVA may not directly manage activities associated with the cleanup of potential CCW spills, TVA would ensure that any required clean-up from rail or truck accidents or spills are dealt with expeditiously and appropriately in accordance with the guidelines in applicable laws and regulations.

Comment: Since TVA has received complaints in the past about wet CCW leaking from the back of its trucks, TVA should better examine the measures required to ensure that CCW is either too wet or dry, and describe the environmental and public health risks associated with various modes of CCW transportation. (Comment by EIP)

Response: TVA did receive some early complaints about leaking ash from trucks relating to a project at the New Johnsonville Fossil Plant for transporting dredged ash off-site for disposal. During the start up of this project there were inconsistencies in the manner that the material was handled. Those inconsistencies have been corrected and no leaks have occurred. Using the lessons learned from the earlier event at Johnsonville, TVA will ensure that there is optimum moisture in the fly ash transported off-site to reduce fugitive emission and to prevent leakage from trucks.

Environmental Justice

Comment: The EA does not address environmental justice impacts at offsite CCW disposal locations or recommendations from the National Environmental Justice Advisory Council ("NEJAC"). (Comment by: EIP)

Response: An evaluation of potential impacts to minority and low-income populations resulting from offsite CCP disposal has been added to Section 3.6 of the EA.

Comment: TVA did not consider economic justice within its EA because its reference sites were already permitted landfills. TDEC solid waste permitting process does not consider

economic justice concerns. However, TVA needs to address this concern if it owns and operates its own landfill and if it uses trucks to transport the coal ash. TVA as a federal agency not only has a public image that it must consider, but also TVA knows that it will not go unchallenged if it causes a host community great harm. (Comment by: Solar Valley Coalition)

Response: Comment noted. Section 3.6 of the EA assesses the environmental justice impacts of transporting ash to the 6 off-site locations and for the onsite location. Potential environmental justice impacts in the vicinity of KIS were also assessed in the Scrubber EA (TVA 2006).

Comment: TVA's duty to ensure that its Conversion does not unfairly impact environmental justice communities does not subside once state or federal agencies approve CCW disposal sites. TVA should prepare a supplemental EA, or a full EIS prepared to identify disposal sites with specificity, and to fully examine the environmental justice impacts, if any, at these sites. (Comment by EIP)

Response: Comment noted. See the responses to the two previous comments.

Comment: Further, NEJAC prepared recommendations for federal facilities to better address environmental justice concerns. TVA can use this document, as well as recent recommendations from environmental justice communities in the TVA region, to address the problems NEJAC identified at federal facilities. (Comment by EIP)

Response: TVA's analyses of environmental justice impacts is consistent with the National Environmental Justice Advisory Council's (NEJAC) recommendations.

TVA Operations

Comment: Please, do the right thing; keep your own waste on your own property. That's the only way to make us whole again as a county and we're confident that you have the technology and expertise to come up with long term solutions that will be more cost effective, easier to manage etc. if you manage this yourselves and keep the ash on TVA property. (Comment by: Mary and Larry Oran)

Response: Currently there is not a permitted landfill for fly ash on the Kingston reservation; however, the proposed Phase II gypsum disposal landfill could potentially be modified to accept fly ash. Accordingly, in addition to the six off-site options, TVA is also considering an on-site option for short-term disposal of dry fly ash.

Comment: TVA should consider sites on its own property before it exports its coal ash waste to another community. (Comment by: Solar Valley Coalition)

Response: Currently there is not a permitted landfill for fly ash on the Kingston reservation however, the Phase II gypsum disposal could potentially be modified to accept fly ash. Accordingly, in addition to the six off-site options, TVA is also considering an on-site option for short-term disposal of dry fly ash.

Comment: TVA should be required to maintain extended responsibility for its coal ash as part of its contractual agreement with landfill operators. TVA contract writing should be improved to tighten specifications enough that both TVA and the contractor can be held responsible for actions under the contract. This will ensure that TVA will responsibly

manage its offsite disposal of coal ash. This concern is not addressed in the EA. (Comment by: Solar Valley Coalition)

Response: Comment noted

Comment: Address the conversion of all wet CCW storage, in particular, wet bottom ash and flue gas desulfurization ("FGD") wastes, despite TVA's stated commitment to phase out all wet CCW storage at Kingston. (Comment by: EIP)

Response: While TVA acknowledges that it is planning future conversion projects for gypsum and bottom ash de-watering at Kingston, the planning for those other projects has not advanced to a stage where it has ripened into a proposal. TVA plans to provide public opportunities for submitting comments on the impact of future proposals.

Comment: Another concern I have is that TVA is paying to "expert" consultants they bring in to study and recommend solutions. What happened to all the "in house" employee experts that TVA has been paying enormous salaries to keep them from going to other companies per TVA? How has the Army Corp of Engineers been used to help resolve these many issues? Have any universities been awarded grants to study these issues and apply their expertise too? (Comment by: G. Sage)

Response: TVA is utilizing qualified technical experts for design and evaluation of alternatives for disposal of CCW.

Comment: Despite the TVA Board resolution to convert all wet CCW disposal to dry systems, the problems with wet FGD waste containment at Kingston, and recent TDEC enforcement action, this EA does not evaluate the effect of Kingston's new FGD waste stream on the Conversion, or propose how TVA might convert wet FGD waste to a dry disposal system. (Comment by EIP)

Response: While TVA is planning future conversion projects for gypsum and bottom ash de-watering for Kingston, these projects have not yet ripened into proposals. An environmental review for handling gypsum will be forth coming in the near future once enough information for this project has been developed so that TVA can formulate a proposal.

Comment: In addition, the EA does not address the Conversion of bottom ash at Kingston. Kingston produces approximately 80,000 – 110,000 tons of bottom ash each year. Bottom ash was wet sluiced with fly ash to the active ash disposal area. However, this EA suggests that bottom ash at Kingston is now "reclaimed for use in on-site dike and roadway construction primarily in the ash pond area." TVA should only be undertaking CCW disposal actions that are approved and permitted by TDEC, and should clarify whether bottom ash is to be handled in the same method as fly ash in the EA, and if not, fully account for the disposal of 80,000 – 110,000 tons of bottom ash at Kingston Fossil Plant. (Comment by EIP)

Response: Previous operations at KIF included separate channels for sluicing of bottom ash and fly ash. This arrangement allowed for collection of bottom ash for other approved uses at the plant. Currently both channels are utilized for dredging of recovered ash from the Emory River. This arrangement does not allow for separation of the ash types. In addition, KIF has only operated units sporadically and the production ash has been limited. Any future proposal to convert bottom ash would be subject to a NEPA review that provides an opportunity for public comments.

Solid and Hazardous Waste

Comment: The EPA has yet to make its determination on the hazardous nature of coal ash. Consequently, TVA and the State of TN are complying with existing EPA determinations in their coal waste management operations and permitting, respectively. If EPA should declare coal ash as hazardous, then the Solar Valley Coalition will expect the TVA to withdraw this coal ash management plan and develop another for management of a hazardous material. (Comment by: Solar Valley Coalition)

Response: It would be speculative to predict the course of future regulations. TVA would abide by all current and future regulatory requirements.

Comment: The generator of coal ash needs to be responsible for the full analysis of coal ash constituents to determine its hazards and potential harm to the public and the environment. Such an analysis is needed for engineering the design of coal ash reuse and/or disposal. Coal ash needs to be tested in the application process and throughout the landfill operation. (Comment by: Solar Valley Coalition)

Response: This comment is addressed in the final EA in Chapter 3.3 Solid and Hazardous Waste: "In order to be acceptable for placement in a permitted disposal facility, TVA must regularly characterize and submit analytical and physical data of the CCP waste to the disposal site owner/operators. This documentation is specific and in accordance with regulatory permitting requirements for the disposal sites."

Geology

Comment: Sites should have geologic stability, providing the potential for the long-term immobility of coal ash beyond the 30-year post-closure monitoring period. (Comment by: Solar Valley Coalition)

Response: Comment noted. TVA will follow current and future regulatory guidelines for site selection currently there are no requirements beyond the 30-year post closure monitoring period TVA will meet the seismic stability requirements at the time of permitting.

Comment: Consideration needs to be given to avoiding the Sewanee coal seam and other dangerous pre-existing conditions. (Comment by: Solar Valley Coalition)

Response: TVA will follow current and future regulatory guidelines for landfill siting which includes ground water protection. The disposal of fly ash in mines is not a reasonable alternative for the purposes of this EA.

Water Resources

Comment: The hazards to ground and surface water from siting a coal ash landfill in surface mine, quarries, or any site that has had a history of blasting are still uncertain. If TVA should choose such a site for its coal ash landfill, then we would expect TVA to complete a full EIS. Most surface mine sites already have groundwater problems that will not be improved with dumping coal ash on top of them. (Comment by Solar Valley Coalition)

Response: Comment noted. TVA is not currently proposing to dispose of CCP in mine sites.

Comment: Watershed protection is critical, as is the protection of high priority streams. It is vital that all candidate sites have the approval of NPS, USFW, TDEC (natural heritage), and TWRA. (Comment by Solar Valley Coalition)

Response: Comment noted. State and federal agencies were provided an opportunity to comment on a draft of this EA.

Comment: This EA did not consider...recent reports by EPA's Office of Research and Development on the leaching potential of CCW. (Comment by EIP)

Response: The alternate leaching procedures described in the referenced document are designed to predict behavior of waste materials under different disposal management and beneficial use scenarios as a function of pH. The leach test pH ranges from 2 to 13, which is not representative of any one disposal or beneficial use scenario, rather all scenarios. The key point is that the new leaching procedures are intended to evaluate materials, not just coal ash, for disposal or re-use under a wide variety of conditions. The particular response of the material to those leaching procedures is to be evaluated relative to the environmental conditions expected for the particular disposal or re-use under consideration. So the maximum concentrations reported in the document are not necessarily reflective of the KIF CCP. TVA would properly characterize all CCP for disposal according to applicable state and federal rules and regulations, and the requirements of the receiving landfill, to allow for the proper management of the material.

Comment: Will offsite CCW landfills avoid environmental risks, such as ground and surface water contamination? (Comment by EIP)

Response: The six off-site disposal sites are subject to the regulations for Subtitle D landfills. These regulations contain safeguards to prevent groundwater and surface water contamination.

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Comment: The EA is also inadequate because it does not assess the addition of FGD waste streams on water resources, or Conversion operations. The EA states that the "the makeup of coals burned at KIF might change" when the scrubbers are placed in service, and wastewaters may "become more acidic and contain different amounts of various metals than the present wastewaters." Despite TVA's experience operating FGD systems at other fossil plants, its detailed analysis of FGD waste streams, and widely available information prepared by EPA about FGD waste streams, TVA provided no assessment of this waste stream in the EA. Since the operation of Kingston's FGD scrubbers is imminent, TVA should supplement the EA or prepare an EIS to fully assess the impact on the Conversion and cumulative impact on water sources from FGD operation and Conversion construction. (Comment by EIP)

Response: While TVA is planning future conversion projects for gypsum and bottom ash de-watering for Kingston, these projects have not yet ripened into proposals. An environmental review for handling gypsum will be forth coming in the near future once enough information for this project has been developed so that TVA can formulate a proposal.

Comment: If TVA plans to control dust with water, a common technique, it must also address the runoff of CCW-affected waters from the site. (Comment by EIP)

Response: Runoff from the KIF plant is monitored under NPDES Permit No. TN0005452, NPDES Permit TN0080870, or Storm Water Permit No. TNR050000. Any runoff from the CCP areas will be monitored under current NPDES permits.

Floodplains

Comment: Candidate sites should be above flood plains. (Comment by Solar Valley Coalition)

Response: Comment duly noted. TVA will comply with Executive Order 11988 by avoiding floodplains or through the use appropriate mitigating measures. In addition, current Subtitle D regulations have similar requirements.

Natural Areas

Comment: Coal ash landfills should not be sited adjacent to protected areas. (Comment by Solar Valley Coalition)

Response: Comment noted. TVA would comply with the criteria set forth in 40 CFR 1508.27 for siting of disposal locations. These regulations address consideration of protected areas.

Air Resources

Comment: TVA should hold itself to stringent air quality control at all future coal ash land fill sites as it has for disposal of Kingston Disaster coal ash. (Comment by Solar Valley Coalition)

Response: Air emissions from ash land fill sites will be regulated under applicable local, state, and federal air pollution regulations.

Comment: Candidate sites with high wind profiles should be eliminated to reduce the hazards of air pollution. (Comment by: Solar Valley Coalition)

Response: The effects of wind are considered in determining emissions from the facility.

Comment: Air quality monitoring and reporting must be part of any management plan. (Comment by Solar Valley Coalition)

Response: TVA will comply with all regulations pertaining to disposal or marketing of CCP, include those respecting monitoring and reporting of air quality.

Comment: Assess the cumulative impacts of airborne CCW particles and fugitive dust emissions from the Conversion and ongoing and future ash cleanup activities at Kingston, and present evidence to support conclusions regarding the level of environmental and public health risk associated with these emissions. (Comment by: EIP)

Response: Ambient, mobile and worker protection monitoring data to date does not show any noteworthy impact on air quality from cleanup activities. Data from on-site and near-site monitoring results stations showed the particulate levels to be far below the National Ambient Air Quality Standards for PM_{10} (150 $\mu g/m^3$) and $PM_{2.5}$ (35 $\mu g/m^3$) and were comparable to data from regional monitoring in areas well away from the site. Annual

fugitive emissions from the fly ash conversion project are very low: PM_{10} at approximately 0.2 tons and $PM_{2.5}$ at approximately 0.03 tons. Daily fugitive emissions based on a 200 day work year would be approximately 2 pounds of PM_{10} and 0.3 pounds of $PM_{2.5}$ and would not add appreciably to emissions produced during cleanup activities.

Comment: TVA must also consider the cumulative impacts of fugitive dust emissions at the Kingston site. For example, TVA recently proposed to store dewatered ash recovered from the failed dredge cell and embayment on the ball field at Kingston. It is not clear that TVA has studied the impact both the Conversion and TVA's ongoing cleanup activities will have on the nearby community, or accurately modeled the cumulative emissions from all activities onsite. Due to the public health risks associated with the mobility and inhalation of coal ash dust, TVA should be required to make its air modeling studies available for public review and prepare a supplemental EA or EIS to better address this health risk. (Comment by EIP)

Response: Given the data available from monitoring during cleanup, there is no expectation that there will be any measureable impact from fugitive emissions.

Comment: This EA did not consider... Recent studies of the health risks posed by CCW fugitive dust emissions, and best technologies and practices to reduce such risks. (Comment by: EIP)

Response: Best practices will be used to control fugitive emissions including the use of water as a suppressant. As noted above, there have been no monitored exceedences of the NAAQS. In fact, the monitoring did not show any noteworthy impact on air quality form cleanup activities. Given the data, there is no expectation of any measureable impact from fugitive emissions resulting from the conversion project.

Comment: Will offsite CCW landfills avoid environmental risks, such as...fugitive dust emissions? (Comment by EIP)

Response: Best practices will be used to control fugitive emissions including the use of water as a suppressant. As noted above, there have been no monitored exceedences of the NAAQS and no monitoring indicating any measureable impact from the ongoing cleanup activities.

Comment: TVA must assess the environmental and public health risks from fugitive CCW dust, and explain the basis for its conclusion that fugitive dust emission presents minimal risks to the surrounding community. EPA recently found TVA's air monitoring for particulate matter ("PM") to be deficient at Kingston Fossil Plant. Specifically, EPA found that TVA's PM2.5 and PM 10 monitoring "failed to meet quality assurance procedures as specified in the Dust Control and Air Monitoring Plan" required by the Kingston Consent Order. Although EPA stated that the public was not at risk during TVA's lapse in air sampling data, commenter's encourage TVA to supplement this EA or prepare an EIS to assess the cumulative risks posed by fugitive dust emissions from ongoing cleanup work, and new fugitive dust emissions from the Conversion. Fugitive dust emissions cannot be considered piecemeal, project by project, but must be evaluated on a site-wide basis in order to properly assess environmental and public health risks. Part of TVA's revised EA to look at the cumulative impacts of fugitive dust should be the findings presented in a peer-reviewed Duke University study of the health implications of coal ash disposal at the Kingston Fossil Plant. (Comment by EIP)

Response: EPA gave a presentation at a January 26, 2010 public meeting on the KIF ash spill cleanup efforts. This presentation, entitled, Time Critical Removal Action Update for the TVA Kingston Ash Recovery Project, *addressed the air quality monitoring data and is available at http://www.epakingstontva.com/Fact%20Sheets%20%20Documents/Jan.%2026,%202010%20Public%20Meeting%20Time%20Critical%20Update%20Presentation.pdf. The filter-based monitor data from mid-September to mid-January was recommended for rejection. EPA also concluded that it was "confident that the public was not put at risk during this period. The redundant nature of the air monitoring system coupled with environmental conditions makes us confident." EPA went further to explain that in addition to these filter-based monitors, TVA also utilized tamper element oscillating microbalance (TEOM) monitors. EPA stated: "Months of good quality data demonstrate the TEOM's are excellent predictors of air quality surrounding the site" and that "concentrations were far below the National Ambient Air Quality Standards." These data were also compared to "thousands of mobile PM10 readings support this conclusion" and "Industrial hygiene samples within the exclusion zone also support this conclusion."*

The selected actions will be subject to air regulatory and permitting requirements. These requirements are designed protect ambient air quality standards. TVA will continue air monitoring for the duration of the cleanup efforts and take any necessary actions to avoid cumulative impacts.

Comment: TVA should specify the "dust control techniques" it will employ to reduce harmful ash emissions. It should provide information about past fugitive dust problems at the Kingston site, and Kingston's overall wind profile. (Comment by EIP)

Response: TVA will use best practices to control fugitive emissions including the use of water as a suppressant. As noted above, there have been no monitored exceedences of the NAAQS and no monitoring indicating any measureable impact from the ongoing cleanup activities. The predominate wind direction for the plant is Southwest to Northeast.

Safety

Comment: Assess environmental and workplace safety at the Conversion site to protect employees, contractors and the environment. (Comment by EIP)

Response: TVA secures appropriate environmental permits for all activities. TVA's philosophy on occupational health and safety is: "It is an integral part of business." TVA treats safety as a company value and, as such, safety receives significant consideration in the conduct of daily operations. One of TVA's critical success factors is linked to carrying out agency activities in a manner that minimizes safety and environmental impacts on its operations and the public. TVA's safety program applies to all agency employees and its contractors. It is designed to:

A. Supplement TVA's policy on safety by identifying the actions required for the control of hazards in all TVA activities, operations and programs.

B. *Establish responsibilities for implementing Section 19 of the Occupational Safety and Health Act of 1970 (OSHAct) and implementing requirements issued by the Secretary of Labor.*

C. *Implement Executive Order 12196, "Occupational Safety and Health Programs for Federal Employees," which requires heads of federal agencies to comply with basic program elements issued by the Secretary of Labor.*

Section 19 of OSHA requires heads of federal agencies to establish and maintain effective and comprehensive safety programs. TVA's safety program has been developed in accordance with the program elements specified in 29 CFR 1960, "Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters." TVA's Safety Manual contains specific procedures for implementing Section 19 of OSHA.

Comment: This EA should explain and assess how TVA can best integrate safety management into all facets of the Conversion planning and execution. It appears that TVA has not assessed how to implement health and safety plans. (Comment by EIP)

Response: In implementing the dry ash conversion project, TVA will follow the practices and procedures in the TVA Safety Manual. Some of the pertinent practices and procedures are outlined below.

1. **TVA Practices and Procedures, Safety Procedure 2, "Develop Safety Program Documentation."**

   This process:
   a. Provides standardized TVA safety management practices and other agency-wide requirements for all organizations.
   b. Ensures alignment of organizational specific safety documentation with regulatory and TVA requirements.
   c. Implement required change management plans associated with safety manual / program revision.

2. **TVA Practices and Procedures, Safety Procedure 3, "Establish Annual Safety Goals."**

   This process establishes a safety goal setting methodology that is an integral part of TVA's business planning process. TVA establishes measurable numerical and activity-based goals as one means of improving the agency's safety program.

3. **TVA Practices and Procedures, Safety Procedure 4, "Implement Labor Contract Safety Requirements."**

   The process provides a means for ensuring that work performed using labor contracts is carried out safely by:
   a. Incorporating federal, state, and TVA safety requirements into contract documents.
   b. Assessing safety needs consistent with contract work scope.
   c. Defining safety requirements appropriate for the work scope.

d. Evaluating bid proposals received from a safety perspective.
e. Assessing safety performance of contractors who perform work for TVA.

4. **TVA Practices and Procedures, Safety Procedure 5, "Implement Industrial Hygiene Activities."**

   This process provides for:
   a. Identification, evaluation, and timely control of health hazards to which TVA employees may be exposed.
   b. Planning, budgeting, prioritizing, executing, and evaluating industrial hygiene (IH) activities, strategies, and services.

5. **TVA Practices and Procedures, Safety Procedure 6, "Plan Jobs Safely."**

   This process provides a means to ensure that employees, particularly managers and supervisors, plan jobs in such a manner that:
   a. Hazards are identified and controlled prior to beginning work.
   b. "Lessons learned" during task execution are incorporated into job plans for future performance of work.

6. **TVA Practices and Procedures, Safety Procedure 7, "Operate Certified Safety and Health Committees."**

   This process encourages employee participation in TVA's safety program through the establishment and maintenance of active safety and health committees at both the agency and local workplace levels.

7. **TVA Practices and Procedures, Safety Procedure 8, "Recognize and Reward Safety."**

   This process provides a mechanism to promote safe work performance through recognition and awards.

8. **TVA Practices and Procedures, Safety Procedure 9, "Implement Safety Training Requirements."**

   This process provides a means for ensuring that all TVA employees obtain the knowledge, skills, and abilities to safely perform assigned tasks.

9. **TVA Practices and Procedures, Safety Procedure 10, "Investigate Employee Hazard Identification Reports."**

   This process establishes a method for documenting and investigating employee reports of unsafe and unhealthful working conditions (employee complaints).

10. **TVA Practices and Procedures, Safety Procedure 11, "Conduct Serious Accident Investigation."**

    This process is to establishes a method for:

a. Identifying root causes/contributing factors of serious accidents that may occur in TVA.
b. Recommending actions to prevent recurrence.

11. **TVA Practices and Procedures, Safety Procedure 12, "Conduct Workplace Regulatory Compliance Inspections."**

    This process provides for detecting, reporting, and correcting unsafe and unhealthful conditions by conducting workplace regulatory compliance inspections, as required by OSHA.

12. **TVA Practices and Procedures, Safety Procedure 13, "Report and Investigate Injuries and Illnesses."**

    This process:
    a. Standardizes the method for reporting and investigating work-related injuries and illnesses.
    b. Aids in identifying root causes of injuries and illnesses and in ensuring that appropriate and timely corrective action is taken by management to improve TVA's safety performance.

13. **TVA Practices and Procedures, Safety Procedure 14, "Conduct Safety Program Assessments."**

    This process establishes a method for providing management with information on the effectiveness of TVA's health and safety program in order to prevent injuries/illnesses and their related cost.

Public Health Impacts

Comment: The EA does not identify the environmental and public health impacts of disposing of coal combustion waste ("CCW") in mines (Comment by: EIP).

Response: While initially considered, the disposal of CCP in mines is not a reasonable alternative for the purposes of this EA.

Comment: This EA did not consider...Recent reports prepared by the Electric Power Research Institute, including the recent "Evaluation of Potentially Exposed Populations in the Vicinity of Coal Combustion Waste Storage Units and Associated Cancer Risk." (Comment by EIP)

Response: EPRI has informed TVA that this is still in draft form and its findings are not final. For the conversion project, the ash would be contained in two storage silos, and measures, as described in this EA, would be taken to reduce fugitive dust emissions. TVA would fully comply with all state and federal requirements for proper management of the ash, and operations of the dry ash handling system are not likely to violate applicable air or water quality criteria.

Comment: This EA did not consider: U.S. Environmental Protection Agency ("EPA") studies regarding the public health impacts of CCW disposal. Experts have stated, "Human health risk assessment methods are available to evaluate population exposures to multiple chemical mixtures. Coal combustion waste is a complex mixture of constituents. Risk

assessment methods for multiple chemical exposures will be essential to evaluating health risks of exposure to coal combustion waste." Yet this EA proposes dumping Kingston's CCW in unidentified offsite disposal locations without assessing the impact of CCW disposal on the surrounding environment or public health (Comment by EIP).

Response: TVA would properly characterize all CCP for disposal according to applicable state and federal rules and regulations, and the requirements of the receiving landfill, to allow for the proper management of the material. The CCP bound for offsite disposal would be safely disposed of in permitted landfills that are operated in accordance with their respective operating permits, as governed by the respective state's regulatory authority. Landfill permit requirements are established to be protective of human health and the environment. TVA would examine the landfill operations to assess compliance with contract requirements agreed upon between TVA and the landfill representatives, which would include an audit of their environmental management systems.

CCP Disposal

Comment: The EA fails to identify with specificity the locations for offsite disposal and assess the environmental or public health impacts of CCW disposal at each site (Comment by EIP).

Response: This EA identifies six offsite Subtitle D landfill locations which have the capacity to dispose of fly ash and it also discuss the onsite Phase II Gypsum Disposal Area which could be modified to accept fly ash. If so modified, the on-site disposal facility will meet the Subtitle D requirements.

Comment: This option, to dispose of CCW in a mine ("minefill") was not addressed in the EA, and the proposed landfill sites in the EA are not representative of minefills (Comment by EIP).

Response: There is no proposal in the context of this EA to dispose of CCP in mine sites.

Comment: This EA did not consider...The imminent announcement of federal regulations for CCW disposal. TVA must prepare a supplemental EA to ensure that TVA's CCW disposal practices at the Kingston Fossil Plant and associated landfills meet all new federal requirements (Comment by EIP).

Response: It would be speculative to predict the course of future regulations. TVA would abide by all current and future regulatory requirements.

Comment: This EA did not consider... Studies regarding the environmental and public health impacts of CCW disposal in mines, such new reports from Earthjustice, "Waste Deep Filling Mines with Coal Ash Is Profit for Industry, But Poison for People"; the National Research Council ("NRC") report "Managing Coal Combustion Residues in Mines"; or the detailed study of Water Quality impacts from CCW disposal in Pennsylvania coal mines (Comment by EIP).

Response: There is no proposal in the context of this EA to dispose of CCP in mine sites.

Comment: In addition to identifying specific disposal sites, examining the environmental and public health impacts of CCW disposal at each site, and providing basic information

about waste volumes and available landfill space, TVA should also investigate the ability of each disposal site to treat CCW leachate. In particular, TVA should consider that landfills in rural communities may need special controls to prevent CCW leachate from entering groundwater or aquifers that supply local well water. If landfills are not in rural areas, TVA should analyze the available treatment options for CCW leachate at local wastewater treatment plants. Not all wastewater treatment plants can remove the metals and toxic pollutants found in CCW, for example, TVA has already encountered this problem at the Perry County landfill, where it has proven difficult to treat CCW leachate locally. Without proper treatment, local water supplies could be polluted by CCW leachate at TVA's offsite CCW disposal sites (Comment by EIP).

Response: TVA would safely dispose of that ash in permitted landfills that are operated in accordance with their respective operating permits, as governed by the respective state's regulatory authority. Leachate treatment would be governed by that authority. The Perry County Landfill has been the recipient of multiple and frequent inspections by both EPA and ADEM. TVA does not have the ability to control the waste management practices at commercial offsite disposal facilities, but would examine landfill operations to assess compliance with contract requirements, which would include audits of the landfill facility's environmental management system.

Comment: Tennessee, like many states, is seeking to reduce the amount of waste sent to Class I, municipal landfills. In 2007, Tennesseans generated 14,056,132 tons of solid waste with 6,810,800 tons disposed of in Class I landfills. Yet this EA does not explain how TVA will avoid overburdening Tennessee Class I landfills, or even fully account for the volume of Kingston CCW that will need to be disposed of in offsite landfills. If TVA is considering CCW disposal in Tennessee landfills, it must also comply with Tennessee's new coal waste disposal law, which is applicable to new landfills and expansions of existing landfills. (Comment by EIP)

Response: All landfills under consideration are permitted and open for business, and have expressed interest in receiving CCP's and have capacity well in excess of TVA's future operating production rates.

Comment: TVA's selection criterion for CCW disposal sites is also unclear, and this EA should assess the minimum standards that each CCW disposal site must meet in order to be deemed suitable for CCW disposal. For example, it is highly relevant to know whether TVA considered or deemed acceptable only disposal sites with composite liners, leachate collection systems, or groundwater monitoring for the life of the unit (Comment by EIP).

Response: TVA only considered landfills with Subtitle D permits as outlined in Section 3.3 (Solid and Hazardous Waste) of this EA.

Kingston Fossil Plant Spill Clean up

Comment: The EA fails to analyze how the Conversion will impact the ongoing, time critical ash cleanup efforts, or the current Engineering Evaluation/Cost Analysis ("EE/CA") for non-time critical cleanup at Kingston Fossil Plant. The EE/CA proposes alternatives for restoration of the Swan Pond Embayment area impacted by the spilled coal ash, and the stabilization and closure of the failed dredge cell. As currently drafted, the EE/CA calls for the removal of 2.5 – 6.8 million cubic yards of coal ash from Kinston's failed dredge cell and disposal of this coal ash in an offsite landfill. Currently, the only approved offsite disposal location is the Arrowhead Landfill in Perry County, Alabama. TVA should supplement this EA to explain how the Conversion will impact TVA's long-term ash cleanup plan at

Kingston, in particular, the need for coal ash from both ongoing power production and ongoing cleanup activities to be disposed of in offsite landfills (Comment by EIP).

Response: Short term, TVA would likely need to utilize existing permitted disposal facilities for disposal of all fly ash from KIF until long term solutions are developed. All landfills under consideration are permitted, open for business, expressed interests in disposing of CCP's and have indicated they have capacity in excess of TVA's future operating production rates. These landfills have the capacity to handle both cleanup activities as well as from short-term future production.

Comment: The EA provides only the most cursory information about how TVA's short term and long term cleanup and ash disposal activities may impact the Conversion and vice versa. The EA states that "ash from power production and ash dredged from the river are discharged to a channel, dipped out, dewatered, and then loaded onto rail cars for disposal at a permitted landfill in Alabama." However, this statement does not show that TVA has analyzed its long term offsite disposal needs, the capacity of offsite landfills, the cumulative environmental impacts of concurrent Conversion activities and cleanup activities, or possibilities to integrate the two activities to store, transport, and dispose of CCW in a manner that minimizes risk to the environment and public health (Comment by EIP).

Response: In the short term, TVA would likely need to utilize existing permitted disposal facilities for disposal of all fly ash from KIF until long term solutions are developed. All landfills under consideration are permitted, open for business; expressed interests in disposing of CCP's and have indicated they have capacity in excess of that need to handle ash from clean up and production activities. The cumulative impacts of conversion and cleanup activities have been analyzed in the EA.