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DRAFT ENVIRONMENTAL ASSESSMENT

INSTALLATION OF FLUE GAS DESULFURIZATION SYSTEM ON JOHN SEVIER FOSSIL PLANT

Hawkins County, Tennessee

PREPARED BY:
TENNESSEE VALLEY AUTHORITY

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Direct comments to:

David W. Robinson
NEPA Resources
Tennessee Valley Authority
1101 Market Street
Chattanooga, TN 37402
Phone: (423) 751-2502
Fax: (423) 751-3230
E-mail: dwrobins@tva.gov

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ACRONYMS, ABBREVIATIONS, AND SYMBOLS

$\mu g/m^3$	Micrograms per cubic meter
ARAP	Aquatic Resource Alteration Permit
BMPs	Best management practices
BRF	Bull Run Fossil Plant
CAA	*Clean Air Act*
CaO	Calcium oxide
CCB	Coal combustion by-product
CFB	Circulating fluidized bed
CO	Carbon monoxide
CWA	*Clean Water Act*
EA	Environmental assessment
EO	Executive order
ESPs	Electrostatic precipitators
FDA	Flash dryer absorber
FGD	Flue gas desulfurization
FML	Flexible membrane liner
HRM	Holston River Mile
IPP	Integrated pollution prevention
JSF	John Sevier Fossil Plant
KIF	Kingston Fossil Plant
lb	Pound
MGD	Million gallons per day
mg/L	Milligrams per liter
mg/m^3	Milligrams per cubic meter
mmBtu	Million British thermal units
NAAQS	National Ambient Air Quality Standards
NEPA	*National Environmental Policy Act*
NO_2	Nitrogen dioxide
NOx	Nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
NWS	National Weather Service
O_3	Ozone
PAF	Paradise Fossil Plant
Pb	Lead
PM	Particulate matter
PM_{10}	Particulate matter with a diameter less than or equal to 10 micrometers
$PM_{2.5}$	Particulate matter with a diameter less than or equal to 2.5 micrometers
ppb	Parts per billion
ppm	Parts per million
PSO	TVA Power System Operations
SAMI	Southern Appalachian Mountains Initiative
SCR	Selective catalytic reduction
SDA	Spray dryer absorber
SFI	Sport Fishing Index
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan

SO_2	Sulfur dioxide
SPLP	Synthetic Precipitation Leaching Procedure
TCLP	Toxicity Characteristic Leaching Procedure
TDEC	Tennessee Department of Environment and Conservation
TVA	Tennessee Valley Authority
TVARAM	TVA Rapid Assessment Method for categorizing wetlands, a version of the Ohio Rapid Assessment Method designed specifically for the TVA region
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VSMP	Vital Signs Monitoring Program

CHAPTER 1

1.0 PURPOSE OF AND NEED FOR ACTION

1.1. The Decision

Tennessee Valley Authority (TVA) must reduce systemwide sulfur dioxide (SO_2) emissions to meet requirements under the *Clean Air Act* including those established under the Acid Rain Program (Title IV), the Clean Air Interstate Rule, and the State Implementation Plan (SIP). In addition, TVA is required to reduce SO_2 emissions under the order issued by the Federal District Court for the Western District of North Carolina in the *State of North Carolina v. Tennessee Valley Authority case* (Civil No. 1:06CV20). Accordingly, TVA is proposing to reduce future SO_2 emissions by at least 95 percent at John Sevier Fossil Plant (JSF) by installing flue gas desulfurization (FGD) equipment, also known as "scrubbers." TVA is also integrating the future installation of selective catalytic reduction (SCR) technology for nitrogen oxide (NOx) emissions control into the FGD design to allow for more seamless installation of this technology. The SCRs would be constructed where the electrostatic precipitators (ESPs) are currently located. The decision TVA must make is whether or not to install the FGD or scrubber equipment.

Background

TVA initially was considering a forced oxidation wet limestone scrubber for JSF. In the course of performing the *National Environmental Policy Act* (NEPA) work for such a wet scrubber, it was becoming apparent that meeting the new National Pollutant Discharge Elimination System (NPDES) water quality discharge limits for the Holston River was going to require ongoing, expensive wastewater treatment for the continuous discharge associated with that option. Further, the prices for wet scrubbers have escalated in the interim period. Therefore, in August 2007, TVA started to investigate the installation of a dry scrubber for JSF. This investigation yielded a lower capital cost for construction of a dry scrubber with fabric filter particulate collection as compared to installation of a wet scrubber with the planned ESP replacement. In addition, it removed the need for continuous wastewater treatment. The new dry option is still being evaluated internally, and no decision has been made concerning the type of dry scrubber technology that will be employed for JSF.

In TVA's continuing efforts to improve air quality in the Tennessee Valley and to comply with the *Clean Air Act* (CAA), TVA is considering potentially designing, building, and operating several FGD systems to reduce SO_2 emissions from its coal-fired power plants. TVA has installed FGD systems at Paradise Fossil Plant, Unit 3 in Kentucky, and at Bull Run Fossil Plant in East Tennessee, and construction is underway for scrubbers at Kingston Fossil Plant. Additionally, TVA is contemplating the installation of scrubbers at other facilities. This environmental assessment (EA) will focus on the proposed installation of two modules to control SO_2 emissions from JSF's four units.

The FGD systems for all plants would collectively cost approximately $1.5 billion and would reduce emissions of SO_2 by more than 200,000 tons per year, bringing TVA's total emissions down by 85 percent since 1977. This EA describes the impacts of constructing and operating an FGD system to serve JSF. As pollution-control technology improves in the future, TVA may potentially shift to other technology.

John Sevier Fossil Plant
TVA's JSF is located on 750 acres of rolling land south of the Holston River near Rogersville, Tennessee (Figure 1-1). The plant is located on Cherokee Reservoir near Holston River Mile (HRM) 106. Most nearby land is agricultural, but residential and recreational areas are in close proximity. The closest residences are located on land immediately adjacent to the plant reservation and are approximately 3,200 feet from the JSF powerhouse.

Plant construction began October 14, 1952. The first generating unit went into operation on July 12, 1955. JSF currently uses low-sulfur coal from mines in Virginia. Exhaust gases from JSF are emitted through two 350-foot (106-meter) stacks. With the addition of dry scrubbers, no new stacks will be needed. Between May and December 1995, the four units at JSF were equipped with burners designed to reduce emission of NOx. Installation of the low-NOx burners reduced the NOx emissions by approximately 20 percent. In 2006, TVA completed an EA for the installation of additional NOx controls, *John Sevier Fossil Plant Units 1-4 Control Systems for Nitrous Oxides, Hawkins County, Tennessee* (TVA 2006a). Selective noncatalytic reduction technology is now being added to the plant for additional reductions. The SCR technology, as described in the above-referenced EA, would be added at the same time as the scrubbers. This technology would reduce NOx emission by 90 percent.

1.2. Other Pertinent Environmental Reviews or Documentation

- *Energy Vision 2020 - Integrated Resource Plan Environmental Impact Statement*, December 1995 (TVA 1995)

- *Installation of Flue Gas Desulfurization (Scrubber) System on Paradise Fossil Plant Unit 3, Muhlenberg County, Kentucky, Environmental Assessment*, March 2003 (TVA 2003)

- *Installation of Flue Gas Desulfurization System on Bull Run Fossil Plant, Roane County, Tennessee, Environmental Assessment*, March 2005 (TVA 2005)

- *Installation of Flue Gas Desulfurization System on Kingston Fossil Plant, Anderson County, Tennessee, Environmental Assessment,* April 2006 (TVA 2006b)

- *John Sevier Fossil Plant Units 1-4 Control Systems for Nitrous Oxides, Hawkins County Tennessee, Environmental Assessment,* March 2006 (TVA 2006a)

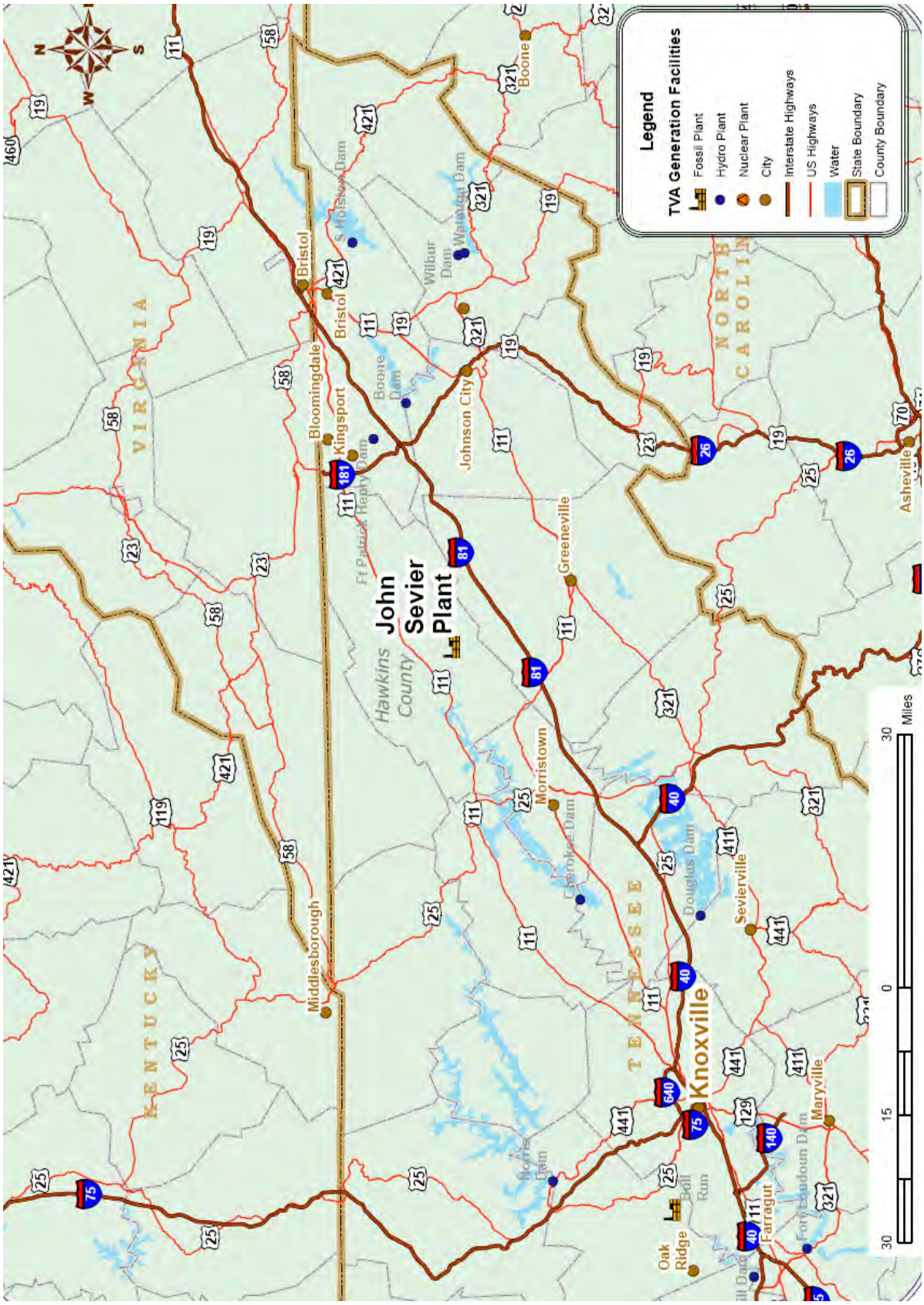

Figure 1-1. Generalized Location Map of John Sevier Fossil Plant

1.3. Sulfur Dioxide Emissions and Control Technologies

Sulfur is present in coal as an impurity and reacts with oxygen to form SO_2 when the coal is burned to generate electricity. Reduction of SO_2 emissions has typically been achieved through one or a combination of the following:

- Use of fuel desulfurization methods
- Switching to lower-sulfur fuels
- Use of FGD systems

TVA utilizes all of these techniques in meeting regulatory requirements at its 11 coal-fired plants. Each of these options has its own costs and benefits; however, there is no single universal solution. Fuel desulfurization occurs through the washing of coal before it is burned. Coal washing is effective in reducing pyrite content (small, discrete iron sulfide particles in the coal) but is not effective for removing the organic sulfur from the coal matrix. Organic sulfur accounts for 35 to 75 percent of the total sulfur content of coals burned in many TVA power plants.

The current strategy for maintaining compliance at JSF involves the use of low-sulfur fuel from the eastern Appalachian coal fields. The sulfur content of the coal used at JSF has ranged from 1.2 to 2.3 pounds (lb) SO_2/million British thermal Units (mmBtu) since 1978. The plant operated at or below 1.5 lb SO_2/mmBtu from 2000 through 2005. The current SIP's SO_2 limit for JSF is 4.0 lb SO_2/mmBtu.

The FGD technology review for JSF was based on TVA performance needs, compatibility with existing facilities at the plant, costs, availability of fuels, and maintenance procedures. TVA additionally required that the technology be commercially available and fully demonstrated on utility coal-fired plants larger than 100 megawatts and be capable of controlling emission generated from burning medium- to high-sulfur coal (greater than 3 lb/mmBtu).

1.4. The Scoping Process

Preliminary internal scoping by TVA has determined that from the standpoint of NEPA, there are two alternatives available to TVA: the No Action Alternative and the Action Alternative (construction of the JSF scrubber). The Action Alternative considered the use of wet scrubber technology and three different dry technologies, which include flash dryers, spray dryers, and fluidized beds. All three of the dry technologies further described in Section 2.1 of this EA would require similar environmental footprints and would have similar environmental effects. The wet scrubber technology will be eliminated from further detailed analysis due to its escalating cost and environmental impact from the continuous generation of wastewater.

A TVA interdisciplinary team reviewed the potential direct, indirect, and cumulative effects of the proposed use of dry scrubber technology at JSF for SO_2 reduction. From this review, the following project aspects were identified for detailed analyses.

- Air
- Solid Waste and Groundwater

- Natural Areas and Recreation
- Visual Resources
- Surface Water and Wastewater
- Wetlands
- Aquatic Life
- Terrestrial Ecology
- Protected Species
- Cultural Resources
- Socioeconomics
- Environmental Justice
- Prime Farmland

1.5. Public and Agency Involvement

Concurrent with public review, the draft EA is being sent to the agencies listed below for comments:

- National Park Service
- Hawkins County Mayor's Office
- Tennessee Department of Environment and Conservation
- Tennessee Wildlife Resources Agency
- U.S. Department of Energy
- U.S. Fish and Wildlife Service

1.6. Environmental Permits and Applicable Regulations

- Implementation of the proposed action would result in the need to modify the NPDES Permit TN0005436.

- A new Solid Waste Class II Disposal Permit would be required for the disposal of air pollution control device waste produced by the new scrubber. This permit would contain applicable groundwater protection measures.

- Mitigation would be provided for the loss of an intermittent stream for the construction of the new landfill permitting to meet requirements under the *Clean Water Act* (CWA) and the *Tennessee Water Quality Control Act*, U.S. Army Corps of Engineers (USACE) Section 404 Permit, and Aquatic Resource Alteration Permit (ARAP).

- Coverage under the Construction Storm Water Permit would be obtained from the Tennessee Department of Environment and Conservation (TDEC) to ensure all construction-related activities comply with applicable regulatory requirements.

- Air construction notification to TDEC would be required. A minor source construction permit may be required for the limestone handling system. No other permits would be required by TDEC due to the pollution prevention nature of this project.

- As necessary, 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 75 percent.

- Standard best management practices (BMPs) and regulatory compliance measures would be incorporated.

- Modifications to the Integrated Pollution Prevention (IPP) Plan would be made for the addition of new ponds, switchyards, and fuel tanks.

CHAPTER 2

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1. The Proposed Action

Under the Action Alternative, TVA proposes to reduce future SO_2 emissions under full load conditions by at least 95 percent at JSF by installing FGD equipment and construct a new landfill for disposal of the coal combustion by-product waste. The proposed action is to construct and operate an FGD (scrubber) system at JSF as depicted in Figure 2-1. The scrubber(s) would utilize one of three "dry system" technologies described below. Four absorbers would be constructed along with those subsystems and utilities necessary to support their operation. A truck receiving and material handling facility would be constructed to provide the reagent needed in the scrubbers. Additional construction would include a gas-handling system to transport flue gas from the existing precipitators to the absorber, water supply systems, fire control systems, and power supply and control systems. The new disposal area would be located on property recently purchased for this purpose and is adjacent to the original plant reservation.

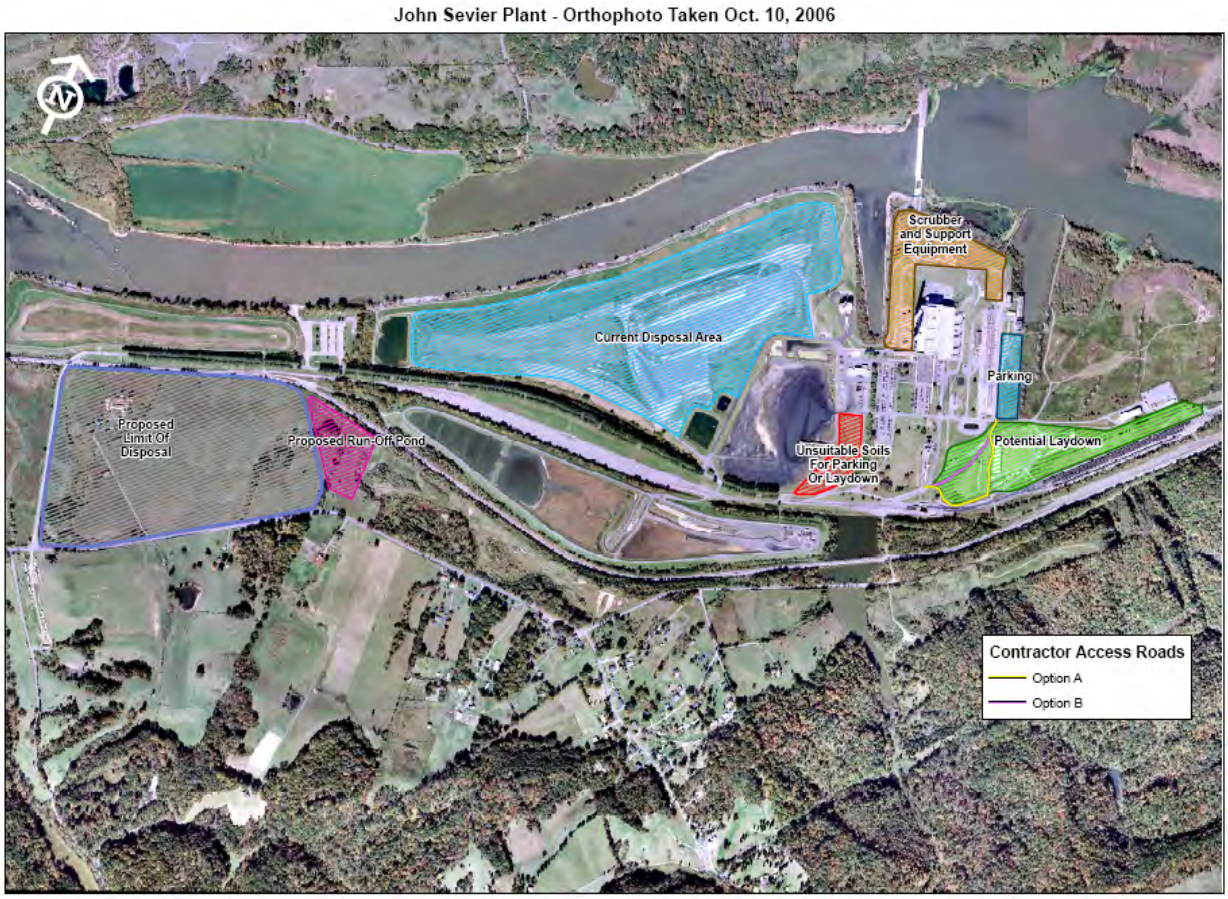

Figure 2-1. Generalized Footprint of Flue Gas Desulfurization Project at John Sevier Fossil Plant

The current proposal contemplates construction to begin on the JSF scrubber potentially as soon as June 2009, with operation starting before January 1, 2012. The scrubber would be designed and constructed to achieve various electricity production goals and to maximize operational flexibility. Most of the plant and its operation would remain the same after the new scrubber is in place. Due to the high removal efficiency of the scrubber, coal of a higher sulfur content may be burned than is currently burned, but the overall result would be a substantial reduction in SO_2 emissions. The dry FGD technology would be able to remove 95 percent of the SO_2 produced by 3.1 lb SO_2/mmBtu coal.

TVA is currently investigating three types of dry FGD technology: spray dryers, flash dryers, and circulating fluidized beds, as described below. A dry scrubber uses calcium oxide (CaO) as a reagent to reduce SO_2 from the flue gas stream. The chemical reaction produces primarily calcium salts ($CaSO_3$ and $CaSO_4$ $2H_2O$) as by-products. This type of scrubber must be operated at a stoichiometry of 1.3-1.6, which means from 25-40 percent of the CaO added to the flue gas stream will not react with SO_2. In addition, this type of scrubber does not necessarily require the use of ESPs for particulate control prior to the scrubber, instead a bag house could be situated at the end of the system to capture the mixture of fly ash, calcium salts, and unreacted CaO. This mixture is not as marketable as pure fly ash or gypsum produced by wet limestone forced oxidation scrubbers. The new combined waste could initially be stacked in the plant's existing dry fly ash disposal area for a period of approximately 21 months with the plant burning 3.1 lb SO_2/mmBtu coal. These three types of systems would have similar footprints and potential for environmental effects.

2.1.1. Dry System Technologies

Spray Dryer Absorber Process

All spray dryer absorber (SDA) systems offered today are similar in basic design. The flue gas enters the top of the SDA and is accelerated to produce a highly turbulent regime prior to entering the actual dryer vessel, where its velocity is greatly reduced. Upon entering the dryer vessel, the gas is mingled with a finely atomized spray of dilute calcium hydroxide [$Ca(OH)_2$] slurry. The slurry is produced in a separate slaking system, which converts the quicklime [CaO] delivered to site, to calcium hydroxide through reaction with water. The flue gas flows around the atomizer(s), which assures that the slurry droplets are intimately and thoroughly mixed with the gas. The atomizer(s) being considered for JSF scrubbers consists of spinning wheels into which are inserted ceramic nozzles. The lime slurry enters into the atomizer and is then ejected by centrifugal force though the ceramic nozzles producing a mist of very fine droplets.

As the flue gas/calcium hydroxide slurry flows down the dryer, the SO_2 reacts to form calcium sulfite/sulfate [$CaSO_3$ ½ H_2O/$CaSO_4$ $2H_2O$]. At the same time, the heat of the flue gas causes the water in the droplets to evaporate, leaving dry particles of reacted solids suspended in the gas stream. Some of the dry reaction products and fly ash fall out of the gas stream and are discharged through the SDA hopper bottom. The remaining products and fly ash are carried by the flue gas stream to the particulate collector. From the particulate collector, the material can either be sent to disposal or recycled back into the slurry feed system.

Circulating Fluidized Bed Process

The circulating fluidized bed (CFB) process being considered is the Turbosorp® process licensed to Babcock Power. In the Turbosorp process, gas flows through the absorber vessel from the bottom to the top. Recirculating fly ash and absorber reaction products serve as the primary bed material. Fresh calcium hydroxide, produced in the hydrator from CaO and water, is fed into the base of the absorber vessel. The TVA design will employ four hydrators (two operating and two spare). Each hydrator will be sized to provide sufficient calcium hydroxide to feed two absorbers operating at 200 megawatts.

Most of the solids removed from the top of the absorber vessel are returned to the reactor as recycle. The remaining solids proceed to the particulate collection system. Water is also injected into the base of the absorber. The water reacts with the incoming SO_2 to form sulfurous acid and subsequently reacts with calcium hydroxide.

As with the SDA process, the primary reaction products of the SO_2 and calcium hydroxide reaction are calcium sulfite/sulfate. Activated carbon injection may also be employed to ensure high removal efficiencies of mercury. Due to the high recirculation rates, the incoming flue gas is constantly subjected to a surplus of calcium hydroxide.

Flash Dryer Absorber

Alstom's flash dryer absorber (FDA), also referred to as the NID, is the third technology considered for the JSF scrubbers. In the FDA process, the entering flue gas is split between four "J" ducts (known as J ducts because of their design). The gas travels down and then up the long side of the duct where it meets the entering solids stream from the mixer. Each of the four mixers acts independently. In the mixer, recycle flyash and SO_2 reaction products are mixed with fresh calcium hydroxide from the hydrator. The hydrator is flanged directly onto the mixer. As with the CFB process, the hydrator is used to convert quick lime to calcium hydroxide.

Unlike the CFB absorber, there is no bed of material in the FDA absorber. The solids/gas contact time is effected through the use of higher recycle rates, which are three to five times that of the CFB. Single pass gas/solids contact time is approximately 1.2 seconds.

As with the SDA process, the primary reaction products of the SO_2 and calcium hydroxide reaction are calcium sulfite/sulfate. Activated carbon injection may also be employed to ensure high removal efficiencies of mercury. Due to the high recirculation rates, the incoming flue gas is constantly subjected to a surplus of calcium hydroxide.

2.1.2. Development of Additional By-Product Storage Area

Initially, TVA plans to place the combined waste in the currently active dry fly ash disposal area. Based on projected waste volumes and current space remaining in the disposal area and given the dry FGD system is scheduled to be operational beginning in 2012, there would be approximately 21 months of codisposal capacity remaining when the scrubber comes online. In order to provide the required additional disposal capacity for the combined waste, a new disposal area is proposed for development.

Several sites were initially considered for the location of the proposed JSF coal combustion by-product (CCB) disposal area. Due to site geology, topography, distance from the plant, or existing site development, such as transmission lines and towers, four of these potential

sites were determined to be not feasible based on preliminary investigation criteria and data. The feasible and preferred site was determined to be located immediately south of, and contiguous with, the JSF reservation. The area encompasses 94 total acres and is situated between Old Highway 70 on the east and TVA property as shown in Figure 2-2. The developed disposal facility would encompass approximately 61 acres of the site and would provide enough disposal capacity for over 10 years of the mixed (fly ash/dry FGD) waste stream. Figure 2-3 is a cross section of Figure 2-2 (A-A') that depicts the proposed conceptual vertical height of the stack at closure.

The proposed stack would be permitted as a Class II waste disposal facility and would meet design and siting criteria of TDEC's Division of Solid Waste Management. These requirements include a geologic soil buffer, protective liner system, which would include a flexible membrane liner (FML) and compacted clay layer, leachate collection system, a lined sedimentation pond, and a final cover system with low permeability to prevent infiltration of moisture following closure of the facility. During the operation phase of the facility, the working face would be minimized to less than 10 total acres using intermediate soil cover. This would further limit infiltration and help control dusting and erosion during the active life of the facility.

The status of JSF as a small quantity generator of hazardous waste would not change as a result of the Action Alternative.

2.1.3. Power Supply

For any of the three systems, in order to supply power to the two new scrubber transformers, TVA's Power System Operations (PSO) organization would construct two new on-site power feeds. PSO would install one scrubber feed by tapping the existing common station service feed in the JSF switchyard. PSO would install a second scrubber feed by building a new half bay (Bay 37) in the JSF switchyard. Any spoil accumulated from the excavation of new foundations or extension of the switchyard for the new bay would be used as fill on site, and the area would be regraveled. If any spoil were hauled off the work site, it would be disposed of at a designated spoil area located on the JSF property. Surface water impacts and pollution runoff would be prevented by the use of standard TVA BMPs (Muncy 1999). Any environmental-related activities would be coordinated with the JSF environmental administrator.

2.1.4. Transportation

With the use of any of the above three technologies, fly ash marketing would no longer be an option for JSF because the CCB would be a mixture of fly ash and calcium salts, and currently, the marketing of this mixture has very few options. In the past, JSF has marketed as much as 85 percent of its annual production of 225,000 tons of ash. This equated to approximately 8,000 truckloads annually. JSF would need approximately 6,200 truckloads of CaO reagent for the scrubber annually. Initiation of this project would mean a net reduction of approximately 1,800 trucks annually. Transportation of the major components and material for the construction of this project would be by rail to the plant.

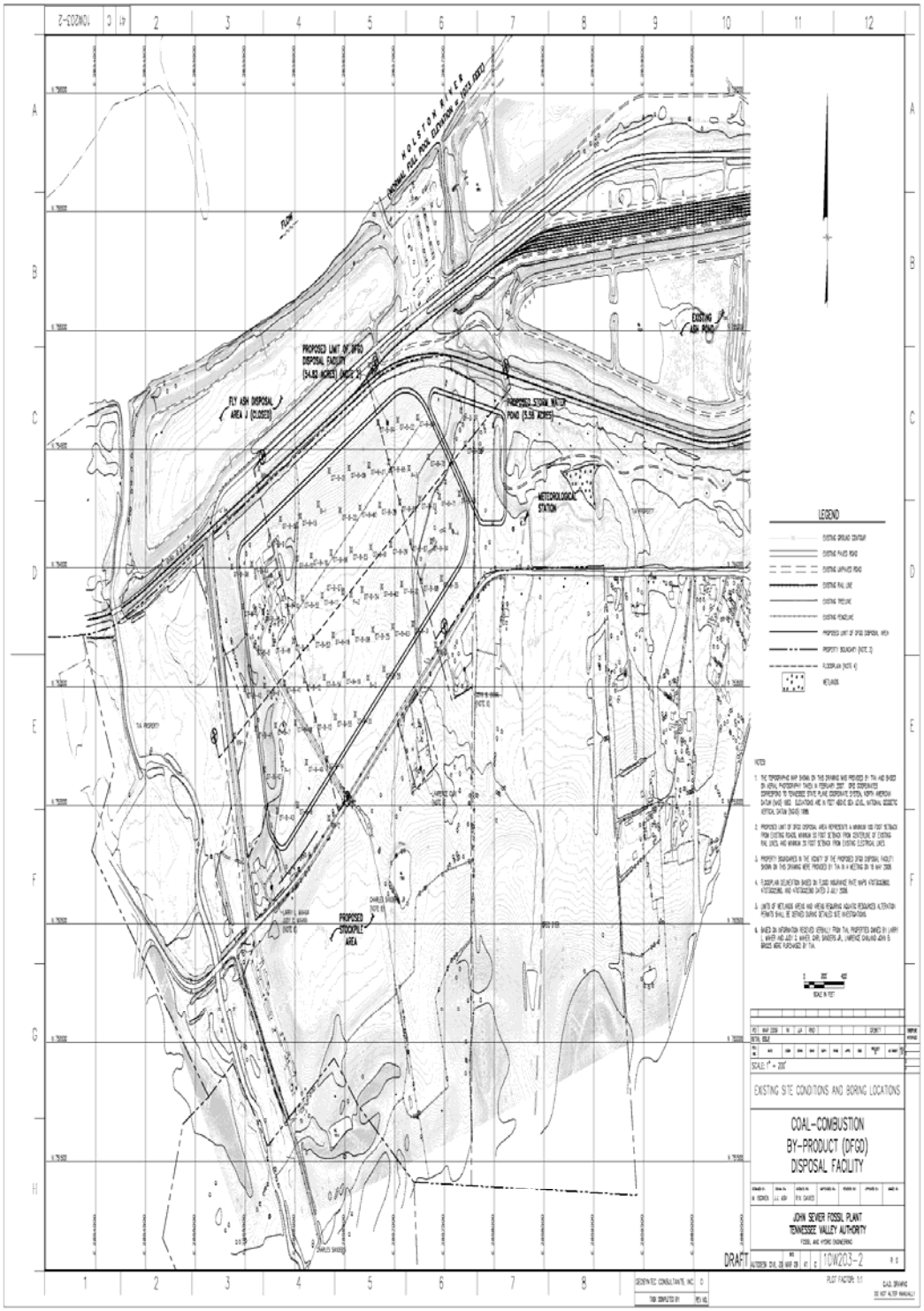

Figure 2-2. Proposed New Coal Combustion By-Product Disposal Area Conceptual Layout

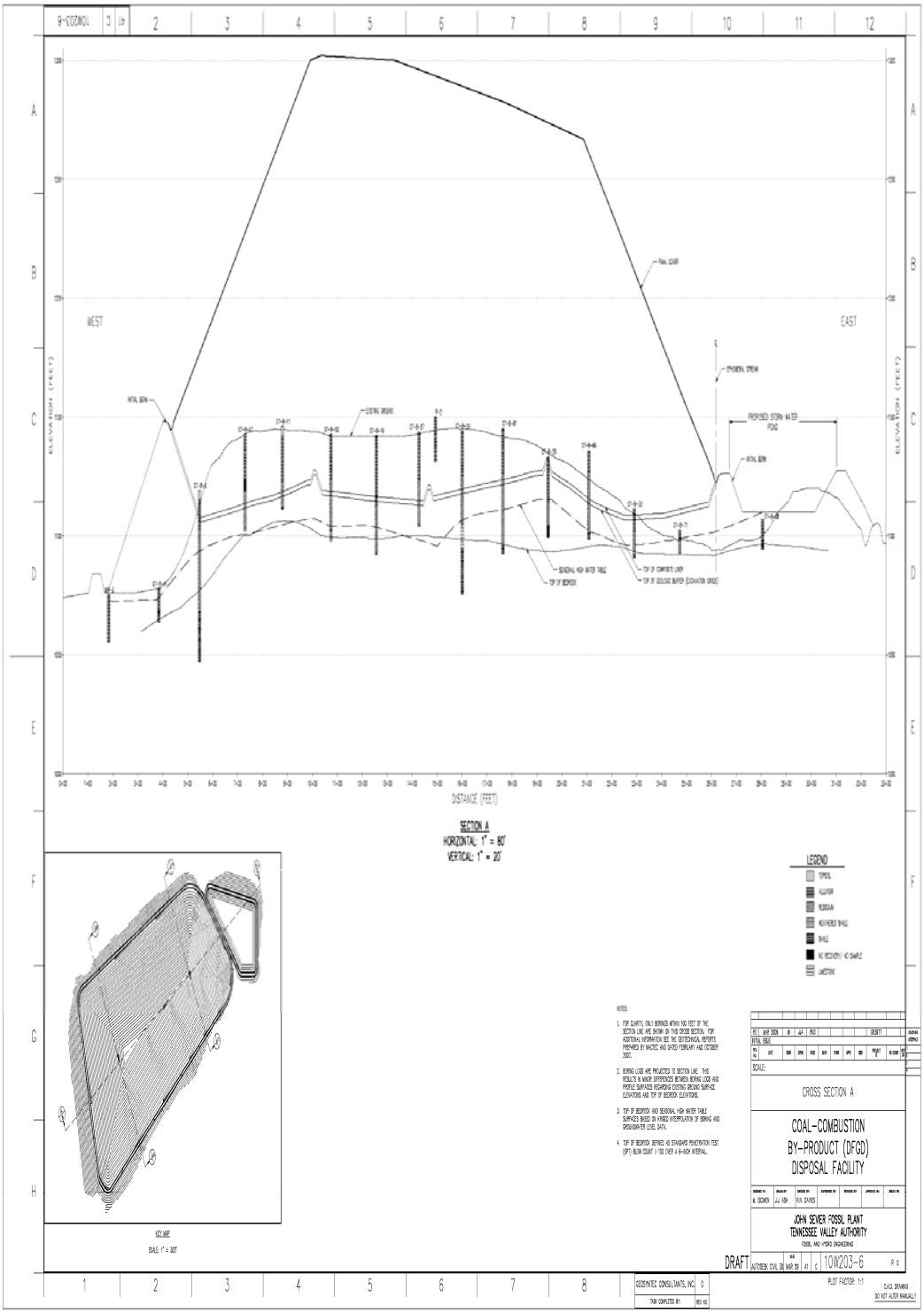

Figure 2-3. Section A Cross Section

2.1.5. Direct Purchase of Scrubber Reagent

In previous EAs for scrubber installations, the noisiest aspect of the projects has been the operation of the ball mill to pulverize the limestone reagent for the scrubber. Within these reviews, the closest residences were within 1,500 feet of the ball mill, and it was determined that the noise levels would not be audible over the background. The nearest residence for this project is approximately 3,200 feet from the powerhouse. This scrubber would not have a ball mill because TVA would purchase a CaO reagent for the scrubber, which does not require a ball mill for pulverization.

Because of the temporary nature of construction, the similarity of construction noise to plant operating noise, and the noise levels of existing plant traffic in the area, noise impacts from construction and operation are expected to be insignificant.

2.2. No Action Alternative

Under a No Action Alternative, no FGD or other system for SO_2 reduction from JSF would be installed. A No Action Alternative would not meet TVA's goal to reduce SO_2 emissions from JSF in order to help meet systemwide needs for reduction in SO_2 emissions. The No Action Alternative for JSF would likely result in the need to reduce SO_2 emissions from other TVA fossil plants or require purchase of additional pollution credit allowances.

2.3. Comparison of Alternatives

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

Issue Area	Impacts From No Action Alternative	Impacts From Proposed Action Alternative
Air Quality	No regional impact since TVA would still be required to make comparable reductions in SO_2 emissions at other plants	• Impacts to local and regional air quality would be minor but beneficial with the addition of the scrubber; overall, the air quality impact of construction-related activities for the project would not be significant
Solid Waste	None	• Insignificant impacts from the construction and operation of a new landfill consisting of the features as described below
Groundwater Quality	None	• Insignificant with the addition of a clay liner, FML, geologic buffer and leachate collection for the new landfill

Issue Area	Impacts From No Action Alternative	Impacts From Proposed Action Alternative
Natural Areas	None	• Indirect effects anticipated to natural areas would be improved air quality due to particulate matter reduction • Cumulative effects anticipated over time to all natural areas would include improved regional air quality with respect to visibility and reduced ecosystem acidification, improving wildlife habitat and visitor experience as a result of the Action Alternative
Visual Resources	None	• This would have a positive impact on surrounding mature forestlands; the reduced emissions from the Action Alternative, in concert with other regional and national measures, is expected to increase visibility in the region, resulting in a projected decrease of up to 3 deciviews* through 2020
Surface Water	None	• Construction impacts would be insignificant with the implementation of BMPs
Wastewater	None	• Insignificant with discharge of solid waste sedimentation pond to the Holston River
Wetlands	None	None
Aquatic Ecology	None	None
Terrestrial Ecology	None	• The benefits of the reduction in SO_2 emissions would improve the air quality in this region, benefiting local and regional populations of wildlife and their habitats • Not expected to directly, indirectly, or cumulatively result in significant impacts to terrestrial wildlife or their habitats
Protected and Sensitive Species	None	None
Cultural Resources	None	None
Socioeconomics	None	• Small positive impact to the local economy
Environmental Justice	None	None

Issue Area	Impacts From No Action Alternative	Impacts From Proposed Action Alternative
Prime Farmland	None	• Soil characteristics for 33.6 acres meet the criteria for prime farmland for Phase I of the proposed landfill location; however, the total score for the land is less than 160 points, so this location does not warrant the consideration of alternative locations

* A deciview is a measure of visibility that captures the relationship between air pollution and human perception of visibility.

2.4. The Preferred Alternative

TVA's preferred alternative is to construct and operate a dry FGD (scrubber) system with associated ancillary equipment at JSF.

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CHAPTER 3

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1. Air Quality

3.1.1. Affected Environment

Air quality is an environmental resource value that is considered important to most people. 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 ($\leq$) 10 micrometers (PM_{10})
- particulate matter whose particles are $\leq$ 2.5 micrometers ($PM_{2.5}$)
- carbon monoxide (CO)
- lead (Pb)

A listing of the NAAQS is presented in Table 3-1. National standards, other than annual standards, are not to be exceeded more than once per year (except where noted). Units are parts per million (ppm) by volume of air except for particulate matter (PM) and lead, which are expressed in micrograms per cubic meter ($\mu g/m^3$).

Regionally, air quality is generally good. The air quality in the vicinity of JSF is also generally good. Table 3-2 shows the results of ambient air quality monitoring of criteria pollutants that are considered representative of the JSF site. Hawkins County, which contains the JSF site, and all of its bordering counties are currently in attainment for all 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 revised the primary and secondary NAAQS for ozone (73 *Federal Register* 60). 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. USEPA recently designated Hawkins and Sullivan counties in Tennessee as attainment for the old 8-hour ozone standard, effective April 15, 2008 (73 *Federal Register* 64).

Table 3-1. National Ambient Air Quality Standards

	Primary Standards[a]		Secondary Standards[b]	
Pollutant	**Level**	**Averaging Time**	**Level**	**Averaging Time**
Carbon Monoxide	9 ppm (10 mg/m^3)	8-hour [(1)]	None	
	35 ppm (40 mg/m^3)	1-hour [(1)]		
Lead	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	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	0.075 ppm (2008 std)	8-hour [(6)]	Same as Primary	
	0.08 ppm (1997 std)	8-hour [(7)]	Same as Primary	
	0.12 ppm	1-hour [(8)] (Applies only in limited areas)	Same as Primary	
Sulfur Dioxide	0.03 ppm (80 µg/m^3)	Annual (Arithmetic Mean)	0.5 ppm (1300µg/m^3)	3-hour [(1)]
	0.14 ppm (365 µg/m^3)	24-hour [(1)]		

Source: (71 *Federal Register* 200)
ppm = Parts per million mg/m^3 = Milligrams per cubic meter µg/m^3 = Micrograms per cubic meter
std = Standard

[(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 3 years
[(4)] To attain this standard, the 3-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 3-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 3-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 3-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 < 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

Table 3-2. Ambient Concentrations of Criteria Air Pollutants Near John Sevier Fossil Plant Compared With Air Quality Standards

Pollutant	Level of Standard (ppm)[a]	1-Year Maximum or Mean	
		Concentration (ppm)[a]	Percent of Standard
Ozone (New Standard)[b]	4th Highest 8-hour average (0.075)	0.074[c]	93
Sulfur Dioxide	Maximum 3-hour average (0.5) Maximum 24-hour average (0.14) Annual mean (0.030)	0.163[d] 0.038[d] 0.0043[d]	33 27 14
Nitrogen Dioxide	Annual mean (0.053)	0.0099[c]	19
Carbon Monoxide	Maximum 1-hour average (35) Maximum 8-hour average (9)	1.7[c] 1.0[c]	5 11
PM_{10} (Revised Standard)	($\mu g/m^3$) Maximum 24-hour average (150)	($\mu g/m^3$) 42[e]	28
$PM_{2.5}$ (New Standard)	($\mu g/m^3$) Maximum 24-hour average (35) Annual average (15)	($\mu g/m^3$) 31.1[c] 11.44[c]	89 76
Lead	($\mu g/m^3$) Quarterly mean (1.5)	($\mu g/m^3$) 0.125[c]	8

(a) ppm unless otherwise noted
(b) Fourth-highest concentration must be 0.075 ppm to be considered above the level of the standard (0.075 ppm)
(c) O_3, NO_2, CO, $PM_{2.5}$, and Pb values for Sullivan County, Tennessee, 2008
(d) SO_2 values for Hawkins County, Tennessee, 2007
(e) PM_{10} values for Greene County, Tennessee, 2001

3.1.2. Environmental Consequences

3.1.2.1. No Action Alternative

Under the No Action Alternative, air pollutant emissions would be unchanged. Consequently, air quality would not be improved from current conditions.

3.1.2.2. Action Alternative

Construction Impacts

The proposal under consideration would have associated transient air pollutant emissions during the construction phase of the project. 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 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. If necessary, emissions from open construction areas and unpaved roads could be mitigated by spraying water on the roadways as needed to reduce fugitive dust emissions by as much as 75 percent. The project would comply with Tennessee regulations applicable to fugitive emissions.

Combustion of gasoline and diesel fuels by internal combustion engines (vehicles, generators, construction equipment, etc.) would generate local emissions of PM, NOx, CO, volatile organic compounds, and 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.

Air quality impacts from all of these construction activities would be temporary and dependent on both man-made factors (e.g., intensity of activity, control measures, etc.) and natural factors (e.g., wind speed, wind direction, soil moisture, etc.). However, 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 not be significant.

Operational Impacts

Description of Analysis

An air quality analysis was performed in accordance with the USEPA's "Guideline on Air Quality Models" (70 *Federal Register* 216). The focus of the analysis was to determine the air quality impacts of SO_2, $PM_{10,}$ and $PM_{2.5}$ emissions on the area surrounding JSF following installation of dry FGD. Refined air quality modeling was performed using the American Meteorological Society (AMS)/USEPA Regulatory Model (AERMOD, Version 07026) assuming maximum emissions. Modeling runs were made using detailed receptor sets and representative hourly meteorology. Descriptions of the dispersion model, sources, data requirements, and modeling results are presented in the following sections.

Air Quality Dispersion Model

Air quality dispersion modeling was performed using AERMOD to obtain estimates of maximum ambient air quality impacts. As of December 9, 2006, AERMOD is fully promulgated as USEPA's preferred regulatory model, in accordance with USEPA guidance (70 *Federal Register* 216).

The options used within the model were the recommended default regulatory options, which include the following:

- Stack tip downwash
- Calms and missing meteorological data routine
- Direction-specific building downwash
- Actual receptor elevations

- Complex/intermediate terrain algorithms

Technical details on AERMOD are presented in USEPA (2004a).

Sources and Emissions
The physical dimensions and flue gas parameters of the JSF stacks used in the model runs are presented in Table 3-3.

Table 3-3. Stack Locations, Physical Dimensions, and Flue Gas Parameters of John Sevier Fossil Plant

Stack	Easting (km)	Northing (km)	Stack Base Elevation (ft-msl)	Stack Height (m)	Stack Diameter (m)	Stack Exit Velocity (m/s)	Stack Temperature (K)
Units 1-2	323.840	4027310	1109	106.7	7.16	13.41	346.5
Units 3-4	323.820	4027370	1109	106.7	7.16	13.41	346.5

km = kilometer
ft-msl = feet mean sea level
m = meter
m/s = meters per second
K = Kelvin

The emission rates used in the modeling are presented in Table 3-4 and represent continuous operation during the year. The emissions and exhaust flows presented in these tables reflect maximum operating conditions. This approach ensured that the modeling produced conservative estimates of ambient impacts.

Table 3-4. Emissions Used in Modeling

Stack	SO_2 Emission Rate (lb/hour)	PM_{10} Emission Rate (lb/hour)	$PM_{2.5}$ Emission Rate (lb/hour)
Units 1-2	600	106.72	61.48
Units 3-4	600	106.72	61.48

Note: Emissions are based on coal with 3.1 lb SO_2/mmBtu

Receptors
The modeling was performed using two receptor sets for a total of 15,516 receptors. These receptor elevations were extracted from 7.5-minute United States Geological Survey Digital Elevation Model files and processed using the AERMOD Terrain Preprocessor (AERMAP) (USEPA 2004b). Nested receptor grids were built surrounding the JSF site using the metric measurement system. The first receptor set covers a 40-kilometer by 40-kilometer area centered on the midpoint of the two stacks. Receptors were spaced 100 meters apart to a distance of 3 kilometer from the plant, receptors 3 to 10 kilometer from the plant were spaced 250 meters apart, and receptors 10-20 kilometers from the plant were spaced 500 meters apart. The origin of each grid is located in the southwest corner. The initial receptor spacing is outlined in Table 3.5.

Table 3-5. Receptor Grid Size and Spacing

Receptor Spacing (meter)	Grid Size (kilometer)	Grid Origin (kilometer south and west of site)
100	6 x 6	3
250	20 x 20	10
500	40 x 40	20

The initial AERMOD runs revealed that the highest concentrations were occurring at receptors that fell within the 250-meter spaced receptors. Therefore, an additional set of 100-meter spaced receptors was built covering an 800-meter by 2,700-meter area around the critical impact receptors. This receptor set was then run to ensure that the highest concentrations were being captured.

Meteorology

Given that current years of site-specific meteorological data were not available for the JSF site, National Weather Service (NWS) surface-met data from nearby Bristol, Tennessee, were evaluated for use in the regulatory dispersion modeling. The Bristol NWS station is located approximately 50 miles east of the JSF plant site. Actual surface data collected from the NWS at the Bristol Tri-Cities Regional Airport for the years 2001-2005 were used in the modeling analysis. Upper air data for the same period (2001-2005) from the Nashville, Tennessee, International Airport were used. Data were processed using the AERMET (dated 06341) meteorological data preprocessor for AERMOD (USEPA 2004c).

Processing of meteorological data with AERMET occurs in three stages. Stage 1 has two steps in which the hourly surface data and upper air data are extracted from the raw data files and quality assured. In Stage 2, the processing occurs that merges the hourly surface observations and upper air soundings into a single file. Finally, Stage 3 establishes the boundary layer parameters from the merged data and creates the two meteorological files, which are input meteorologically for AERMOD.

Calculations of the boundary layer parameters are dependent on the surface characteristics in the vicinity of the modeled facility. The surface characteristics are quantified by the assignment of three variables: surface albedo, Bohen ratio, and surface roughness length. These variables were set to vary by season. The surface characteristics were obtained using the USEPA tool, AERSURFACE (USEPA 2008), which uses publicly available national land cover datasets and look-up tables of surface characteristics that vary by land cover type and season. Values of surface characteristics are output from AERSURFACE in a format for input into AERMET Stage 3.

Air Quality Modeling Results

Modeling was performed to evaluate the impact of the JSF FGD project on air quality in the surrounding area. The modeling results also provide a comparison of impacts relative to established air quality metrics. In particular, pollutant-specific NAAQS are the concentration levels established by USEPA to protect public health for various averaging times.

Table 3-6 summarizes the AERMOD modeling results of SO_2, PM_{10}, and $PM_{2.5}$ air quality impacts. The highest concentration ($\mu g/m^3$) in the vicinity of the plant is presented for the annual averaging period and the highest-second-highest is presented for both the 24-hour

and 3-hour averaging periods (to enable comparison with air quality standards). The highest-eighth-highest is presented for the 24-hour averaging period for $PM_{2.5}$ (to enable comparison with air quality standards).

Table 3-6. AERMOD Modeling Results

Pollutant	Average Type (Highest)	Receptor				Ending Time			Conc. ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
		No.	East (m)	North (m)	Elev. (m-msl)	Year	Day	Hour		
SO_2	Annual	15368	323100	4020300	518	2004	366	24	7.58	80
SO_2	24-hour	15355	323400	4020100	510	2004	142	24	78.77	365
SO_2	3-hour	15487	323000	4021800	511	2002	216	24	383.58	1300
PM_{10}	24-hour	15355	323400	4020100	510	2004	142	24	14.00	150
$PM_{2.5}$	Annual	15368	323100	4020300	518	2004	366	24	0.78	15
$PM_{2.5}$	24-hour	15487	323000	4021800	511	2005	236	24	4.47	35

m = meter
m-msl = meter mean sea level
$\mu g/m^3$ = micrograms per cubic meter

Air quality modeling results show that concentrations of SO_2, PM_{10}, and $PM_{2.5}$ following installation of FGD at JSF Units 1-4, will not result in any exceedences of the NAAQS. Concentrations of other pollutants for which NAAQS exist are not expected to be changed appreciably by the addition of the scrubber.

Cumulative Regional Impacts

The installation of FGD at JSF Units 1-4 is part of an SO_2 emissions-reduction effort that contemplates FGD installation on several of TVA's fossil plants. Construction of FGD systems at Paradise Fossil Plant (PAF) Unit 3 and Bull Run Fossil Plant (BRF) Unit 1 are complete, and Kingston Fossil Plant (KIF) Units 1-9 are underway. The proposed action (installation of FGD on JSF Units 1-4) is part of a TVA systemwide emissions-reduction effort that is expected to benefit overall regional air quality.

Cumulative impacts on air quality in the Southeast due to changes in future emissions were evaluated by the Southern Appalachian Mountains Initiative (SAMI) by performing extensive photochemical and regional haze modeling. A primary conclusion from SAMI's work was that reduction of emissions within a state would provide the most improvement to the air quality within the same or adjacent states. Although SAMI did not model individual sources, the conclusions of the study can be extended to a collection of sources to infer that the primary air quality benefit of SO_2 emissions reductions will be within the states where they are located and in the region adjacent to those states. Thus, although SO_2 emissions reductions due to installation of FGD at BRF, JSF, KIF, and PAF are expected to lead to improvement in overall regional air quality, the most improvement would be within the TVA region.

3.2. Solid Waste

3.2.1. Affected Environment

The amount of calcium salts produced by dry FGD scrubbing is dependent on the sulfur content and heating value of the coal, absorber efficiency, and the amount of coal fired. The maximum theoretical production of calcium salts production at JSF is based on 86.5

percent capacity factor for operation of the four units at the plant, and the use of 3.1 lb SO_2/mmBtu coal is expected to yield approximately 400,000 cubic yards per year (for calcium salts composed primarily of calcium sulfate). Currently the plant produces approximately 225,000 cubic yards of fly ash annually, which is collected and disposed of in a dry condition. Current plans are for dry fly ash and dry FGD to be combined and codisposed in the same area. This mixing of the waste streams would eliminate the possibility of marketing the materials. Initially the combined waste would be disposed in the facility's currently active dry fly ash disposal area. As that area nears capacity, a new disposal area is proposed for development on TVA-owned property. Combined, these areas would provide more than 8 million cubic yards of disposal capacity for the combined calcium salts and fly ash produced.

JSF currently produces CCBs: Fly ash and bottom ash are by-products from the combustion of coal and are disposed on site. JSF is expected to burn between 1.9 and 2.2 million cubic yards of coal annually through at least 2023. The coal averages 11.6 percent ash; therefore, total ash production would range from approximately 220,000 to 254,000 cubic yards of ash per year. The ash is collected as either fly ash, which is fine enough and light enough to be carried with the flue gas stream exiting the boiler, or as bottom ash, which is coarser and heavier and falls to the bottom of the boiler.

The fly ash/bottom ash split is about 93 percent fly ash and 7 percent bottom ash. In 1986, the fly ash handling system at JSF was converted to a dry fly ash handling system. Prior to this, all fly ash and bottom ash was sluiced to the on-site ash pond complex. Since the conversion, fly ash, which is separated from the flue gases in ESPs and collected in hoppers, is pneumatically collected dry and blown to either of two 1,200-ton fly ash silos.

Fly ash that meets industry specifications is marketed for ready-mix concrete or other products and can be delivered into pneumatic tanker trucks from one silo, which is equipped with a dry fly ash unloader. Fly ash that does not meet specifications and/or that is not marketed can be conditioned with water in pug mills located near the bottom of the silos and loaded into dump trucks for transport to the fly ash disposal area.

Although JSF collects most of the fly ash dry, it has retained the capability to sluice fly ash to the bottom ash pond complex. Fly ash is sluiced during unit startup and during operational problems that compromise the reliability of the dry fly ash collection system. Since fly ash that is wet sluiced impedes ash-marketing efforts in the bottom ash pond, wet sluicing fly ash is kept to a minimum.

The existing dry fly ash stacking area currently has approximately 1.6 million cubic yards of disposal capacity remaining. Based on the current fly ash production rate of 225,000 cubic yards per year, if no fly ash were marketed, this would be enough disposal capacity for about eight years (2017).

Bottom ash collects in the bottom of the boiler and is periodically washed from the boiler bottoms with jets of water and sluiced to a bottom ash dewatering area within the bottom ash pond complex. The bottom ash is currently collected in this area by Appalachian Products, an independent ash marketing company that processes and sells the bottom ash for use in concrete block manufacturing.

3.2.2. Environmental Consequences

3.2.2.1. No Action Alternative

For the No Action Alternative, JSF could continue to handle fly ash by dry stacking in the current disposal area and sluicing bottom ash to the current facilities until capacity in these areas is exhausted.

3.2.2.2. Action Alternative

Proposed Scrubber
For the proposed action to construct and operate a dry FGD system at JSF, resulting in a new CCB composed primarily of calcium salts, it is anticipated that based on the estimated coal burn and the projected sulfur content of the coal (3.1 lb sulfur per mmBtu), approximately 400,000 cubic yards of the new CCB would be produced annually. TVA proposes to codispose this new waste stream by combining it with the estimated 225,000 annual cubic yards of fly ash produced by the plant. As a result of combining the two wastes, the ability to market either by-product will end, and it will be necessary to dispose of the waste in a permitted solid waste facility. As described in Section 2.1.2 of the alternatives and as shown in Figures 2-2 and 2-3, implementation of the proposed Action Alternative would require the development of a Class II solid waste disposal facility. The proposed site is located south of the JSF site. The environmental effects, required permitting actions, and mitigation commitments for developing the site are discussed under the various sections of this EA on alternatives and resource areas.

3.3. Surface Water

3.3.1. Affected Environment

Site Topography and Surface Drainage
The proposed project area is located in a rural portion of Hawkins County, Tennessee, near the small settlement of McCloud. The surrounding topography gently slopes toward the banks of the Holston River. The JSF reservation rests on the present Holston River floodplain and an older, higher river terrace to the southeast. The Holston River floodplain, averaging about 800 feet in width, extends the full length of the JSF reservation and has an average surface elevation of about 1,080 feet. The older terrace rises to an average elevation of about 1,140 feet and extends southeastward a distance of approximately 2,500 feet to the base of a low ridge. The terrace is dissected by tributary streams.

The proposed CCB disposal area would occupy approximately 94 acres immediately south of the rail yard at JSF. The proposed CCB disposal area is presently primarily pastureland adjacent to the existing JSF facility on which occur one unnamed, intermittent stream and two farm ponds. The proposed gypsum disposal site is to be located near the western edge of the JSF reservation property on a corner of the old river terrace bounded by the present floodplains of the Holston River to the north-northwest and Dodson Creek to the south and west (Figure 2-1). The proposed CCB disposal area currently slopes and drains to the Holston River, Dodson Creek, and to the unnamed ephemeral stream. The far west side of the proposed CCB disposal area currently drains toward Dodson Creek, which discharges into the Holston River at about HRM 104.7. The middle and east sides of the proposed CCB disposal area currently drain toward Polly Branch. Polly Branch discharges

into the Holston River at about HRM 105.4. An unnamed intermittent stream flows across the southeastern corner of the proposed CCB disposal area. Periodic observations between February and October 2007 showed stream flow during the winter and early spring months, but except for storm runoff events, the stream was dry from May until field investigations ended in October. During a field survey in June 2007, this stream supported aquatic insects but did not support a fish community. The unnamed ephemeral stream crossing the eastern side of the site does not appear to be in hydraulic communication with shallow groundwater, even during relatively wet periods.

Holston River Designated Uses and Existing Environmental Issues

Stream Designated Uses - JSF is located at approximately HRM 106.2. The Holston River is impounded at HRM 52.3 by Cherokee Dam, and the impoundment extends upstream approximately 54 miles to the John Sevier detention dam and pool at HRM 106.3. Cherokee Reservoir is the most downstream and largest impoundment of the Holston River. The average flow of the Holston River at Cherokee Dam is 4,500 cubic feet per second. JSF uses water withdrawn from the John Sevier detention pool as cooling water for its condensers.

The Holston River is classified for use as a domestic water supply, as an industrial water supply, for fish and aquatic life, for recreation, for livestock watering and wildlife, and for irrigation (TDEC 2007). The Holston River from HRM 89.0 upstream to HRM 142.3 is listed as not supporting one or more of its uses due to mercury contamination from sources outside Tennessee (TDEC 2008a). As of March 28, 2009, Polly Branch had not been assessed by TDEC as either supporting or not supporting its uses. Dodson Creek was assessed in 2008 as fully supporting its uses of fish and aquatic life, livestock watering and wildlife, and recreation, from Cherokee Reservoir to the confluence of Louderback Creek, at approximately Dodson Creek Mile 2.

Drainage from the JSF site leads to the Holston River, either directly or via Polly Branch, a zero (low) flow stream. Polly Branch is classified for uses for fish and aquatic life, recreation, livestock watering and wildlife, and irrigation (TDEC 2007). Water discharges at JSF are covered by NPDES Permit number TN0005436, and NPDES Industrial Storm Water General Permit number TNR053187.

Domestic Water Supply - The nearest major city downstream of the site is Morristown, which operates a municipal water intake 31 miles downstream at HRM 75. The utility serves approximately 60,000 people in Morristown, Bean Station, Rutledge, Russellville, Whitesburg, Bulls Gap, White Pine, and Mooresburg. The plant design capacity is 24 million gallons per day (MGD) with 9 MGD being the average daily demand. The intake design has two separate systems. The primary system is a variable stage intake that allows water to be drawn from lake stages between 1,020 and 1,070 feet. The secondary system is a standby intake that projects into the original riverbed and can be activated during outages of the primary system. The plant is equipped with conventional equipment for potable water treatment including equipment for chlorinating water. Morristown Utilities does not have a secondary source of water should an environmental event occur that would force the intake to discontinue operation for more than 24 hours (Mike Howard, Morristown Utility Systems, personal communications, November 2, 2004).

The Persia Water Utility serves most residents within the site locality. This utility operates a water-supply intake on the left bank of the Holston River between HRMs 102 and 103. This

is the only public water supply in the site locality and is slightly less than 2 miles west and downstream of the proposed gypsum disposal site.

Reservoir Water Quality Issues - The reach of the Holston River adjacent to JSF and the planned CCB disposal area has been substantially altered from its former free-flowing character by: (1) control of river flow by upstream dams, primarily Fort Patrick Henry Dam; (2) the presence of the John Sevier Detention Dam and the downstream Cherokee Dam. The area affected by Cherokee Reservoir extends to the tailwaters of the John Sevier detention dam and pool. Cherokee Reservoir is a relatively deep storage impoundment with a long retention time and plenty of nutrients, resulting in low dissolved oxygen levels and high chlorophyll levels (Dycus and Baker 2001). Like most TVA reservoirs, stratification during summer months occurs for Cherokee Reservoir. Recent concerns have included occasional low dissolved oxygen in the reservoir forebay and in releases from Cherokee Dam. Approximately 27 miles of river downstream of Cherokee Dam are reported as impaired due to low dissolved oxygen and flow alterations (TDEC 2008a). TVA currently mitigates (increases) dissolved oxygen and maintains a minimum release flow from Cherokee Reservoir. In 1995, as part of the Reservoir Releases Improvements Program, TVA installed an oxygen addition system on the upstream side of Cherokee Dam. TVA typically injects 2,100 tons per year of pure oxygen into the water impounded behind Cherokee Dam. This system, in addition to surface water pumps and turbine venting, maintains the dissolved oxygen concentrations of Cherokee Dam releases at 4 milligrams per liter (mg/L) or more. These systems have improved the aquatic habitat downstream for the last 10 years.

Another water quality issue in the watershed is mercury, historically released from the Saltville, Virginia, chlor-alkali plant into the North Fork of the Holston River for an extended period of time until the plant was closed in 1972. It was located more than 100 miles upstream of the JSF site. Mercury released from this industrial source has contaminated surface water and sediments of both the North Fork Holston and Holston Rivers. Since the 1970s, TVA has measured elevated levels of mercury in Cherokee Reservoir. In 1983, the Saltville site was added to the Superfund National Priorities List. A 2001-2002 USEPA investigation of the North Fork Holston and Holston Rivers and an associated ecological risk assessment reported results indicating elevated mercury levels in sediment cores collected in front of the JSF detention dam, downstream from the JSF intake channel. TVA's Reservoir Vital Signs Monitoring Program continues to monitor mercury levels in water, sediment, and fish tissues (http://www.tva.com/environment/air/ontheair/3decades.htm). Olin Corporation and USEPA may also sample Holston River sediments in conjunction with assessments of the Saltville Waste Disposal Ponds Superfund Site.

No Nationwide Rivers Inventory (NRI) streams or Wild and Scenic rivers are in the vicinity of the proposed action.

3.3.2. Environmental Consequences

3.3.2.1. No Action Alternative

Under this alternative, the FGD system would not be constructed, and there would be no current need for construction of a coal-combustion waste disposal facility. TVA-owned property identified for the gypsum disposal facility would remain undeveloped for the

foreseeable future. Consequently, there would be no adverse impacts to local surface water resources. Long-term use of this property by TVA is uncertain at this time.

3.3.2.2. Action Alternative

Construction Impacts
TVA would obtain a Construction Storm Water Permit from TDEC prior to beginning construction. Surface water impacts due to land disturbance during construction would be mitigated by use of storm water pollution prevention BMPs, which would minimize the extent of disturbance and erosion. Silt fences and/or other controls would be installed, inspected, and maintained for the duration of construction. The JSF IPP Plan would be updated, and TVA would comply with all requirements.

An intermittent stream would be redirected around the CCB disposal area. To conduct this work, the appropriate CWA, USACE, and TDEC permits would be obtained. Per permit requirements, any mitigation would be identified through the ARAP and 404 permitting process providing for the loss of stream reaches.

Potential surface water impacts during construction would be mitigated, and the impacts would be insignificant through the use of BMPs as well as compliance with the requirements of the ARAP and 404 permitting process.

Operational Impacts
TVA would obtain a Construction Storm Water Permit from TDEC prior to beginning construction. Surface water impacts due to land disturbance during construction would be mitigated by use of storm water pollution prevention BMPs, which would minimize the extent of disturbance and erosion. Silt fences and/or other controls would be installed, inspected, and maintained for the duration of construction. The JSF Integrated Pollution Prevention Plan would be updated, and TVA would comply with all requirements.

An intermittent stream would be redirected around the CCB disposal area. As noted in the section of this EA on Environmental Permits and Applicable Regulations, appropriate CWA, USACE, and TDEC permits would be obtained and complied with. Mitigation would be provided for the loss of stream reaches.

Potential surface water impacts during construction would be mitigated, though the use of BMPs and through the APAP and 404 permitting processes, and the impacts would be insignificant.

Eight trace elements of gypsum (cadmium, lead, silver, vanadium, antimony, selenium, thallium, and mercury) were estimated to be greater than TDEC criteria (TDEC 2008b) if the sedimentation pond effluent discharged to Polly Branch (see Table 3-7). If the pond discharged to the Holston River, only silver was greater than the calculated TDEC fish and aquatic life criterion continuous concentration (assuming 50 mg/L hardness). However, neither cadmium nor silver were actually detected in the Toxicity Characteristic Leaching Procedure (TCLP) and Synthetic Precipitation Leaching Procedure (SPLP) extracts from operational samples collected from the three types of dry scrubbers being evaluated. The maximum concentration of mercury was estimated to be 0.53 part per trillion in the Holston River after the sedimentation pond effluent mixed with the river flow. The Holston River in the vicinity of JSF is listed for mercury on the final version of the 2008 TDEC 303(d) list, but

addition of a maximum concentration of less than 1 part per trillion would not be expected to have a significant impact.

Table 3-7. Summary of Estimated Maximum Concentrations of Trace Elements in the Receiving Stream

Constituents of Concern	Maximum TCLP mg/L	Maximum SPLP mg/L	Holston River mg/L	Polly Branch mg/L	TDEC Criteria* mg/L
Aluminum	0.025	3.9	0.0047	1.77	
Barium	2.3	0.6	0.00072	0.27	2
Berylium	<0.015	<0.003	3.60E-06	0.0014	0.004
Boron	7.9	4.2	0.0050	1.91	
Cadmium	<0.002	<0.002	2.40E-06	0.00091	0.000152
Calcium	2500	1300	1.56	590	
Chromium	<0.03	0.0085	1.02E-05	0.0039	0.011
Cobalt	0.0083	<0.006	7.20E-06	0.0027	
Copper	<0.03	<0.006	7.20E-06	0.002723	0.004962
Iron	0.072	<0.05	6.00E-05	0.023	0.3
Lead	<0.025	0.0075	9.00E-06	0.003403	0.001177
Magnesium	68	3.1	0.0037	1.41	
Manganese	0.3	<0.002	2.42E-06	0.0009	
Molybdenum	0.34	0.47	0.00056	0.21	
Nickel	0.019	<0.01	1.20E-05	0.00454	0.02898
Silver	<0.025	<0.005	6.00E-06	0.0023	0
Vanadium	0.12	<0.05	6.00E-05	0.023	0.002
Zinc	0.68	<0.02	2.40E-05	0.0091	0.0629
Antimony	0.046	0.018	2.16E-05	0.008	0.006
Arsenic	0.123	0.006	7.20E-06	0.0027	0.01
Selenium	0.186	0.078	9.36E-05	0.035	0.005
Thallium	0.01	0.004	4.80E-06	0.00181	0.00024
Tin	<0.01	<0.01	1.20E-05	0.0045	
Titanium	<0.01	<0.01	1.20E-05	0.0045	
Mercury	0.00245	0.000444	5.33E-07	0.00020	0.00005

TCLP = Toxicity Characteristic Leaching Procedure
SPLP = Synthetic Precipitation Leaching Procedure
* For calculation of the criterion continuous concentrations, 50 mg/L hardness was used.

Because only 60-75 percent of the CaO added to the flue gas stream will react with the SO_2, the pH in the runoff and groundwater would be expected to be elevated. The pHs of the TCLP and SPLP extracts ranged from 6.92 to 12.76. According to the JSF NPDES Permit, the pH at the ash pond discharge (Outfall 001) is required to be in the range of 6.0 to 9.0. In addition, the Tennessee Storm Water Multi-Sector General Permit for Industrial Activities (Sector L) limits effluent pH to a range or 6.0 to 9.0 for landfills and land application sites. If the sedimentation pond discharge is similarly limited, pH control measures, such as a CO_2 system, might have to be used at the pond to control pH to within these limits.

The CCB disposal area would have a maximum of 10 acres of gypsum exposed at any given time. The other areas would have either temporary or permanent cover, which would reduce the concentration of suspended solids and trace elements in the storm water runoff. The sedimentation pond would be managed in a manner that would promote settling of suspended solids, and controls such as turbidity curtains would be utilized as needed.

Based on the evaluation conducted, the surface water impacts would be insignificant if the sedimentation pond effluent discharged to the Holston River. Estimated concentrations of trace elements of gypsum in the Holston River were low enough not to cause a concern. As noted above, general pond management would mitigate other possible impacts due to elevated pH or suspended solids. The sedimentation pond would be monitored to determine that proper management and controls were in place to ensure the effluent had no significant impact to the receiving stream.

3.4. Groundwater

3.4.1. Affected Environment

The JSF site is located in the Valley and Ridge Province of the Appalachian Highlands. The region is characterized by long, narrow ridges and somewhat broader intervening valleys trending northeast-southwest. The ridges are typically parallel and have relatively level tops. They are composed of resistant sandstones and less soluble limestones and dolomites; whereas, the intervening valleys are developed in more easily weathered shales and more soluble limestones (Kellberg and Benziger 1952).

The plant reservation occupies the present floodplain and an older, higher river terrace to the southeast. The present floodplain, averaging about 800 feet in width, extends the full length of the reservation and has an average surface elevation of about 1,080 feet. The older terrace rises to an average elevation of about 1,140 feet and extends southeastward a distance of approximately 2,500 feet to the base of a low ridge. The terrace is presently being dissected by tributary streams.

The proposed disposal site for calcium salts is situated on a corner of the old river terrace bounded by the present floodplains of the Holston River to the northwest and Dodson Creek to the southwest. Topography across the disposal area currently slopes and drains to the Holston River, Dodson Creek, and to an unnamed ephemeral stream flowing generally northeastward across the eastern end of disposal area and sedimentation pond.

Three shallow geologic units of relevance to the EA are present beneath the proposed disposal site. These include, in descending stratigraphic order, Recent and Plio-Pleistocene age alluvial deposits associated with the Holston River and its tributaries, residuum derived from weathering of underlying rock, and the Sevier shale (Ordovician age).

The alluvial deposits generally mantle the entire site, and consist of unconsolidated sandy, clayey silt with interspersed pebbles and cobbles. The recent alluvium occupies the present floodplains of the Holston River and its tributaries where surface elevation is below about 1,100 feet. It is present only at the southwestern margin of the disposal area and along the unnamed ephemeral stream crossing the eastern side of the site. Older terrace alluvium is generally present beneath upland portions of the site above elevation 1,100 feet. Thickness of the alluvium tends to be greatest within the upland interior portions of the disposal site and thinnest along the southeastern side of the site. Overall thickness ranges from 0 to 39 feet and averages approximately 14 feet.

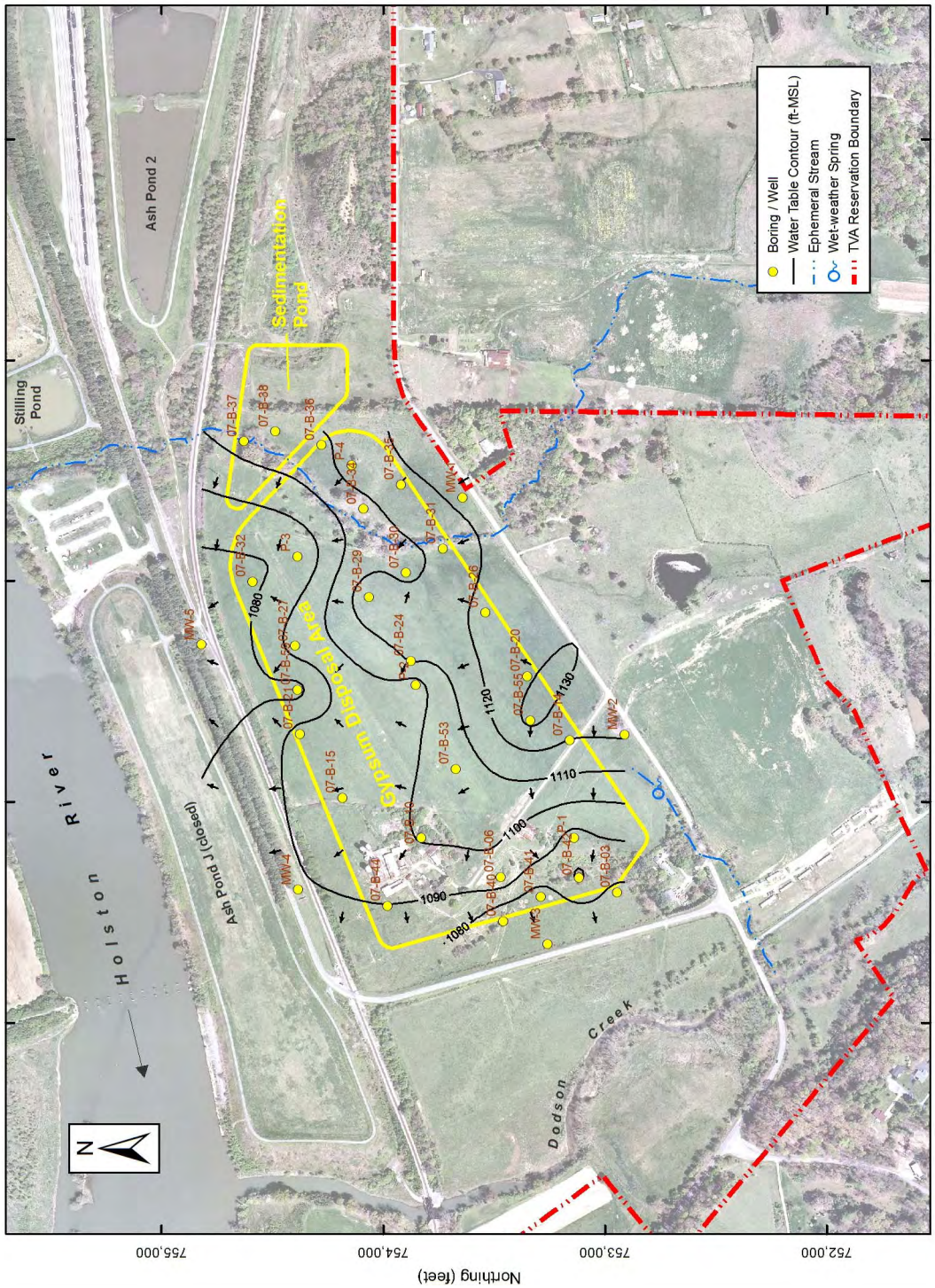
The residual soils are generally encountered beneath the alluvium deposits. Residuum primarily consists of unconsolidated silts, clays, weathered shale, and typically exhibits weak relict structure of the parent shale bedrock. Thickness varies widely across the site,

ranging from 0 to 60 feet and averaging 21 feet. Unconsolidated overburden materials at the site also include fly ash fill within a former borrow area located beneath the eastern portion of the proposed sedimentation pond (Figure 2-2). Borings in the former borrow area encountered from 7 to 23 feet of fly ash fill (TVA 1987). Total aggregate thickness of unconsolidated overburden ranges from 4 to 74 feet and averages approximately 38 feet over the proposed disposal area.

The Sevier shale comprises bedrock beneath the site. The Sevier shale consists of dark gray to black, slightly calcareous shale with thin interbedded limestone layers ranging up to about 0.3 foot in thickness. Shales vary from fresh to friable with some layers showing evidence of moderate weathering. Bedding attitude is highly variable often ranging from 40 to 90 degrees within the same core hole from which we infer the presence of small-scale, tightly folded anticlines and synclines as commonly observed in local bedrock exposures. Several cores indicated faults of unknown displacement intersecting bedding at various angles. Brecciation of thin limestone layers within a shale matrix was also observed in some cases. No borings completed on the JSF reservation have fully penetrated the Sevier shale, but Rodgers (1953) estimates total thickness is at least 2,500 feet.

The first occurrence of groundwater beneath the proposed disposal site is generally either in the basal portion of the soil overburden or upper bedrock, depending on location and time of year, as depicted in Figure 3-1. Groundwater is derived from infiltration of precipitation through the soil overburden and from lateral groundwater inflow originating in upland recharge areas to the southeast. Movement of shallow groundwater is generally northwestward across the site toward the Holston River and Dodson Creek where it ultimately discharges (Figure 2-2). The unnamed ephemeral stream crossing the eastern side of the site does not appear to be in hydraulic communication with shallow groundwater, even during relatively wet periods. Periodic observations between February and October 2007 showed stream flow during the winter and early spring months, but except for storm runoff events, the stream was dry from May until field investigations ended in October.

The principal aquifer in the site locality is the Sevier shale consisting of thinly bedded, slightly calcareous shale with interbedded limestone layers. Faulting and jointing has provided limited access for circulating groundwater as evidenced by iron staining along joints and fractures and moderate weathering of some layers. However, the absence of thick sections of pure limestone has precluded cavity development. Because of limited secondary porosity and low rock matrix permeability, the upper portion of the Sevier shale in the site locality is generally capable of supplying only small domestic and farm water demands.



(Arrows indicate inferred groundwater flow direction.)

Figure 3-1. Seasonal High-Water Table Based on 03/02/2009 Data

An inventory of water-supply wells on the south side of the Holston River within 1 mile of the proposed CCB disposal area was performed in July 2007. Local wells were identified using the TDEC well database, discussions with the Persia Water Utility, which serves the region, review of Hawkins County property assessments, and drive-by observations. Eighteen private water-supply wells were identified within 1 mile of the proposed disposal facility. Information regarding these wells is listed in Table 3-8, with locations shown on Figure 3-2. This includes one residential well (Well No. 1) located on property now owned by TVA. Well sources and depths were not confirmed, but given the limited selection of aquifers available locally and the limited demands typical of domestic or farm users, it is reasonable to assume most wells obtain water from the Sevier shale or possibly the alluvial deposits. Well depths of less than 300 feet would be expected. For example, reported depths of 30 wells completed in the Sevier shale in Hawkins County range from 30 to 350 feet with a median depth of 64 feet (DeBuchananne and Richardson 1956). All off-site private wells are located either upgradient of the disposal site or on the opposite side of Dodson Creek. Consequently, none of the off-site water wells would be affected by the proposed disposal facility.

Table 3-8. Local Water-Supply Wells

Well No.	Owner Street Address	Water Use
1	621 Old State Highway 70	Domestic
2	738 Old State Highway 70	Domestic
3	184 Temple Road	Domestic
4	Wayne Road	Domestic
5	Driveway off of Old State Highway 70	Domestic
6	275 Dru Haynes Road	Domestic
7	172 Dru Haynes Road	Domestic
8	Squirrel Hill Road	Domestic
9	Squirrel Hill Road	Domestic
10	186 Temple Road	Domestic
11	Cupp Hollow Road	Domestic
12	Cupp Hollow Road	Domestic
13	Driveway off of Old State Highway 70	Domestic
14	McCloud Church Road	Domestic
15	McCloud Church Road	Domestic
16	Driveway off of McCloud Church Road	Domestic
17	Brooks Drive	Domestic
18	Driveway off of Old State Highway 70	Domestic

The Persia Water Utility serves most residents within the site locality. This utility operates a water-supply intake on the left bank of the Holston River between HRMs 102 and 103. This is the only public water supply in the site locality and is slightly less than 2 miles west of the site.

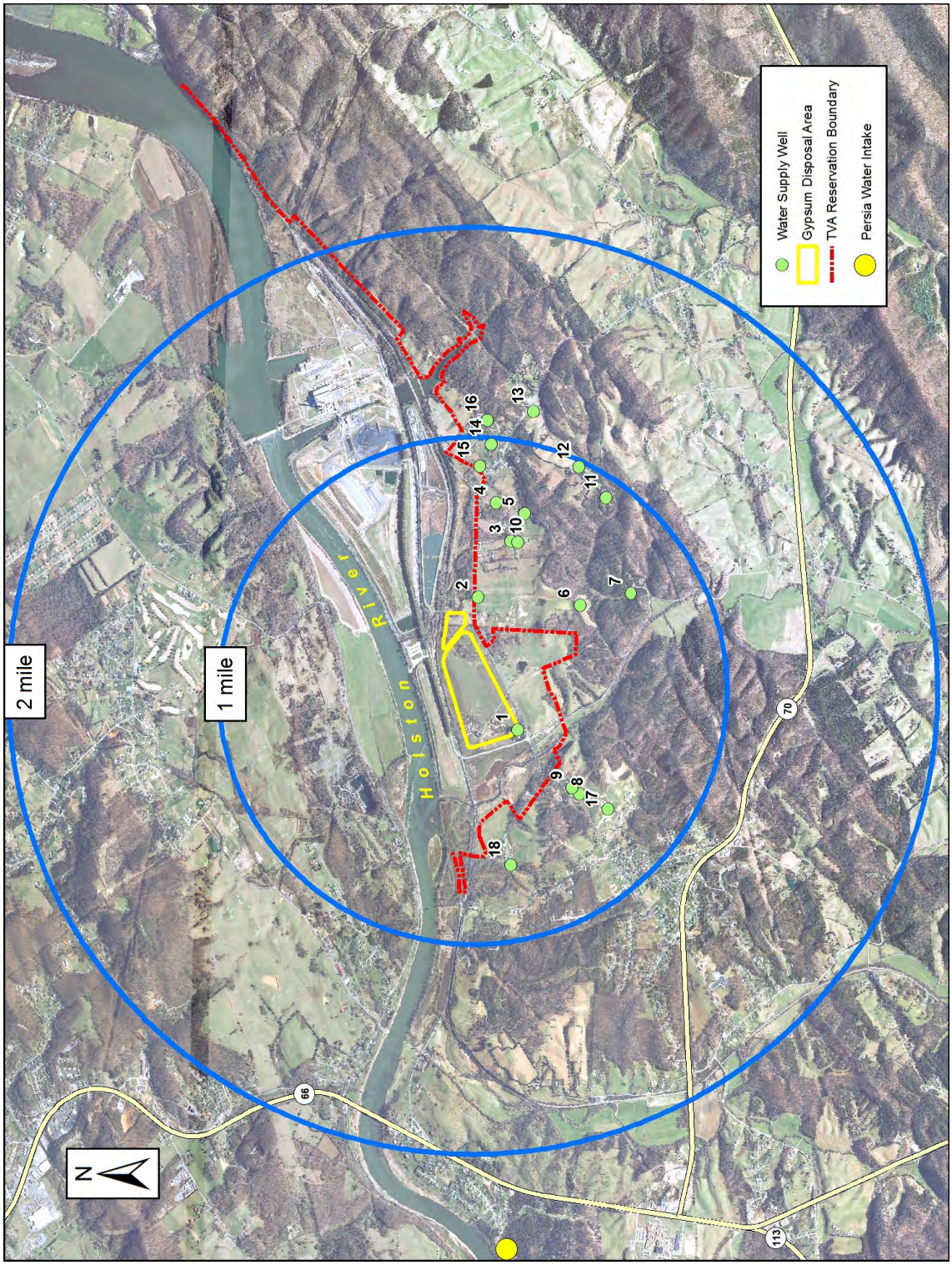


Figure 3-2. Private Water Supply Wells in Site Locality

3.4.2. Environmental Consequences

3.4.2.1. No Action Alternative

Under this alternative, the FGD system would not be constructed, and there would be no current need for construction of a coal-combustion waste disposal facility. Property intended for the disposal facility would remain undeveloped for the foreseeable future. Consequently, there would be no adverse impacts to local groundwater resources. Long-term future use of this property by TVA is uncertain at this time.

3.4.2.2. Action Alternative

The impacts of construction of the disposal facility on local groundwater resources and users are expected to be insignificant. Excavations associated with the disposal area and sedimentation pond would not encounter groundwater, as solid waste regulations require a minimum 5-foot geologic buffer between the base of the landfill and the seasonal high water table. There would be no need for excavation dewatering, and consequently no potential for adversely affecting groundwater supply wells or springs.

Operation of the disposal facility is also expected to have an insignificant impact on groundwater resources and users in the site locality. The landfill would be designed and constructed in accordance with the requirements of TDEC Rule 1200-1-7-.04 for Class II disposal facilities. A minimum buffer zone of 500 feet would be maintained between the facility and neighboring water-supply wells, and the facility would be no closer than 200 feet to perennial streams and springs. CCB leachate migration controls would include: (1) a leachate collection system; (2) a composite liner consisting of a minimum 30-millimeter FML resting on 2 feet of 10^{-7} centimeter/second compacted clay; and (3) a minimum 5-foot-thick geologic buffer between the composite liner and the seasonal high water table having maximum hydraulic conductivity of $1x10^{-6}$ centimeter/second.

The rate of leachate flux across the composite liner is expected to be extremely small and would be limited to seepage through pinhole-sized defects in the FML and/or FML-welded seams. Contaminants associated with leachate emerging through the composite liner would be expected to enter groundwater and migrate downgradient toward the Holston River and possibly Dodson Creek where they would ultimately discharge. As indicated in the previous section, there are no groundwater supply wells or springs located downgradient of the disposal facility. Furthermore, there is no potential for future development of groundwater supplies, as TVA owns all property downgradient of the facility. Consequently, there would be no adverse impacts to present or future groundwater users.

Potential impacts of leachate-affected groundwater entering the Holston River and possibly Dodson Creek have not been quantified because the design of the dry disposal facility is currently incomplete. However, in view of the stringent leachate controls (described above) that will be incorporated in the facility design, stream water quality impacts are expected to be insignificant. A quantitative evaluation of potential stream impacts will be performed later this year in connection with the facility permit application. If this evaluation alters conclusions presented here regarding stream impacts, a supplement to this EA will be prepared.

3.5. Socioeconomics

3.5.1. Affected Environment

JSF is located in Hawkins County, Tennessee, about 5 miles east-southeast of the city of Rogersville. The 2008 population of Hawkins County was 57,477, according to U.S. Census Bureau estimates (www.census.gov). This is a 7.3 percent increase over the 2000 census population count of 53,563, somewhat slower than the state rate of 9.2 percent and the national rate of 8.0 percent. Total employment in Hawkins County in 2006 was 19,958 (www.bea.gov). Employment in the county is more heavily concentrated in farming and manufacturing than in the state and the nation. In 2006, 10.8 percent of the total employment in the county was in farming and 20.6 percent in manufacturing. In comparison, statewide, 2.6 percent of jobs were in farming and 11.1 in manufacturing, while nationally 1.6 percent were in farming and 8.3 percent in manufacturing. Per capita personal income in 2006 in Hawkins County was $24,206, only 66 percent of the national average of $36,714. Statewide, it was $32,172, almost 88 percent of the national average.

3.5.2. Environmental Consequences

3.5.2.1. No Action Alternative

If the No Action Alternative were chosen, operation of the facility would not change, and therefore, there would be no socioeconomic impacts.

3.5.2.2. Action Alternative

Installation of the dry scrubber would provide some temporary jobs, with a peak number for several weeks and a smaller number for a few weeks before and after this peak period. These jobs would provide a small and temporary, but positive impact to income and employment in the county and a small positive impact to the overall local economy. After construction is completed, a small increase in permanent employment at JSF is also likely, providing a small positive impact to the economy. No impacts have been identified that would result in noticeable negative socioeconomic impacts.

3.6. Environmental Justice

3.6.1. Affected Environment

The minority population in Hawkins County is 3.7 percent of the total, according to U.S. Census Bureau 2007 estimates (http://www.census.gov/popest/estbygeo.html). This is well below the state and national levels of 22.8 and 34.0 percent, respectively. The plant and related facilities are located in Census Tract 508, Blocks 1027, 1028, 1029, 1032, and a portion of 1026 located immediately to the west of the plant. Except for Block 1026, these blocks are not inhabited. Based on the 2000 Census of Population (http://factfinder.census.gov/), Block 1026 has a total population of 119, of which five (4.2 percent) are minorities.

The poverty level in Hawkins County in 2007 was 16.4 percent, which is slightly higher than the state average of 15.8 percent and higher than the national average of 13.0 percent (http://www.census.gov/did/www/saipe/county.html). Poverty level estimates for 2007 are not available below the county level. However, the 2000 Census of Population

(http://factfinder.census.gov/) has these data down to the block group level. According to these data, the poverty level in Block Group 1, Census Tract 508, was 17.6 percent, and the level in Census Tract 508 as a whole was 16.9 percent. These levels are higher than the corresponding county level of 15.8 percent, the state level of 13.5 percent, and the national level of 12.4 percent.

3.6.2. Environmental Consequences

3.6.2.1. No Action Alternative

If the No Action Alternative were chosen, operation of the facility would not change, and therefore, there would be no socioeconomic impacts.

3.6.2.2. Action Alternative

As discussed above, population around the JSF site is relatively sparse and scattered. While the poverty level is somewhat higher than in the larger surrounding areas, the minority population is small. Any impacts to persons living in the area would be minor and not significant. Therefore, no disproportionate impacts to disadvantaged populations would be expected if the Action Alternative were chosen.

3.7. Wetlands

3.7.1. Affected Environment

The proposed disposal site and sedimentation pond is located in the Holston River subwatershed, north of Old Highway 70, adjacent to JSF on TVA property. A field visit conducted on June 27, 2007, located no wetlands within the proposed disposal site/sedimentation pond area. The property west of the project area and south of the project area were purchased concurrently with the proposed disposal site.

Wetlands are protected under Sections 404 and 401 of the CWA and by Executive Order (EO) 11990. In order to conduct specific activities in wetlands, authorization under a Section 404 Permit from the USACE may be required depending on the wetland's size and hydrologic connectivity to a navigable waterway. Section 401 gives states the authority to certify whether activities permitted under Section 404 are in accordance with state water quality standards. In Tennessee, TDEC is responsible for issuing Section 401 water quality certification. EO 11990 requires all federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities.

Wetland determinations were performed according to USACE standards (Environmental Laboratory 1987), which require documentation of hydrophytic vegetation (U.S. Fish and Wildlife Service [USFWS] 1996), hydric soil, and wetland hydrology. Broader definitions of wetlands, such as the definition provided in EO 11990 (Protection of Wetlands), the USFWS definition (Cowardin et al. 1979), and the TVA Environmental Review Procedures definition, were also considered in this review.

The TVA Rapid Assessment Method (TVARAM) was used to assess wetland condition and identify wetlands with potential ecological significance (Mack 2001). Using TVARAM,

wetlands may be classified into three categories. Category 1 wetlands are described as "limited quality waters." They are considered a resource that has been degraded, has limited potential for restoration, or is of such low functionality that lower standards for avoidance, minimization, and mitigation can be applied. Category 2 includes wetlands of moderate quality and wetlands that are degraded but exhibit reasonable potential for restoration. Category 3 generally includes wetlands of very high quality and wetlands of concern regionally and/or statewide, such as wetlands that provide habitat for species listed as threatened or endangered.

3.7.2. Environmental Consequences

Activities in wetlands are regulated under Section 404 of the CWA, as well as EO 11990. Under Section 404, the USACE established a permit system to regulate activities in "Waters of the United States," including wetlands. This requires that authorization under either a Nationwide General Permit or an Individual Permit be obtained to conduct specific activities in wetlands. Additionally, Section 401 requires water quality certification by the state for projects permitted by the federal government (Strand 1997). EO 11990 requires agencies to minimize wetland destruction, loss, or degradation, and preserve and enhance natural and beneficial wetland values, while carrying out agency responsibilities. The use of TVARAM aids TVA in guiding wetland mitigation decisions consistent with TVA's independent responsibilities under NEPA and EO 11990.

3.7.2.1. No Action Alternative

Under the No Action Alternative, the proposed disposal area would not be constructed.

3.7.2.2. Action Alternative

There were no wetlands identified within the proposed project area. Therefore, no wetlands would be affected by the construction of the proposed facility.

3.8. Aquatic Ecology

3.8.1. Affected Environment

Only one intermittent stream (a tributary to the Holston River) was documented during a June 2007 field survey of the project area, proposed disposal area, and the area identified for additional purchase. No perennial stream features were present. This stream flows across the southeastern corner of the proposed disposal area and enters the northeastern corner of the area identified for additional purchase. This stream supports aquatic life (insects) during periods of flow but was reduced to isolated pool areas, and no surface flow was evident during the field survey in June 2007. This stream does not support a fish community. Two farm ponds are present on the area identified for additional purchase. No important aquatic resources are present in either of these ponds or the intermittent stream.

The reach of the Holston River adjacent to JSF and the planned disposal area has been substantially altered from its former free-flowing character by the presence of upstream dams (primarily Fort Patrick Henry Dam), the John Sevier Detention Dam (located adjacent to JSF) and Cherokee Dam (35.5 miles downstream). The area affected by Cherokee Reservoir extends to the tailwaters of the John Sevier Detention Dam. TVA began a program to monitor the ecological conditions of its reservoirs systematically in 1990.

Reservoir (and stream) monitoring programs were combined with TVA's fish tissue and bacteriological studies to form an integrated Vital Signs Monitoring Program (VSMP). Vital signs monitoring activities focus on (1) physical/chemical characteristics of waters; (2) physical/chemical characteristics of sediments; (3) benthic macroinvertebrate community sampling; and (4) fish assemblage sampling (Dycus and Baker 2001).

Benthic Community - Benthic macroinvertebrates are included in aquatic monitoring programs because of their importance to the aquatic food chain and because they have limited capability of movement, thereby preventing them from avoiding undesirable conditions. Sampling and data analysis were based on seven parameters that include species diversity, presence of selected taxa that are indicative of good water quality, occurrence of long-lived organisms, total abundance of all organisms except those indicative of poor water quality, proportion of total abundance comprised by pollution-tolerant oligochaetes, proportion of total abundance comprised by the two most abundant taxa, and proportion of samples with no organisms present. Compared to the stations of other TVA run-of-the-river reservoirs, the monitoring sites on Cherokee Reservoir have consistently rated as "poor" to "fair." Cherokee Reservoir rated "fair" at the forebay and "poor" at the midreservoir in 2006 monitoring; ecological conditions were similar to those found in previous years (see Table 3-9). Cherokee is a relatively deep storage impoundment with a long retention time and plenty of nutrients, resulting in low dissolved oxygen levels and high chlorophyll levels. Data were collected in 2008 but have not been analyzed at the time of this assessment.

Table 3-9. Recent (1996-2006) Benthic Community Scores Collected as Part of the Vital Signs Monitoring Program in Cherokee Reservoir

Station	Mile	1996	1998	2000	2002	2004	2006
Forebay	HRM 55	Poor	Fair	Poor	Poor	Good	Fair
Midreservoir	HRM 76	Poor	Fair	Fair	Poor	Fair	Poor

Fish Community - The VSMP included annual sampling from 1993-1996 and semiannual fish sampling at Cherokee Reservoir in 1998, 2000, 2002, 2004, and 2006. Data were collected in 2008 but have not been analyzed at the time of this assessment.

The electrofishing and gill netting sampling stations correspond to those described for benthic macroinvertebrate sampling. Fish are included in aquatic monitoring programs because they are important to the aquatic food chain and because they have a long life cycle that allows them to reflect conditions over time. Fish are also important to the public for aesthetic, recreational, and commercial reasons. Monitoring results for each sampling station are analyzed to arrive at a Reservoir Fish Assemblage Index rating, which is based primarily on fish community structure and function. Also considered in the rating is the percentage of the sample represented by omnivores and insectivores, overall number of fish collected, and the occurrence of fish with anomalies such as diseases, lesions, parasites, deformities, etc. (TVA 1999). The VSMP fish community monitoring results are shown in Table 3-10. These data compare Cherokee to other Ridge-and-Valley ecoregion reservoirs. Overall results indicate that the Cherokee fish assemblage has been consistently in the "fair" range at the forebay station and in the "good" range at the midreservoir transition station since 2000.

Table 3-10. Cherokee Reservoir Fisheries Assemblage Index Scores, Based on Vital Signs Monitoring Data

Station	1993	1994	1995	1996	1998	2000	2002	2004	2006
Forebay	Good	Fair	Good	Fair	Fair	Fair	Fair	Fair	Good
Midreservoir	Good	Good	Good	Fair	Fair	Good	Fair	Good	Good

Cherokee Reservoir provides many opportunities for sport anglers. A Sport Fishing Index (SFI) has been developed to measure sport fishing quality for various species in Tennessee and Cumberland Valley reservoirs (Hickman 1999). The SFI is based on the results of fish population sampling by TVA and state resource agencies and, when available, results of angler success as measured by state resource agencies (i.e., bass tournament results and creel surveys). In 2007, Cherokee rated better than average for black crappie and striped bass; the SFI rating was below average for black basses, smallmouth bass, spotted bass, and largemouth bass (Table 3-11). There are no fish consumption advisories in effect for Cherokee Reservoir.

Table 3-11. Sport Fishing Index Scores for Selected Sport Fish Species in Cherokee Reservoir, 2007

Fish Species	2007 Score	2007 Valleywide Average
Black Basses	32	36
Black Crappie	50	34
Largemouth Bass	30	33
Smallmouth Bass	24	30
Spotted Bass	28	33
Striped Bass	46	37

3.8.2. Environmental Consequences

3.8.2.1. No Action Alternative

For the No Action Alternative, the existing conditions and trends described for aquatic life in this segment of the Holston River are expected to continue. No impacts to listed aquatic animals would occur.

3.8.2.2. Action Alternative

Construction of the scrubber equipment would occur on previously disturbed areas on the JSF plant site, and all work would be conducted using BMPs to minimize potential impacts to surface waters in the Holston River. No effects to aquatic life would occur as a result of these construction activities.

The proposed disposal area is located on an area that is primarily pastureland adjacent to the existing JSF facility. Only one intermittent stream and two farm ponds were identified during field survey. This stream supports aquatic life (insects) during periods of flow but was reduced to isolated pool areas, and no surface flow was evident during the field survey in June 2007. All activities would be conducted using BMPs to minimize potential impacts to surface waters in the Holston River.

Alteration of the intermittent stream through relocation or encapsulation to facilitate disposal at the CCB disposal area would likely occur. Applicable ARAP and USACE 404 permits would be obtained for any stream alteration, and the terms and conditions of these permits would require mitigation from these proposed activities. No measurable impacts to aquatic life in the Holston River would occur under these options.

Operational discharges from cooling systems and settling ponds associated with this facility would be permitted under the existing NPDES Permit and under the conditions of the permit would have no adverse effect on water quality in the Holston River. Therefore, the proposed actions would have only minor direct, indirect, or cumulative impacts on aquatic life in the Holston River.

Future use of the area identified for additional purchase may occur, but there is no current plan for development of this site. Any effects on aquatic life in these areas would be discussed in future project-specific assessments.

3.9. Aquatic Threatened and Endangered Animal Species

3.9.1. Affected Environment

Data from the TVA Natural Heritage database indicated that several state-listed and federally listed aquatic animal species are reported from the Holston River and its tributaries upstream of JSF and the John Sevier Detention Dam (Table 3-12). The records for the federally listed purple bean mussel are from Beech Creek, a tributary to the Holston River that flows into the John Sevier Detention Reservoir at approximately HRM 108.7. No federally designated critical habitat segments are present within the project area. However, Beech Creek Unit Seven Designated Critical Habitat for five federally listed mussels occurs within 4 river miles upstream from JSF. No impacts to this designated critical habitat would occur because of its location upstream from the project site.

Table 3-12. Threatened and Endangered State- and Federally Listed Aquatic Animal Species Reported From the Holston River and its Tributaries Upstream of John Sevier Fossil Plant

Common Name	Scientific Name	Federal Status	State Status (Rank)
Fish			
Blotchside logperch	*Percina burtoni*	-	NMGT (S2)
Spotfin chub	*Cyprinella monacha*	THR	THR (S1)
Tangerine darter	*Percina aurantiaca*	-	NMGT (S3)
Tennessee dace	*Phoxinus tennesseensis*	-	NMGT (S3)
Mussel			
Cumberland Bean	*Villosa trabalis*	END	END (S1)
Purple bean	*Villosa perpurpurea*	END	END (S1)

- = Not applicable
Status code: END = Endangered; NMGT = In need of management; THR = Threatened
Rank: S1 = Extremely rare and critically imperiled in the state; S2 = Very rare and imperiled within the state; S3 = Rare or uncommon

Due to changes caused by impoundment of the river, suitable habitat is no longer present for the purple bean or any of the other state-listed or federally listed species in the main stem of the Holston River from Cherokee Dam (HRM 52.3) upstream to the upper end of the John Sevier Detention Reservoir (at HRM 118), and none of these species are likely to occur in the vicinity of JSF (HRMs 106-107). Several additional federally listed species were once present in the Holston River adjacent to and downstream of JSF but have been eliminated from this portion of their former range. These species include the green blossom pearly mussel, fine-rayed pigtoe, spiny river snail, turgid blossom pearly mussel, birdwing pearly mussel, and Cumberland monkeyface.

While the potential for impacts to sensitive aquatic resources downstream of Cherokee Dam (50+ river miles downstream of JSF) is extremely low, populations of several sensitive aquatic species are known to be present in the Holston River below Cherokee Dam (Table 3-13).

Table 3-13. Threatened and Endangered State- and Federally Listed Aquatic Animal Species Reported From the Holston River and its Tributaries Downstream of Cherokee Dam (50+ River Miles Downstream of John Sevier Fossil Plant)

Common Name	Scientific Name	Federal Status	State Status (Rank)
Fish			
Blue sucker	*Cycleptus elongatus*	THR	NMGT (S2)
Snail darter	*Percina tanasi*	THR	THR (S1)
Tennessee dace	*Phoxinus tennesseensis*	-	NMGT (S3)
Mussels			
Pink mucket	*Lampsilis abrupta*	END	END (S1)
Purple bean	*Villosa perpurpurea*	END	END (S1)
Sheepnose	*Plethobasus cyphyus*	CAND	NOST (S2S3)

- = Not applicable
Status code: CAND = Candidate for federal listing; END = Endangered; NMGT = In need of management; NOST = No legal status, but tracked by the Tennessee Natural Heritage Program; THR = Threatened
Rank: S1 = Extremely rare and critically imperiled in the state; S2 = Very rare and imperiled within the state; S3 = Rare or uncommon; S#S# = Occurrence numbers are uncertain

A brief description of the above-listed species can be found below. Habitat requirements for fish are as described in Etnier and Starnes (1993) and for mussels as described in Parmalee and Bogan (1998).

The **blotchside logperch** prefers large to medium-sized rivers and creeks with areas of large gravel and small cobble, low turbidity, and moderate current. It can usually be found in depths of 1.5 feet or more. Spawning occurs from April to May. It is endemic to the Tennessee and Cumberland River drainages.

The **blue sucker** inhabits relatively deep, swift waters over firm substrates in larger rivers. It occurs throughout the Mississippi River basin and Gulf coastal drainages from the Mobile basin to the Rio Grande River.

The **cumberland bean** occurs in small rivers and streams in gravel or sand substrate with fast current in riffle areas. It is restricted to a very few streams and rivers in the upper Cumberland River and its tributaries in Kentucky.

The **pink mucket** is typically a big river species, but occasionally individuals become established in small to medium-sized tributaries of large rivers. The species inhabits rocky bottoms with swift current usually in less than 3 feet of water.

The **purple bean** occurs in substrate of coarse sand and gravel with some silt, in moderate to strong current with rock piles and large flat rocks. Suitable fish host include the sculpin (*Cottus sp.*), greenside darter (*Etheostoma blennioides*), and fantail darter (*E. flabellare*).

The **tangerine darter** is restricted to clearer portions of large to moderate-sized headwater tributaries in the upper Tennessee River system, upstream from the Hiwassee River system. The habitat typically occupied by this fish is deeper riffles, runs, and pools with large rubble, boulder, and bedrock substrates.

The **Tennessee dace** is restricted to small, low-gradient woodland tributaries in the upper Tennessee River drainage. This species can be found in shallow pools with undercut banks and debris.

The **snail darter** is restricted to the upper Tennessee River system, where it occurs in parts of the main river channel and in the lower reaches of some tributaries.

The **spotfin chub** is an obligate inhabitant of clear upland rivers associated with swift currents and boulder substrate. However, juveniles can be found over small gravel substrate with moderate current.

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

3.9.2. Environmental Consequences

3.9.2.1. No Action Alternative

For the No Action Alternative, the existing conditions and trends described for aquatic life in this segment of the Holston River are expected to continue. No impacts to listed aquatic animals would occur.

3.9.2.2. Action Alternative

Because this alternative would not result in significant impacts to surface waters, and no protected aquatic animals are present in the vicinity of the disposal area, no direct, indirect, or cumulative impacts to protected aquatic species or their habitat would occur.

3.10. Prime Farmland

3.10.1. Affected Environment

Prime farmland soils, as defined by the U.S. Department of Agriculture, are those soils that have the best combination of physical and chemical properties for production of agricultural crops. The concern that continued conversion of prime farmland to nonagricultural use would deplete the nation's resource of productive farmland prompted creation of the 1981 *Federal Farmland Protection Policy Act.* The act set guidelines that require all federal agencies to evaluate land prior to permanently converting it to nonagricultural land use. Form AD 1006, "Farmland Conversion Impact Rating," is required to be completed with assistance from the Natural Resources Conservation Service (NRCS) before an action is taken.

All of the soils on the two sites under consideration for possible disposal of scrubber CCB are currently being used for cattle production. Prime farmland soils comprise 40 percent and 36 percent of these soils in proposed disposal Sites 1 and 2, respectively (Table 3-14). The soils have formed in alluvial deposits of sandstone, shale, and limestone material deposited by the Holston River. Most are considered very deep soils and are either moderately well drained or well-drained soils. The remainder of the project area is in an industrial setting. Table 3-14 lists the prime farmland soils on each site and their total acreage.

Table 3-14. Prime Farmland Soil Summary

Soil Survey Area Map Unit Symbol	Map Unit Name	Acres of Soil in Site 1	Acres of Soils in Site 2
CoB	Cloudland loam, 2 to 5 percent slopes	3.9	10.8
Ha	Hamblen silt loam	2.7	0
HoB	Holston loam, 2 to 5 percent slopes	22.5	12.0
Me	Melvin silt loam	1.9	0
Ta	Taft silt loam	2.6	2.9

Source: Soil Survey of Hawkins and Hancock County, Tennessee (Moore 1979)

3.10.2. Environmental Consequences

3.10.2.1. No Action Alternative

Under the No Action Alternative, the landfill would not be constructed, and therefore, there would be no farmland conversion.

3.10.2.2. Action Alternative

Since the proposed action will permanently convert this land to nonagricultural use, a Form AD 1006, "Farmland Conversion Impact Rating," was completed with assistance from the NRCS. The Farmland Conversion Impact Rating uses several criteria to assess the relative detrimental impact from the loss of prime farmland. A total score of 160 or more out of a possible maximum of 260 indicates that the prime farmland is valuable enough to merit protection under the *Federal Farmland Protection Policy Act*, i.e., requiring justification for the farmland conversion or consideration of alternative locations.

Clarence Conner, NRCS soil scientist in Anderson County, Tennessee, completed the NRCS section of the Farmland Conversion Impact Rating, assigning a rating of 77 for Site 1 and 74 for Site 2 (see Appendix A). These ratings are out of a possible maximum of 100 for the relative value of the prime farmland soils in the project area. Because the project will not necessarily lead to the conversion of other nearby farmland to nonfarm use or have an adverse impact on supporting agricultural services, the site assessment scores assigned by the TVA prime farmland staff for the two sites are 77 and 74, respectively. The sums of these two scores yield a total impact rating of 150 for Site 1 and 146 for Site 2. Each of these total rating scores falls below the score of 160 required to warrant consideration of other alternatives.

3.11. Terrestrial Ecology (Animals)

3.11.1. Affected Environment

Agricultural practices have heavily impacted the area surrounding JSF. The majority of the proposed project area (76 percent) consists of early successional habitats dominated by herbaceous vegetation. Fragments of forest exist along roads, fencerows, and stream corridors, comprising 18 percent of the project area, and the remainder is in an industrial setting. The forested habitats included both mixed evergreen-deciduous forest and deciduous forest. The deciduous forest had both upland and bottomland components.

Early successional habitats consist of pastures, hayfields, and transmission line rights-of-way. These habitats support many common species including common yellowthroat, field sparrow, song sparrow, Indigo bunting, eastern meadowlark, wild turkey, red-winged blackbird, Carolina wren, mourning dove, white-tailed deer, eastern cottontail, and striped skunk. Reptiles found in this habitat include black racer and black rat snake.

Stands of mixed evergreen-deciduous trees are scattered along fencerows and along the slopes adjacent to a few creek bottoms. Remaining forested fragments are young in age. Both forests types are highly fragmented, show disturbances from both cattle and previous agricultural practices, and provide poor quality overall habitat for terrestrial animals. Two wetlands were noted in these areas. Several common birds were observed in both forest types including tufted titmouse, eastern towhee, northern cardinal, yellow-billed cuckoo, blue jay, American crow, American goldfinch, eastern phoebe, downy woodpecker, blue-gray gnatcatcher, and Carolina chickadee. Eastern chipmunk and gray squirrel are also observed in the forested areas. Common amphibians and reptiles in this habitat include slimy salamanders, eastern box turtle, copperhead, and eastern garter snake. Low-gradient streams and wetlands in this forested habitat provide habitat for American woodcock, northern cricket frog, upland chorus frog, dusky salamander, and southern two-lined salamander.

There is a record of one cave, but no heron colonies, within 3 miles of the proposed project area. The cave locality is greater than 1 mile from the project area. No other unique habitats were observed during field investigations. The project area does not contain any designated critical habitat for federally protected species.

3.11.2. Environmental Consequences

3.11.2.1. No Action Alternative

Under the No Action Alternative, the proposed actions would not occur. Agricultural practices and fossil plant operations would continue as they currently do in the project area. There would be no project-related impacts to wildlife populations or habitats due to the selection of this alternative.

3.11.2.2. Action Alternative

Under the Action Alternative, TVA would install a scrubber to reduce SO_2 emissions by 95 percent. The CCBs would be stored in the proposed disposal area with a runoff control pond. The proposed project area would be converted from a landscape of primarily early successional habitat with small forest fragments, to an industrial disposal area, providing little habitat for terrestrial wildlife. The existing habitats in the project area are disturbed by agricultural practices and are similar to the surrounding landscape. Wildlife currently using the project area would be displaced by the landfill but would not be significantly impacted, as individuals would be able to move into nearby habitats in the surrounding landscape. The benefits of the reduction in SO_2 emissions would improve the air quality in this region, benefiting local and regional populations of wildlife and their habitats. This alternative is not expected to directly, indirectly, or cumulatively result in significant impacts to terrestrial wildlife or their habitats.

3.12. Terrestrial Threatened and Endangered Species (Animals)

3.12.1. Affected Environment

Two federally listed and one federally protected terrestrial animal species are reported from Hawkins County, Tennessee. One state-listed species is reported in the vicinity (Table 3-15).

Table 3-15. Federally Listed or Protected Terrestrial Animal Species Reported From Hawkins County and State-Listed Terrestrial Animal Species Reported From Within 3 Miles of the Project Site

Common Name	Scientific Name	Federal Status	State Status (Rank)
Birds			
Bald Eagle	*Haliaeetus leucocephalus*	PROT	NMGT (S3)
Mammals			
Gray Bat	*Myotis grisescens*	END	END (S2)
Indiana Bat	*Myotis sodalis*	END	END (S1)
Southern Bog Lemming	*Synaptomys cooperi*	-	NMGT (S4)

- = Not applicable
Status code: END = Endangered; NMGT = In need of management; PROT = Protected by the *Bald and Golden Eagle Protection Act*
Rank : S1 = Critically imperiled, S2 = Very rare or imperiled, S3 = Rare or uncommon, S4 = Abundant

Bald eagles typically nest in forested habitats near large bodies of waters, such as reservoirs and rivers, where they forage. Populations of bald eagles have gradually

increased in northeast Tennessee. Bald eagles have been reported from localities approximately 1.8, 11, and 20 miles from the project site. Recently, the species has been observed foraging along the Holston River near the fossil plant. Suitable bald eagle nesting habitat does not occur at the proposed project site.

Gray bats roost in caves year-round and typically forage over open water habitats including streams, rivers, and reservoirs. Three caves used by gray bats occur approximately 7, 12, and 21 miles from the project area. No caves exist at the project area, but the species likely forages nearby on the Holston River.

Indiana bats roost in caves during the winter and typically form summer roosts under the bark of dead or dying trees (Menzel et al. 2001). Their summer roosts are found in mature forests with an open understory, usually near water (Romme et al. 1995). The species has been reported from a cave approximately 12 miles from the project area. No suitable roosting habitat for this species exists in the project area.

Southern bog lemmings are found in a variety of habitats from bogs and wet meadows to forested habitats, but usually preferred habitat includes a thick herbaceous or humus layer. Moderately suitable habitat for this species exists at wetlands within the project area.

3.12.2. Environmental Consequences

3.12.2.1. No Action Alternative

Under the No Action Alternative, the proposed actions would not occur. Agricultural practices and fossil plant operations would likely continue as they currently do in the project area. There would be no project-related impacts to protected wildlife populations or habitats due to TVA actions.

3.12.2.2. Action Alternative

Bald eagles recently began nesting and foraging in proximity to JSF. The proposed actions are not expected to result in impacts to bald eagles. The project site is well beyond the 660-foot buffer zone recommended by the *National Bald Eagle Management Guidelines* developed by the U. S. Fish and Wildlife Service. Construction and operation of the scrubbers is not expected to result in direct or cumulative impacts to eagles that nest and forage near the project site. Improved air quality resulting from the operation of the scrubbers would indirectly benefit this and other species in the region.

There is no suitable roosting habitat for either species of bat at the project site. The proposed actions would not result in impacts to suitable foraging habitat for gray bats in the Holston River.

Suitable habitat for southern bog lemming exists in both the project area and the nearby landscape. The proposed actions in the project area may displace some individuals into nearby areas, but would not measurably affect populations of this species.

No designated critical habitat for federally listed species exists within the project area. The reduced SO_2 emissions will result in improved air quality in the region, benefiting listed species and their habitats in the region. The proposed actions are not expected to result in

direct, indirect, or cumulative impacts to federally or state-listed terrestrial animal species or their habitats.

3.13. Terrestrial Ecology (Plants)

3.13.1. Affected Environment

JSF is located in the Southern Shale Valleys, a subdivision of the Ridge and Valley ecoregion, which occurs between the Blue Ridge Mountains on the east to the Cumberland Plateau on the west and is a relatively low-lying region made up of roughly parallel ridges and valleys that were formed through extreme folding and faulting events in past geologic time (Griffith et al. 1998). The Southern Shale Valleys consist of lowlands, rolling valleys and slopes and hilly areas dominated by shale materials. Small farms and rural residences occur throughout where land is used for grazing or farming tobacco, corn, or hay (Griffith et al. 1998).

The vegetative (physiognomic) classes observed within the project footprint and surrounding areas of JSF were herbaceous vegetation, evergreen-deciduous forest and deciduous woodlands. Much of the forested areas observed were scattered along fencerows and stream corridors.

Herbaceous vegetation: Approximately 86 percent of the project area is pastures, hayfields, or transmission line rights-of-way. Common species found are Bermuda grass, blackberries, butterfly weed, chicory, daisy fleabane, Johnson grass, narrowleaf plantain, perennial ryegrass, orchard grass, Queen Anne's lace, smooth brome grass, tall fescue, and yellow sweet and white sweet clover. In addition, several nonnative species are present such as crown vetch, Japanese honeysuckle, Japanese stilt grass, and sericea lespedeza.

Industrial setting: Approximately 7 percent of the project area is comprised of an industrial setting. The major components of the FGD system would be installed here, as well as in the laydown, fabrication, and parking areas.

Evergreen-deciduous forests: The evergreen-deciduous forests make up 5 percent of the surveyed area and are scattered along fencerows and a few mesic slopes that grade into creek bottoms. Common woody species found in the evergreen-deciduous forests are American beech, American elm, black gum, black locust, black oak, black walnut, eastern red cedar, flowering dogwood, loblolly pine, mimosa, mockernut hickory, northern red oak, Russian olive, southern red oak, sweetgum, silver maple, sugar maple, tulip poplar, Virginia pine, and white ash. Vines such as blackberries, greenbriers, Japanese honeysuckle, multiflora rose, passion flower, poison ivy, summer grape, trumpet creeper, Virginia creeper, and wood rose are common. In the herb layer, black-eyed susan, Christmas fern, iron weed, mayapple, pokeberry, white avens, white crownbeard, and yarrow are common.

Deciduous woodlands: The remaining 2 percent of the project area occurs as deciduous woodlands that are present along stream corridors and within a palustrine forest that included a small wetland. Woody species occurring within deciduous woodlands are American sycamore, black willow, green ash, pawpaw, southern catalpa, spicebush, silky dogwood, tag alder, and winged elm. Herbaceous species include American water plantain, deer-tongue, fowl manna grass, fox sedge, Jack-in-the-pulpit, Japanese stilt grass,

jewel weed, jumpseed, leafy bulrush, little brown jug, lizard tail, path rush, soft rush, and southern lady fern.

There are no uncommon terrestrial plant communities, designated critical plant habitat, or otherwise noteworthy botanical areas occurring on or adjacent to the project area.

3.13.2. Environmental Consequences

3.13.2.1. No Action Alternative

Adoption of the No Action Alternative would not result in any project related impacts to the terrestrial ecology of the region. A major portion of the area is agricultural and will continue to be farmed or used as pasturelands for grazing livestock.

3.13.2.2. Action Alternative

The terrestrial vegetation communities present on both proposed sites are common and representative of the region; as a result, the impacts of the proposed Action Alternative are expected to be insignificant.

3.14. Invasive Terrestrial Species (Plants)

3.14.1. Affected Environment

EO 13112 defines an invasive nonnative species as any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem and whose introduction does or is likely to cause economic or environmental harm or harm to human health (U.S. Department of Agriculture 2007). Invasive nonnative plants infest under and beside forest canopies and occupy small forest openings, increasingly eroding forest productivity, hindering forest use and management activities, and degrading diversity and wildlife habitat. They occur as trees, shrubs, vines, grasses, ferns, and forbs. Some have been introduced into this country accidentally, but most were brought here as ornamentals or for livestock forage. These exotic plants arrived without their natural predators of insects and diseases that tend to keep native plants in natural balance and are able to outcompete native vegetation for available resources such as nutrients, space, and water (Miller 2003).

Essentially the entire proposed project is on land in which the native vegetation has been extensively altered as a result of previous land use history. Common invasive exotic plant species occurring within the project area include Chinese privet, crown vetch, Japanese honeysuckle, Japanese stilt grass, Johnson grass, mimosa, multiflora rose, Russian olive, and sericea lespedeza. All of these species have the potential to adversely impact the native plant communities because of their potential to spread rapidly and displace native vegetation. All of these invasive species are Rank 1 (severe threat) and are of high priority to TVA (James 2002).

3.14.2. Environmental Consequences

3.14.2.1. No Action Alternative

Adoption of the No Action Alternative would not result in any project-related impacts due to the introduction or spread of invasive terrestrial plant species. Under the No Action Alternative, the landfill would not be constructed for disposal of CCB and current management practices on TVA lands associated with the proposed project would continue to prevent the spread of exotic/invasive species.

3.14.2.2. Action Alternative

Ninety-three percent of the project footprint occurs on lands with previous and current levels of disturbance to the native plant communities in the form of managed agricultural practices (farming and pastures). Therefore, with implementation of standard BMPs for revegetating disturbed lands (Muncy 1999 and James 2002) in the areas surrounding the landfill, no significant impacts are expected as a result of the proposed Action Alternative to the spread of invasive species.

3.15. Terrestrial Threatened and Endangered Species (Plants)

3.15.1. Affected Environment

The TVA Natural Heritage database indicated there are no federally listed and one state-listed species of special concern (American barberry) recorded from within 5 miles and five species within 10 miles of JSF. No federally listed taxa are known to occur in Hawkins County, Tennessee (Table 3-16). The two records of American barberry that are reported within 5 miles of the project are considered to be historical records. Current rankings of federally and state-listed species were verified through NatureServe Web site (NatureServe 2008).

TVA biologists conducted a field survey on June 26, 2007, and no state- or federally listed plant species or habitats to support these rare taxa were observed.

Table 3-16. State-Listed Plant Species Reported From Within 10 Miles of the John Sevier Fossil Plant in Hawkins County, Tennessee

Common Name	Scientific Name	Federal Status	State Status (Rank)
American barberry	*Berberis canadensis*	-	SPCO (S2)
American ginseng	*Panax quinquefolius*	-	S-CE (S3S4)
Appalachian bugbane	*Cimicifuga rubifolia*	-	THR (S3)
Pink lady-slipper	*Cypripedium acaule*	-	E-CE (S4)
Purple milkweed	*Asclepias purpurascens*	-	THR (S1)

- = Not applicable
Status code: E-CE = Endangered commercially exploited; S-CE = Special concern, commercially exploited; SPCO = Special concern; THR = Threatened
Rank: S1=Critically imperiled with less than five occurrences; S2 = Imperiled with six to 20 occurrences; S3 = Rare or uncommon with 21 to 100 occurrences; S#S#=occurrence numbers are uncertain

3.15.2. Environmental Consequences

3.15.2.1. No Action Alternative

Adoption of the No Action Alternative would not result in any project-related impacts to endangered or threatened plant species in the areas of the proposed landfill. Under the No Action Alternative, the landfill would not be constructed for disposal of CCB. Therefore, no project-related impacts to rare plant species would result from this action.

3.15.2.2. Action Alternative

One state-listed species of special concern (American barberry) is historically known from rocky woodlands within 5 miles of JSF, and four other state-listed plant species are recorded from within 10 miles of the project area. As a result of a field survey in June 2007, no sensitive plant species or habitat to support those species were observed within the two proposed landfill sites for CCB disposal. Therefore, the proposed action would have no impacts to these botanical resources.

3.16. Cultural Resources

3.16.1. Affected Environment

East Tennessee has been an area of human occupation for the last 12,000 years. This includes five broad cultural periods: Paleo-Indian (11,000-8000 BC), Archaic (8000-1600 BC), Woodland (1600 BC-AD 1000), Mississippian (AD 1000-1700), and Historic (AD 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. Hawkins County was originally established as a North Carolina county on January 6, 1787. At this time, the county consisted of what are now Hancock, Grainger, Jefferson, Knox, Roane, Meigs, and Hamilton counties. Development around the Hawkins Court House soon became known as the town of Rogersville. In 1858, the East Tennessee and Virginia Railroad used slave labor to lay the first tracks through an area called Bulls Gap, which is located near Rogersville. During the Civil War, the strategic location of the tracks made Bulls Gap the frequent scene of fighting between Union and Confederate forces. After the war, the railroad dominated the economic life of Bulls Gap. From the 1840s through the 1870s, the marble industry was developed in Hawkins County, and the area became famous for its pink and red variegated marble. Marble from Hawkins County was used in the Washington Monument in Washington, D.C., as well as the balustrades and stairways of the Capitol. Today the principal sources of farm income are beef cattle and burley tobacco. In 1791, the town of Rogersville printed Tennessee's first newspaper, *The Knoxville Gazette* (Price 1998).

The archaeological area of potential effect for the project was determined in consultation with the State Historic Preservation Officer (SHPO) to be the footprint for the FGD system, and all infrastructure such as equipment and materials laydown area, a dry fly ash disposal area, and land that was purchased during the undertaking but has no designated use. The area of potential effect for architectural resources includes an 0.805-kilometer (0.5-mile) area surrounding the proposed FGD system, as well as any areas where the project would alter existing topography or vegetation in view of a historic resource.

The archaeological survey consisted of Phase II testing at the CCB disposal area on Sites 40HW268 and 40HW269. Site 40HW268 consists of the remains of a residence, a brick well house, and a scatter of historic artifacts dating to the late 19th to 20th century. Due to the lack of integrity, the disturbance associated with the razing of the house, and the lack of research potential, 40HW268 is considered ineligible for listing in the National Register of Historic Places (NRHP). 40HW269 is the remains of a late 18th century log cabin limestone foundation. Due to the lack of integrity and research potential, 40HW269 is considered ineligible for listing in the NRHP.

The architectural survey consisted of assessing the Charles Sanders' farm where the CCB disposal area would be located and the JSF. Initially both the Charles Sanders' farm and JSF were recommended as potentially eligible for listing in the NRHP. Further assessment and documentation was requested in order to make a final NRHP determination. After further review, the Charles Sanders' farm is considered not eligible for listing in the NRHP due to its lack of architectural distinction and loss of integrity caused by modern alterations and damage. JSF is recommended as eligible for listing in the NRHP for its significance in electrical development following World War II and as a representative example of International Style architecture.

3.16.2. Environmental Consequences

3.16.2.1. No Action Alternative

TVA has determined that the No Action Alternative would not have an adverse effect on any historic properties that are potentially eligible or currently listed in the NRHP.

3.16.2.2. Action Alternative

Phase II testing at the CCB disposal area determined that Sites 40HW268 and 40HW269 are considered not eligible for the NRHP due to lack of integrity and research potential. The Charles Sanders' farm is considered not eligible for the NRHP due to its lack of architectural distinction and loss of integrity caused by modern alterations and damage. JSF is recommended as eligible for listing in the NRHP under Criteria A and C for its significance in electrical development following World War II and as a representative example of International Style architecture. The proposed undertaking would have a visual effect on JSF; however, it would not be adverse, because the visual setting of the JSF has already been altered.

TVA has determined that the proposed undertaking would not have an adverse affect on any historic properties that are potentially eligible or currently listed in the NRHP. On December 4, 2008, TVA received a letter from the SHPO concluding that the project would not adversely affect any property that is eligible for listing in the NRHP. This letter is in Appendix A of this EA.

3.17. Visual Resources

3.17.1. Affected Environment

Visual resources are evaluated based on existing landscape character, distances of available views, sensitivity of viewing points, human perceptions of landscape beauty/sense

of place (scenic attractiveness), and the degree of visual unity and wholeness of the natural landscape in the course of human alteration (scenic integrity).

The proposed project area is located in a rural portion of Hawkins County, Tennessee, near the small settlement of McCloud. The surrounding topography ranges from gently sloping near the banks of the Holston River to moderately and steeply sloping ranges at Piney Mountain to the south and Town Knobs to the north. Dense vegetation is visible along the slopes leading up from the valley floor to the hilltops above. Agricultural operations, as well as scattered private residences and rural farmsteads are visible toward the banks of the Holston to the south. To the north, and slightly obscured from view, residential development increases in density along the banks and farther northward to the nearby town of Rogersville.

The existing JSF stacks, as well as the 500-kilovolt transmission lines leaving the plant site to the east, are dominant elements in the landscape for recreational river users, shoreline and near-shore residents, and motorists traveling on nearby roadways within the foreground (0 feet to 0.5 mile from the observer) and middleground (0.5 mile to 4 miles from the observer) viewing distances. Within the immediate vicinity of the plant site, the landscape character is pronouncedly industrial. Plant employees, visitors, and visitors to the recreation area, located just off the plant access road and to the west of a large ash disposal area, currently have views of taller elements within the plant site. Views along portions of the access roadway to the south are precluded due to changes in elevation and existing vegetation. Views are similar to the north, before reaching the ash disposal areas as the topography and vegetation moderate and expansive views of the plant are available.

The scenic attractiveness of the proposed project area is common to minimal, and the scenic integrity is low.

3.17.2. Environmental Consequences

3.17.2.1. No Action Alternative

Under the No Action Alternative, TVA would not implement technologies in order to reduce SO_2 emissions at JSF. The scenic attractiveness would initially remain common, and the scenic integrity would remain low. However, there would be a continued probability that scenic attractiveness and viewing distances would be adversely impacted through typical effects attributable to SO_2 emissions such as increases in regional haze and foliar damage in forestlands. These potential impacts, although generally accepted, are difficult to model singularly as they relate to SO_2 emissions. It is anticipated that visibility and viewing distance would remain unchanged or decrease to 1 deciview through 2020. A deciview is a measure of visibility that captures the relationship between air pollution and human perception of visibility. When air is free of the particles that cause visibility degradation, the Deciview Haze Index is zero. The higher the deciview level, the poorer the visibility; a 1 deciview change translates to a just-noticeable change in visibility for most individuals.

3.17.2.2. Action Alternative

Under the Action Alternative, TVA would construct and operate the FGD system as described in Section 2.1. This would result in the addition of several large structures within the plant site, parking for employees and contractors, acquisition of adjacent property for

future CCB disposal, use of equipment and material staging areas, transportation of reagent via truck, construction of a sedimentation pond, new disposal area on site, and construction of a new access road within the plant site.

These project elements would remain in context with the existing industrial landscape character surrounding the JSF site. Recreational river users and near-shore residents would have views of the proposed scrubber system from within the foreground and middle ground viewing distances. Views of new structures would exist with existing plant structures in the background, causing elements of new construction to appear as part of the larger land use. Motorists traveling nearby roadways would additionally have views of proposed construction in context with the existing landscape.

From greater distances into the middleground and background (4 miles and beyond from the observer), motorists and residents would notice an increase in the amount of vehicular activity associated with construction of the scrubber system due to the increases of employee/contractor traffic and that of rail and/or truck traffic for the delivery of limestone.

Upon completion of the construction activities, nearby residents, recreational river users, and motorists would potentially have views of a water vapor plume that would occur during process operations. This would occur only during process operations and would therefore be temporary in duration.

Long-term impacts would potentially be beneficial, as the scrubber system would reduce SO_2 emissions by approximately 95 percent. This would have a positive impact on surrounding mature forestlands and, as a part of additional regional and national measures to reduce emissions and improve air quality, is projected to increase visibility, resulting in a projected decrease of up to 3 deciviews through 2020.

The construction and operation of a scrubber system at JSF, as proposed, would not result in significant impacts to the existing visual resources.

3.18. Natural Areas

3.18.1. Affected Environment

The TVA Natural Heritage database indicated that the proposed action is not within, adjacent to, or within 3 miles of a natural area or ecologically significant site. No NRI streams or Wild and Scenic rivers are in the vicinity of the proposed action.

3.18.2. Environmental Consequences

3.18.2.1. No Action Alternative

Because no natural areas, NRI streams, or Wild and Scenic rivers are within 3 miles of the proposed action, no impacts to these features are anticipated from the No Action Alternative.

3.18.2.2. Action Alternative

Because no natural areas, NRI streams, or Wild and Scenic rivers are within 3 miles of the proposed action, no impacts to these features are anticipated from the proposed Action Alternative.

3.19. Summary of TVA Commitments and Proposed Mitigation Measures

- Mitigation would be provided for the loss of an intermittent steam for the construction of the new landfill to meet permitting requirements under the *Clean Water Act* (CWA), the *Tennessee Water Quality Control Act*, U.S. Army Corps of Engineers (USACE) Section 404 Permit, and Aquatic Resource Alteration Permit (ARAP).

- The CCB disposal area would have a maximum of 10 acres of gypsum exposed at any given time. The other areas would have either temporary or permanent cover, which would reduce the concentration of suspended solids and trace elements in the storm water runoff.

- The sedimentation pond would be managed in a manner that would promote settling of suspended solids, and controls such as turbidity curtains would be utilized as needed prior to discharge into the Holston River.

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CHAPTER 4

4.0 LIST OF PREPARERS

4.1. NEPA Project Management

Dave W. Robinson

Position:	Senior NEPA Specialist
Education:	B.S., Biology-Geology
Experience:	26 years in Permitted Environmental Programs
Involvement:	NEPA Compliance and Document Preparation

Bruce L. Yeager

Position:	NEPA Policy Program Manager
Education:	M.S., Zoology (Ecology); B.S., Zoology (Aquatic Ecology)
Experience:	32 years in Environmental Compliance for Water, Air, and Land Use Planning; Environmental Business Services
Involvement:	NEPA Compliance

4.2. Other Contributors

Anne M. Aiken

Position:	Senior Environmental Engineer
Education:	M.S., Environmental Engineering; B.A., Environmental Studies
Experience:	18 years in Water Quality and Environmental Engineering Services
Involvement:	Surface Water and Industrial Wastewater

Mary E. Jacobs

Position:	Atmospheric Analyst
Education:	B.S., Mathematics
Experience:	18 years in Air Quality Analysis
Involvement:	Air Resources

J. Markus Boggs

Position:	Hydrologist
Education:	M.S., Hydrology; B.S., Geophysics
Experience:	34 years in Hydrologic Investigation and Analysis for Environmental and Engineering Applications
Involvement:	Groundwater

John (Bo) T. Baxter

Position:	Senior Aquatic Biologist
Education:	M.S. and B.S., Zoology
Experience:	18 years in Protected Aquatic Species Monitoring, Habitat Assessment, and Recovery; 9 years in Environmental Review
Involvement:	Aquatic Ecology/Threatened and Endangered Species

Travis Hill Henry

Position:	Terrestrial Zoologist Specialist
Education:	M.S., Zoology; B.S., Wildlife Biology
Experience:	18 years in Zoology, Endangered Species, and NEPA Compliance
Involvement:	Terrestrial Ecology, Threatened and Endangered Species

Patricia B. Cox

Position:	Senior Botanist
Education:	Ph.D., Botany (Plant Taxonomy and Anatomy); M.S. and B.S., Biology
Experience:	30 years in Plant Taxonomy at the Academic Level; 4 years with TVA Heritage Project
Involvement:	Terrestrial Ecology, Invasive Plant Species, and Threatened and Endangered Species

James H. Eblen

Position:	Contract Economist
Education:	Ph.D., Economics; B.S., Business Administration
Experience:	40 years in Economic Analysis and Research
Involvement:	Socioeconomics and Environmental Justice

P. Alan Mays

Position:	Environmental Scientist
Education:	B.S., Plant and Soil Science
Experience:	31 years in Soil-Plant-Atmospheric Studies
Involvement:	Prime Farmland

W. Chett Peebles

Position:	Specialist, Landscape Architect
Education:	Bachelor of Landscape Architecture; Registered Landscape Architect
Experience:	20 years in Site Planning and Visual Assessment
Involvement:	Visual Resources

Kim Pilarski-Brand

Position:	Senior Wetlands Biologist
Education:	M.S., Geography, Minor Ecology
Experience:	13 years in Wetlands Assessment and Delineation
Involvement:	Wetlands

Marianne M. Shuler

Position:	Archaeologist Technician
Education:	B.A., Religion/Middle Eastern Archaeology
Experience:	3 years in Middle Eastern Archaeology; 5 years in Southeastern U.S. Archaeology
Involvement:	Cultural Resources

Amos L. Smith

Position:	Contract Geologist CTI
Education:	B.S. Geology
Experience:	28 years Geologic Investigations and Solid Waste Landfill Permitting and Operations
Involvement:	Solid Waste

Jan K. Thomas

Position:	Contract Natural Areas Specialist
Education:	M.S., Human Ecology
Experience:	10 years in Health and Safety Research, Environmental Restoration, Technical Writing; 5 years in Natural Area Reviews
Involvement:	Natural Areas (Managed Areas, Nationwide Rivers Inventory, and Ecologically Significant Sites)

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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. Fish and Wildlife Service

State and Local Agencies

Hawkins County Mayor's Office
Tennessee Department of Environment and Conservation
Tennessee Wildlife Resources Agency

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CHAPTER 6

6.0 LITERATURE CITED

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Appendix A – Correspondence

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UNITED STATES
DEPARTMENT OF
AGRICULTURE
(865)4942343

NATURAL RESOURCES
CONSERVATION
SERVICE

Clinton Soil Survey
2691 Andersonville Hwy
CLINTON, TENNESSEE 37'

Subject: SOI-Hydric/Prime Farmland
Determination

July 27, 20

Mr. Paul A. Mays
Tennessee Valley Authority
400 West Summitt Hill Drive
Knoxville, Tennessee

Dear Mr. Mays:

As requested, I have examined the proposed deposal (stacking sites adjacent to the John Sevier Fossil Plant in Hawkins County, Tennessee.

The two sites were examined in regards to hydric and prime farmland soils. Site #1 consist of 1.9 acres of (MA) Melvin silt loam. Melvin soils meet the criteria as hydric soils. There are no hydric soils in proposed site #2.

The proposed sites relative to prime farmland soils are located on Holston loam, 2 to 5 percent slopes, Cloudland loam, 2 to 5 percent slopes, Hamblen silt loam and Taft silt loam. These soils meet the criteria as prime farmland.

Enclosed are your Farmland Conversion Impact Ratings. If you have questions concerning them or I can be of further assistance, please give me a call.

Sincerely,

Clarence T. Conner

Clarence T. Conner
Resource Soil Scientist, East Tn Division

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 7/20/07
Name Of Project John Sevier Fossil Plant - Scrubber	Federal Agency Involved Tennessee valley Authority
Proposed Land Use Disposal Site (FGD)	County And State Hawkins, Tennessee
PART II *(To be completed by NRCS)*	Date Request Received By NRCS

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply -- do not complete additional parts of this form).*	Yes ☑	No ☐	Acres Irrigated 0	Average Farm Size 81

Major Crop(s) Corn-Hay	Farmable Land In Govt. Jurisdiction Acres: 102,650 %	Amount Of Farmland As Defined in FPPA Acres: 40,550 % 40
Name Of Land Evaluation System Used Hawkins County Land Evaluation	Name Of Local Site Assessment System None	Date Land Evaluation Returned By NRCS 7/27/07

PART III *(To be completed by Federal Agency)*	Alternative Site Rating Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly				
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site	0.0	0.0	0.0	0.0
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	33.6	25.7		
B. Total Acres Statewide And Local Important Farmland	0.0	0.0		
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	0.8	0.6		
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	13.2	13.2		
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	77	74	0	0

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use	15	13	13		
2. Perimeter In Nonurban Use	10	10	10		
3. Percent Of Site Being Farmed	20	15	19		
4. Protection Provided By State And Local Government	20	0	0		
5. Distance From Urban Builtup Area	15	15	15		
6. Distance To Urban Support Services	15	0	0		
7. Size Of Present Farm Unit Compared To Average	10	10	10		
8. Creation Of Nonfarmable Farmland	10	0	0		
9. Availability Of Farm Support Services	5	5	5		
10. On-Farm Investments	20	5	0		
11. Effects Of Conversion On Farm Support Services	10	0	0		
12. Compatibility With Existing Agricultural Use	10	0	0		
TOTAL SITE ASSESSMENT POINTS	160	73	72	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	77	74	0	0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	73	72	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	150	146	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection:

(See Instructions on reverse side) **Form AD-1006 (10-83)**

This form was electronically produced by National Production Services Staff

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

December 4, 2008

Dr. Thomas Maher
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902-1499

RE: TVA, JOHN SEVIER PLANT EXPANSION, UNINCORPORATED, HAWKINS COUNTY

Dear Dr. Maher:

Pursuant to your request, this office has reviewed the additional documentation submitted by your Agency concerning the above-referenced undertaking. This is a requirement of Section 106 of the National Historic Preservation Act for compliance by the participating federal agency or applicant for federal assistance. Procedures for implementing Section 106 of the Act are codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Considering available information, we find that the project as currently proposed will not adversely affect any property that is eligible for listing in the National Register of Historic Places. Therefore, this office has no objection to the implementation of this project. Please direct questions and comments to Jennifer M. Barnett (615) 741-1588, ext. 105. We appreciate your cooperation.

Sincerely,

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

EPM/jmb