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# FINAL
# ASH IMPOUNDMENT CLOSURE PROGRAMMATIC EIS

# PART II – SITE-SPECIFIC NEPA REVIEW: JOHN SEVIER FOSSIL PLANT

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# Symbols, Acronyms and Abbreviations

| | |
|---|---|
| **AADT** | Average Annual Daily Traffic |
| **BMP** | Best Management Practices |
| **CCR** | Coal Combustion Residuals |
| **cfs** | Cubic Feet per Second |
| **COC** | Constituents of Concern |
| **CWA** | Clean Water Act |
| **dBA** | Decibels, A-Weighted |
| **DO** | Dissolved Oxygen |
| **EO** | Executive Order |
| **EPA** | U.S. Environmental Protection Agency |
| **EPRI** | Electric Power Research Institute |
| **GWPS** | Groundwater Protection Standards |
| **HRM** | Holston River Mile |
| **HUD** | U.S. Department of Housing and Urban Development |
| **JSF** | John Sevier Fossil Plant |
| **Ldn** | Day-Night Sound Level |
| **MGD** | Million Gallons per Day |
| **mg/L** | Milligram per Liter |
| **$mi^2$** | Square Miles |
| **MW** | Megawatt |
| **NEPA** | National Environmental Policy Act |
| **NLEB** | Northern Long-Eared Bat |
| **NPDES** | National Pollutant Discharge Elimination System |
| **NRHP** | National Register of Historic Places |
| **RIF** | Relative Impact Framework |
| **SWPPP** | Stormwater Pollution Prevention Plan |
| **TDEC** | Tennessee Department of Environment and Conservation |
| **TVA** | Tennessee Valley Authority |
| **TWRA** | Tennessee Wildlife Resources Agency |
| **$yd^3$** | Cubic Yards |

# CHAPTER 1 – PURPOSE AND NEED FOR ACTION

## 1.1 Introduction and Background

The John Sevier Fossil Plant (JSF) is located near Rogersville in northeastern Tennessee (Figure 1-1). TVA began operations at JSF in 1957 and continued to utilize the plant until 2012. The facility has four coal-fired generating units that produced 800 megawatts (MW) of electricity prior to its retirement. The coal-fired power generation produced at JSF was replaced with a natural gas-fired combined-cycle plant on the John Sevier reservation. The combined-cycle plant began commercial operation in April 2012 and is an 880 MW facility.

Tennessee Valley Authority (TVA) plans to close the Bottom Ash Impoundment. The Bottom Ash Impoundment became operational in 1979, and when the coal-fired units were active, approximately 20,000 dry tons per year of bottom ash were wet-sluiced to the Bottom Ash Impoundment (Figure 1-2) (Stantec 2009). Characteristics of the Bottom Ash Impoundment are summarized in Table 1-1. Bottom ash was stacked in the southeastern portion of the area starting in 1981. In 1987, sluicing stopped at the Bottom Ash Impoundment, and the ash was dry hauled off-site for disposal. Ash was again sluiced to this area starting sometime between 1990 and 1993. In 1999, a bottom ash collection facility was constructed in the eastern part of the site and run by Appalachian Products, for off-site marketing of bottom ash. In addition to bottom ash, the impoundment received intermittent fly ash sluice water and effluent from the Coal Yard Runoff Impoundment and Metal Cleaning Impoundments, as well as sump pump flows from the JSF plant.

The Bottom Ash Impoundment at JSF (see inset photo) includes three areas situated from east to west:


**View of Bottom Ash Impoundment**

- Dredge Cell – The dredge cell is located on the east side of the Bottom Ash Impoundment. It contains bottom ash that settled during initial hydraulic deposition in the Bottom Ash Impoundment as well as lesser amounts of finer grained ash that was recovered during periodic mechanical dredging of the Bottom Ash Impoundment and consolidated in this area. The dredge cell conveys water to the Intermediate Impoundment.
- Intermediate Impoundment – The intermediate impoundment is located at the center of the Bottom Ash Impoundment and contains finer grained ash that settled more slowly during hydraulic deposition. The intermediate impoundment conveys water to the Stilling Impoundment.
- Stilling Impoundment – The Stilling Impoundment is located on the west side of the Bottom Ash Impoundment and is used for final treatment of water prior to release through Outfall 006 (Stantec 2015b).

This site-specific National Environmental Policy Act (NEPA) review tiers off the programmatic level review provided in Part I.

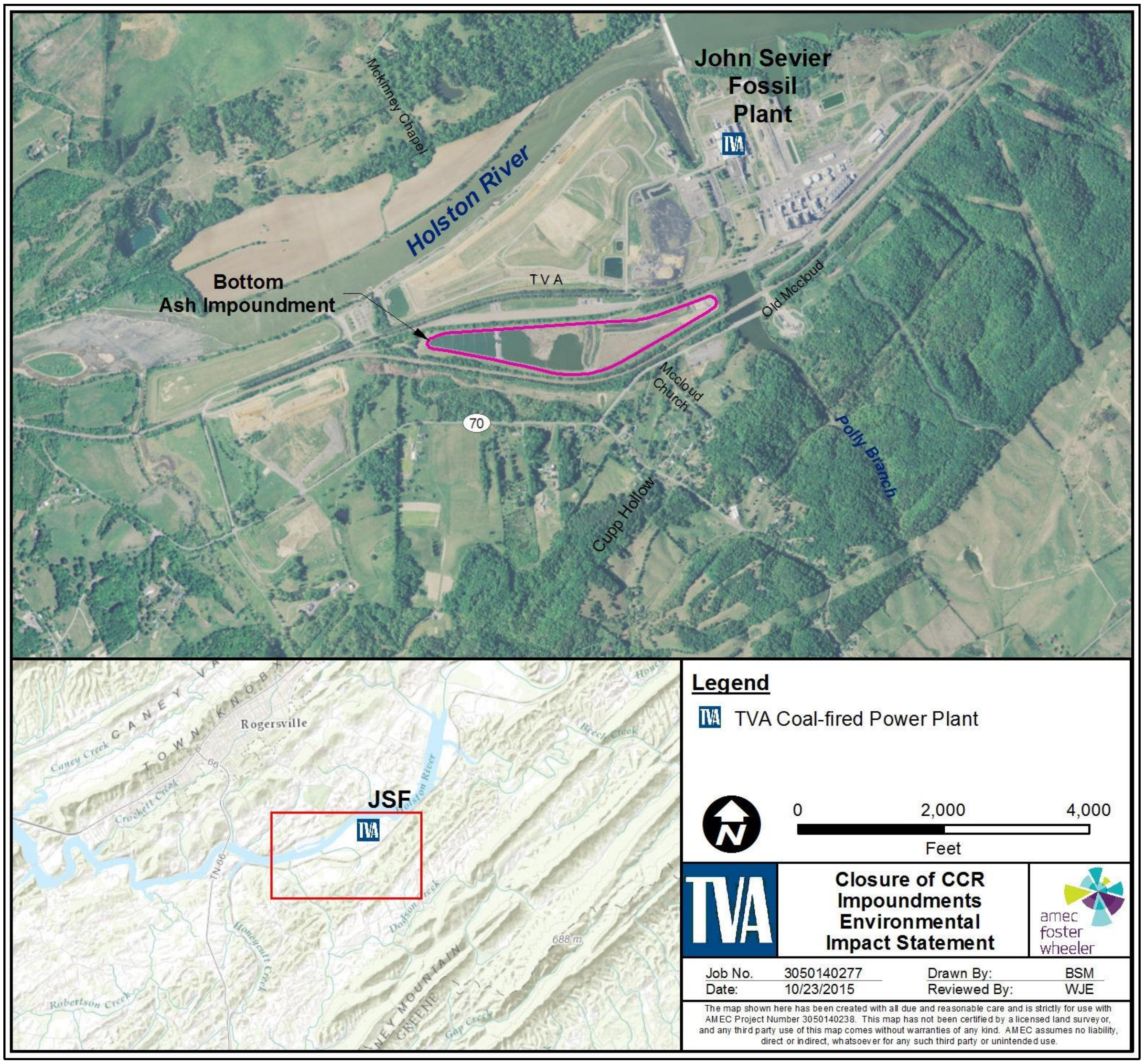


**Figure 1-1. JSF Project Location**

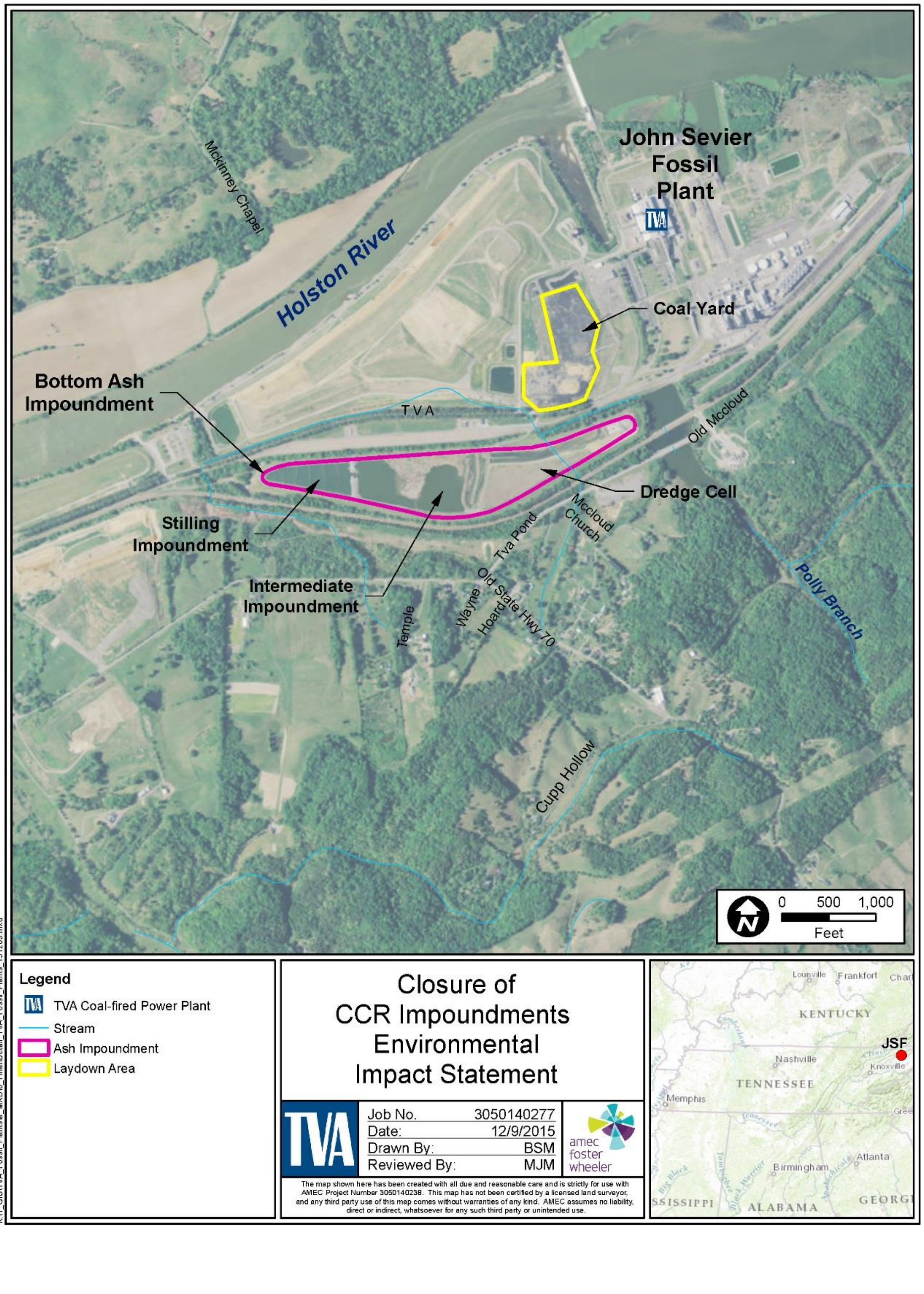


**Figure 1-2. Ash Impoundment Closure Utilization Areas at JSF**

**Table 1-1. Summary of Bottom Ash Impoundment Characteristics**

| Attribute | Description |
|---|---|
| Location | Hawkins County, TN |
| Impoundment Name | Bottom Ash Impoundment |
| Impoundment Status | Inactive |
| Size | 42 ac |
| CCR Material | Fly Ash and Bottom Ash |
| CCR Volume | 770,000 cubic yards ($yd^3$) |
| Borrow Material Volume Required | 15,000 $yd^3$ |
| Temporary Laydown Areas | 5-10 ac |
| Proposed Closure Completion Date | Within 5 years |

## 1.2 Decision to be Made

TVA must decide how to close the Bottom Ash Impoundment at JSF. TVA's decision will consider factors such as potential environmental impacts, economic issues, availability of resources and TVA's long-term goals.

## 1.3 Purpose and Need

The purpose of this action is to support the implementation of TVA's stated goal of eliminating all wet CCR storage at its coal plants by closing the Bottom Ash Impoundment at JSF and to assist TVA in complying with the U.S. Environmental Protection Agency (EPA)'s coal combustion residual (CCR) Rule.

## 1.4 Summary of Proposed Action

TVA proposes to close the inactive Bottom Ash Impoundment at JSF by using an approved closure methodology. The proposed action is described in detail in Chapter 2.

# CHAPTER 2 - ALTERNATIVES

This chapter tiers off the programmatic level alternatives narrative in Part I.

## 2.1 Existing Bottom Ash Impoundment Operations

National Pollutant Discharge Elimination System (NPDES) Permit number TN0005436 (TDEC 2011) and NPDES Industrial Storm Water General Permit number TNR053187 cover water discharges at JSF. Drainage from the JSF site discharges to Holston River at Holston River Mile (HRM) 105.2 (Outfall 006) and Holston River at HRM 106.7 (Outfall 002). Process wastewater discharges from the facility are permitted under the NPDES permit and include outfalls that are sampled, monitored and reported on monthly discharge monitoring reports. These include Outfall 002, Condenser Cooling Water; Internal Monitoring Point (IMP) 005, Metal Cleaning Impoundments discharge to the Bottom Ash Impoundment; Outfall 006, Bottom Ash Impoundment discharges to Holston River; and IMP 008, Waste Stabilization Pond discharges to the Bottom Ash Impoundment. As of June 30, 2014, TN0005436 has been administratively continued as Tennessee Department of Environment and Conservation (TDEC) reviews TVA's permit renewal application.

The majority of the process wastewater flows on-site have either ceased completely due to the closure of the coal-fired units or the quantity of the flows has been reduced greatly. Runoff from a portion of the partially closed dry stack and the coal yard is currently accumulating in the area where the waste stabilization impoundments were previously located and is being pumped to the Bottom Ash Impoundment and is ultimately discharged to the Holston River through Outfall 006. Leachate from the closed dry stacking area is discharged through Outfall 008 to the Holston River.

## 2.2 Project Alternatives

TVA evaluated the three alternatives for closing JSF's Bottom Ash Impoundment: Alternative A: No Action, Alternative B: Close-in-Place and Alternative C – Closure-by-Removal. Screening analysis to determine the reasonability of the "action" alternatives was undertaken by evaluating a range of key issues and factors related to the Bottom Ash Impoundment at JSF and the feasibility of undertaking closure activities (Figure 2-1). Key factors that TVA considered are identified in Part I, Section 2.2.5 and include the following:

- *Volume of CCR materials.* The size of an ash impoundment and volume of CCR may affect closure activities and appropriateness of an alternative. The Bottom Ash Impoundment at JSF is estimated to contain 770,000 yd$^3$ of CCR.
- *Schedule/Duration of Closure Activities.* Time necessary to complete closure activities at a CCR impoundment will affect the reasonability of closure alternatives. EPA initially structured its CCR Rule to encourage regulated entities cease disposing of CCRs in impoundments by October 19, 2015 and complete closure activities by April 2018 (EPA 2015). As promulgated, EPA excluded impoundments closed by April 2018 from the rule's other substantive requirements. In spring 2016, however, EPA agreed to remove this exemption from the rule because the agency failed to provide an opportunity for notice and comment on the exclusion. This change does not affect EPA's technical determination that removing the hydraulic head by dewatering and closing impoundments substantially reduces the risks of structural failures and groundwater contamination. Because of this pending regulatory change, TVA decided not to use the April 2018 incentive closure date as

a significant factor in its consideration of the reasonableness of Closure-in-Place or Closure-by-Removal. Instead, TVA takes into account the 5-year timeframe that EPA set for completing impoundment closures, 40 CFR §257.102(f). Closing earlier rather than later is preferable from an environmental standpoint.

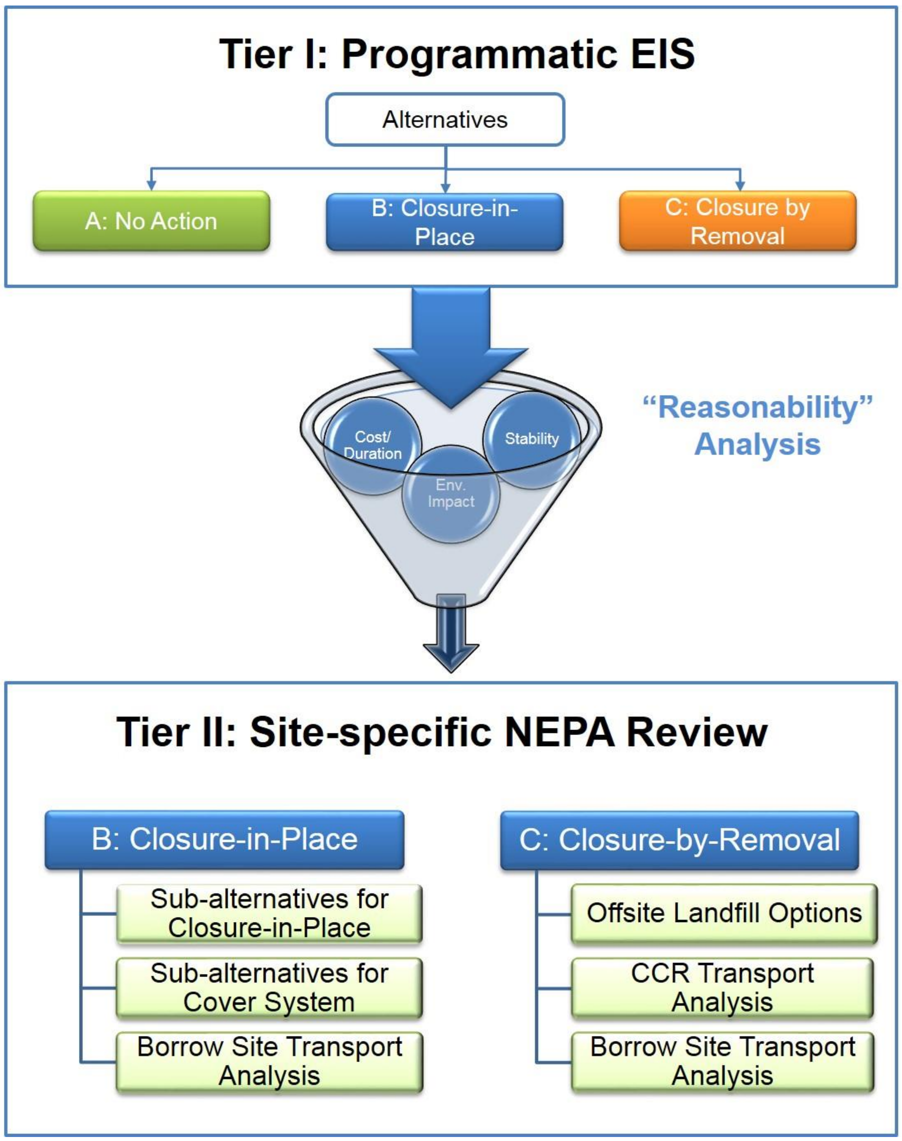


**Figure 2-1. Reasonable Alternatives Analysis for JSF Bottom Ash Impoundment**

- *Stability.* Stability of the CCR facility was evaluated by Dewberry Consultants (2013). Safety ratings under static conditions were determined to be adequate for the Bottom Ash Impoundment. TVA is currently evaluating the seismic stability of all CCR facilities (including the Bottom Ash Impoundment) and will make appropriate modifications to ensure that the berm stability is at a level that meets or exceeds industry acceptable factors of safety using conservative assumptions. The proposed closure grades of the facilities will be evaluated prior to construction and any needed improvements to the berms will be made as part of the closure system construction. The Bottom Ash

Impoundment has ceased receipt of CCR materials and water levels are being reduced consistent with the plant's NPDES permit. Consequently, hydraulic loading due to wet transport to the impoundment have been reduced to de minimis levels. Closure of the CCR unit will also include a rerouting of all process waters around the impoundment, further reducing hydraulic inputs and enhancing stability.

- *Risk to Human Health and Safety Relating to Closure Activities.* Closure activities entail a range of construction activities that represent a potential risk to the health and safety of the workforce and the public. Worker safety is a particular concern as heavy equipment and difficult working conditions would occur for any closure activities. However, deep excavations into the ash impoundment required under the Closure-by-Removal Alternative are particularly dangerous as noted by reports of accidents leading to injury or death in the industry. As discussed in Challenges of Closing Large Fly Ash Ponds, accidents, near misses and fatalities have been reported at impoundments during operations and closure activities (Seymour et al. 2013 and Johnson 2014). Equipment, such as bulldozers and trucks, can become bogged down, disabled and engulfed. For example, while removing fly ash from an impoundment in Kentucky, an excavator was operating approximately 200 ft from the side of the impoundment when the exposed surface of the fly ash slid over an underlying soft, apparently saturated area killing the excavator and its operator.

  Closure-by-Removal also would require a substantially greater number of truck movements into and out of the site and this also would increase the risk of injuries and fatalities associated with truck crashes (see Part I, Chapter 2). As the number of truck movement miles increase, both for Alternatives B and C, the risk of traffic crashes, including personal injuries and fatalities, increases.

- *Mode and Duration of Transport Activities*. As described in Part I, Section 2.2, the activities related to transport of borrow (Alternative B) and CCR removal and transport (Alternative C) require the use of large numbers of vehicles and operators. The Bottom Ash Impoundment at JSF contains approximately 770,000 $yd^3$ of CCR. For those sites with CCR volumes exceeding 600,000 $yd^3$, TVA determined that insufficient time is available within the construction schedule to effectively remove the CCR materials by truck or rail and achieve closure of inactive impoundments within the 5-year period or closure. However, although the estimated volume of CCR in the Bottom Ash Impoundment exceeds the 600,000 $yd^3$ threshold, TVA will evaluate Closure-by-Removal as an option at this site as if determined to be reasonable, the closure of this impoundment through this method could still be accomplished within a reasonable construction schedule.

  Transport of CCR materials by rail must consider the volume of CCR materials to be removed (cost-effectiveness and duration of removal operations), logistics related to supporting infrastructure (constructing and permitting loading and unloading facilities), the availability of rail service at receiving landfills and transport of suitable borrow material to the closure site. The duration of CCR removal by rail is generally expected to be similar to that of truck transport because rail loading operations are highly dependent on the rate at which CCR can be safely excavated, dried and moved to rail loading facilities.

- *Potential Effects to Water Resources.* Potential human health risk was also considered by reviewing results of groundwater monitoring and the incidence of surface water releases from the Bottom Ash Impoundment to receiving waterbodies. No records of releases or issues of concern are known that represent a risk to human health from CCR constituents associated with the existing impoundment.

- *Potential Effects to Wetlands.* Under the Clean Water Act (CWA), wetlands are considered 'special aquatic sites' deserving of special protection because of their ecologic significance. Wetlands are important ecosystems that must be protected and EPA has long identified wetlands protection as a high priority. Initial screening analysis by TVA determined that for both Alternatives B and C, proposed actions would not cause or contribute to significant degradation of wetlands; and that appropriate measures could be taken to avoid and minimize impacts to wetlands and ensure no net loss of wetlands.
- *Risk to Adjacent Environmental Resources.* Risk of potential release and degradation of sensitive environmental resources (groundwater, surface water, ecological receptors and factors related to the human environment) with a defined nexus to the Bottom Ash Impoundment is an important consideration for alternative development. TVA is currently conducting studies to identify the uppermost aquifer, but this depth is not yet known at JSF.

  Initial screening analysis by TVA determined that for both Alternatives B and C, proposed actions would not cause or contribute to violations of any applicable state water quality standard, violate any applicable toxic effluent standard or prohibition, or jeopardize the continued existence of endangered or threatened species or critical habitats.
- *Excessive Cost.* Excessive cost may affect reasonableness of an alternative.

  Other factors affecting cost-effectiveness of transport of CCR, and not related to engineering and infrastructure, include availability of materials for construction, availability of labor, availability of permitted landfills, fuel costs, and other economic factors.

### 2.2.1 Alternatives Eliminated from Further Consideration

#### *2.2.1.1 No Action Alternative*

The No Action Alternative was fully evaluated in Part I and was determined to not meet the purpose and need of achieving the TVA goal of closing CCR impoundments. This alternative, therefore, is not included in the site-specific analysis.

### 2.2.2 Reasonable Alternatives Retained for Further Analysis

As illustrated in Figure 2-1, two alternatives have been evaluated by TVA and are considered reasonable alternatives subject to site-specific detailed evaluation.

> TVA has identified a closure cover system for JSF that is designed to have a minimum permeability performance standard of $1 \times 10^{-7}$ or better– 100 times lower (better) than that prescribed by EPA in the Final Rule.

#### *2.2.2.1 Alternative B – Closure-in-Place*

Construction activities associated with the closure of the Bottom Ash Impoundment would entail direct disturbance of the impoundment and disturbance of supporting laydown area (see Figure 1-2). The former coal yard at JSF has been identified as the laydown area. Within the laydown area, TVA anticipates temporarily using approximately 5 to 10 ac for vehicle and equipment parking, materials storage and construction administration. Under this alternative approximately 15,000 $yd^3$ of borrow material would be hauled using tandem dump trucks from an identified permitted borrow site (Figure 2-2).

Conceptual designs for the in-place closure of the Bottom Ash Impoundment are provided in Appendix A (Stantec 2015a). Activities associated with this action would include the following:

1. Drawdown or dewatering activities
2. Reroute conveyances sending storm water and process water to Bottom Ash Impoundment
3. Decommission and remove existing NPDES outfall
4. Grade and reconfigure CCR (Category B) to consolidate CCR, reduce footprint and promote site drainage
5. Acquire and transport borrow material to help grade and cover site
6. Install geosynthetic liner cover system (Geosynthetic-Protective Soil Cover System)
7. Install protective soil cover and establish vegetation
8. Install and operate groundwater monitoring system per federal and any additional state requirements
9. Complete and submit closure documentation

Because the Bottom Ash Impoundment was not considered to have a stability risk, no measures to improve stability are anticipated during the closure process (Dewberry Consultants 2013).

TVA can complete Closure-in-Place of the Bottom Ash Impoundment within a reasonable time frame (i.e. within 5 years). However, considering the expected scope and sequencing of the project, closure may be completed within approximately 1.7 years. Alternative B is estimated to cost $13 million. Cost and duration information is summarized in Table 2-1.

This closure alternative is evaluated in the Environmental Consequences section as it is an alternative that could meet the purpose and need of the project and could be accomplished within the 5-year closure window.

**Table 2-1 Cost and Duration for Closure of the Bottom Ash Impoundment at JSF**

| Closure-in-Place | | Closure-by-Removal (Truck) | | | Closure-by-Removal (Rail) | | |
|---|---|---|---|---|---|---|---|
| **Cost (millions)** | **Duration (years)** | **Cost (millions)** | **Increase in Cost from Closure-in-Place (percent)** | **Duration (years)** | **Cost (millions)** | **Increase in Cost from Closure-in-Place (percent)** | **Duration (years)** |
| $13 | 1.7 | $64 | 392% | 6.2 | $75 | 477% | 6.1 |

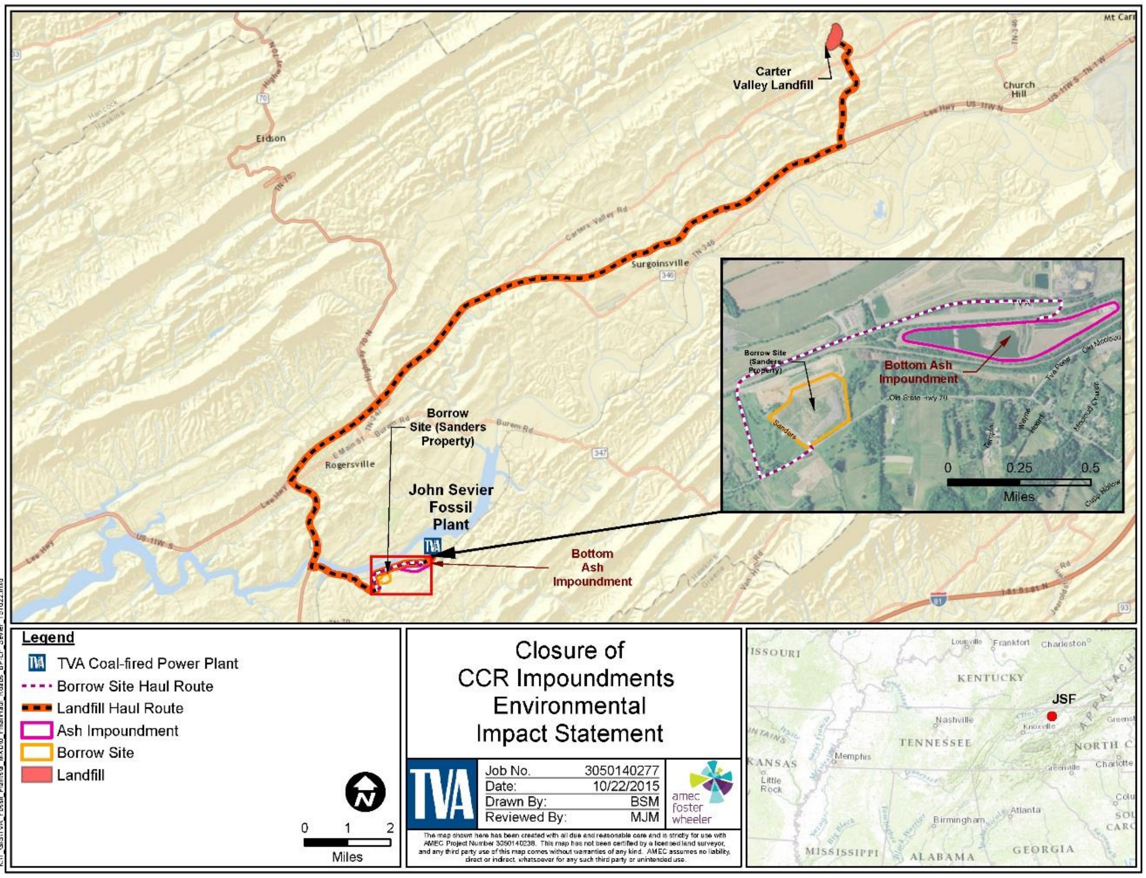


**Figure 2-2. Proposed Borrow Site and Landfill Locations with Haul Routes**

#### *2.2.2.2 Alternative C – Closure-By-Removal*

Alternative C – Closure-by-Removal activities at the Bottom Ash Impoundment would include the following:

1. Dewatering activities.
2. Reroute conveyances sending storm water and process water to Bottom Ash Impoundment.
3. Decommission and remove existing NPDES outfall.
4. Remove CCR and transport to a permitted landfill.
5. Acquire and transport borrow material to help grade and cover site.
6. Fill and grade and establish non-invasive vegetation.
7. Complete and submit closure documentation.

The Carter Valley Landfill, located approximately 25 miles to the northwest is the nearest Resource Conservation and Recovery Act Subtitle D landfill to JSF (see Figure 2-2). While CCR removed from JSF could be transported greater distances to other landfills, the Carter Valley Landfill was used for this analysis.

Alternative C is estimated to cost $64 million to excavate and transport the CCR from the Bottom Ash Impoundment and grade/cover the site. Removal within a reasonable construction schedule would require 77,000 truckloads of CCR to a Subtitle D landfill. It is anticipated that up-front permitting and planning will take 6 months and post-closure site restoration and permit close-out will take 6 months. TVA expects the rate of removal would result in the transport of an average of up to 100 truckloads of CCR per day. This would equate to a daily traffic count of 200 trucks passing by a given location each day (22 per hour) (Figure 2-3). This assumes that one fully loaded truckload leaving the site to the landfill would use the same haul route for the return trip (empty) to the site.

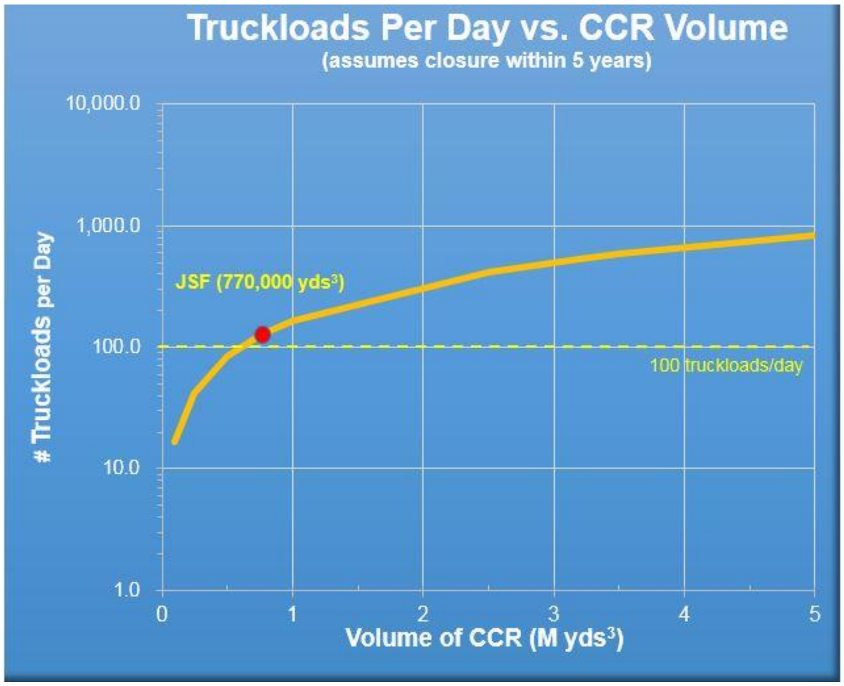


**Figure 2-3. Number of Truckloads vs. CCR Removal Volume**

Considering the expected scope and sequencing of the project, TVA may be able to complete closure-through-removal of the Bottom Ash Impoundment within approximately 6.2 years. Although this exceeds the 5-year window, it is retained for analysis given the relatively reasonable duration of closure. Alternative C, Closure-by-Removal using trucks is estimated to cost $64 million.

Removal of CCR by rail was also considered by TVA for Closure-by-Removal of the Bottom Ash Impoundment. In Part I, Chapter 2.0, TVA identified factors to determine whether transport of CCR by rail would be reasonable. Those factors include volume of material; distance from the impoundment to a permitted landfill; availability of the infrastructure to manage the transfer of material; cost effectiveness; and schedule. Applying these factors to the removal of CCR from the Bottom Ash Impoundment at JSF, transport by rail is unreasonable due to the cost (see Table 2-1). Rail transport would require the installation of loading infrastructure, and a rail transportation service in the form of a rail carrier. Additional rail infrastructure may need to be constructed at or very near a Subtitle D landfill. The components of a rail unloading infrastructure may include: clamshell buckets to move the CCR off the train to a stockpile area prior to being placed on trucks and conveyors or loaders to load the CCR onto trucks; and infrastructure to support trucking to the landfill site. The necessary environmental and construction permits to construct these facilities could easily take 18 to 24 months to acquire. Rail cars may need to be lined to prevent spills or releases as was the case for the removal of CCR at KIF. Given the costs and environmental impacts associated with development and permitting of the required loading and unloading infrastructure, use of rail to transport CCR from this site would not be feasible.

Therefore, the off-site transport of CCR by trucks will be evaluated under this alternative in the Environmental Consequences Section as it is an alternative that could meet the purpose and need of the project and be accomplished within a reasonable construction schedule.

## 2.3 EPRI Relative Impact Framework

As was described in Part I, Section 2.3, the Electric Power Research Institute (EPRI) has developed a comprehensive analytical tool, the "Relative Impact Framework" (RIF) to assess and compare the potential health and environmental impacts of the two CCR impoundment closure alternatives, Closure-in-Place and Closure-by-Removal (EPRI 2016c). The RIF provides a systematic approach to quantify potential relative impacts to environmental media associated with each closure scenario, including constituents in groundwater, surface water, and ambient air. In addition to environmental media, the RIF also provides an approach to quantify potential relative impacts to safety of workers and nearby residents from construction activities, including the transportation of materials to and from the site, in addition to the potential relative impacts to the sustainability of natural resources (e.g., energy, water and materials) associated with each closure alternative.

Part I provides an independent assessment of the health and environmental impacts for each impoundment closure alternative, which the EPRI analysis substantiates. At the programmatic level (Part I), TVA concluded that in most situations, Closure-in-Place likely will be more environmentally beneficial and less costly than Closure-by-Removal, especially when the amount of borrow and CCR material that must be moved to and from a site is substantial.

## 2.4 Comparison of Alternatives

The environmental impacts of Alternative B and Alternative C were analyzed in detail in Chapter 3 and are summarized in Table 2-2. These summaries are derived from the information and analyses provided in the Affected Environment and Environmental Consequences sections of each resource in Part I, and in Chapter 3 of this document.

## 2.5 Identification of Mitigation Measures

Mitigation measures identified in Part I and in Chapter 3 to avoid, minimize, or reduce adverse impacts to the environment are summarized below. TVA‘s analysis of preferred alternatives includes mitigation, as required, to reduce or avoid adverse effects. Project-specific best management practices (BMPs) are also identified.

- Fugitive dust emissions from site preparation and construction will be controlled by wet suppression and BMPs (Clean Air Act Title V operating permit incorporates fugitive dust management conditions).
- Erosion and sedimentation control BMPs (e.g., silt fences, truck wash) will ensure that surface waters are protected from construction impacts.
- Consistent with Executive Order (EO) 13112, disturbed areas will be revegetated with native or non- native, non-invasive plant species to avoid the introduction or spread of invasive species.

- BMPs will be used during construction activities to minimize and restore areas disturbed during construction.
- Under the CCR Rule, TVA will be required to install or updgrade groundwater monitoring systems for JSF CCR facilities. Data from these systems will be used to assess groundwater contamination and, could trigger corrective action. State requirements provide an additional layer of groundwater protection to minimize risk.

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

| Issue Area | Alternative B – Closure-in-Place | Alternative C – Closure-by-Removal |
|---|---|---|
| Closure Cost | $13 million | $64 million |
| Air Quality | Temporary minor impacts during construction from fugitive dust and emissions from equipment and vehicles. | Temporary minor impacts during construction from fugitive dust and emissions from equipment and vehicles. However, given the increased number of truck trips needed for closure activities, this impact would be greater than the impact identified for Alternative B. |
| Climate Change | Construction and trucking operations of borrow material contributes to emissions of GHG. | Construction and trucking operations of CCR removal and borrow material contributes to emissions of GHG. |
| Land Use | No impact as area already industrial land use | No impact as area already industrial land use |
| Prime Farmland | No impact | No impact |
| Geology and Seismology | Stable under static conditions. Seismic stability under evaluation and mitigable. | No impact or risk of failure |
| Groundwater | Reduction of hydraulic input reduces risk of migration of constituents to groundwater. | Reduces risk to groundwater by removing CCR from impoundment. |
| Surface Water | Risk to surface water would be reduced. Construction-related impacts would be negligible. | Risks to surface water would be reduced. Construction-related impacts would be negligible. |
| Floodplains | Reduces risk and extent of CCR migration into surface water during potential flooding event. | Removes risk of CCR migration into surface water during potential flooding event. Potential to incrementally increase floodplain storage. |
| Vegetation | Limited to construction-phase disturbance of largely industrialized environmental settings that lack notable plant communities. Minor and adverse in the short term, but minor and positive in the long term. | Limited to construction-phase disturbance of largely industrialized environmental settings that lack notable plant communities. Minor and adverse in the short term, but minor and positive in the long term. |
| Wildlife | Minor impact to predominantly previously disturbed low quality habitats. Minor beneficial impact in long term. | Minor impact to predominantly previously disturbed low quality habitats. Minor beneficial impact in long term. |
| Aquatic Ecology | No impact | No impact |
| Threatened and Endangered Species | No effect on threatened or endangered species | No effect on threatened or endangered species |
| Wetlands | No impact | No impact |
| Socioeconomic Resources | Short-term beneficial increases in employment, payroll and tax payments during construction | Short-term beneficial increases in employment, payroll and tax payments during construction |
| Environmental Justice | No disproportionate impacts to EJ | No disproportionate impacts to EJ |

**Table 2-2. Summary and Comparison of Alternatives by Resource Area (cont.)**

| Issue Area | Alternative B – Closure-in-Place | Alternative C – Closure-by-Removal |
|---|---|---|
| Natural Areas, Parks and Recreation | No impacts | No impacts |
| Transportation | Temporary minor impacts from transport of borrow material | Temporary minor impacts from transport of borrow and CCR material |
| Visual Resources | Minor impacts during construction. Beneficial in long term | Minor impacts during construction. Beneficial in long term |
| Cultural Resources | No impacts due to use of previously disturbed lands. | No impacts due to use of previously disturbed lands. |
| Noise | Temporary minor construction noise impacts from equipment and vehicles | Temporary moderate construction noise impacts from equipment and vehicles |
| Solid and Hazardous Waste | Minimal amounts generated during construction activities and managed in permitted facilities | Minimal amounts generated during construction activities and managed in permitted facilities |
| Public Health and Safety | Temporary potential for impacts during construction activities and transportation of borrow material. | Potential for impacts during construction activities and transportation. Minor potential for impacts during construction activities and transportation of borrow material and CCR. |
| Cumulative Effects | Minor cumulative effects | Minor cumulative effects |

## 2.6 Identification of Mitigation Measures

Mitigation measures identified in Part I and in Chapter 3 to avoid, minimize, or reduce adverse impacts to the environment are summarized below. TVA's analysis of preferred alternatives includes mitigation, as required, to reduce or avoid adverse effects. Project-specific best management practices (BMPs) are also identified.

- Fugitive dust emissions from site preparation and construction will be controlled by wet suppression and BMPs (Clean Air Act Title V operating permit incorporates fugitive dust management conditions).
- Erosion and sedimentation control BMPs (e.g., silt fences, truck wash) will ensure that surface waters are protected from construction impacts.
- Consistent with Executive Order (EO) 13112, disturbed areas will be revegetated with native or non- native, non-invasive plant species to avoid the introduction or spread of invasive species.
- BMPs will be used during construction activities to minimize and restore areas disturbed during construction.
- TVA will implement supplemental groundwater mitigative measures that could include monitoring, assessment, or corrective action programs as mandated by state requirements. State requirements provide an additional layer of groundwater protection to minimize risk.

## 2.7 Preferred Closure Alternative

TVA has identified Alternative B – Closure-in-Place as the preferred alternative. Alternative B would achieve the purpose and need of the project and close the Bottom Ash Impoundment in a reasonable five-year period. Alternative B can be completed in a shorter time frame than Alternative C, would cost less and avoids adverse impacts associated with off-site transfer of CCR.

## 2.8 Necessary Permits or Licenses

TVA holds the permits necessary for the operation of JSF. Depending on the decisions made respecting the proposed actions, however, TVA may have to obtain or seek amendments to the following permits:

- NPDES Construction Storm Water Permit for storm water runoff from construction activities.
- Modification of JSF’s existing NPDES permit to reflect the decommissioning of Outfall 006: Bottom Ash Impoundment.
- Modification to the Tennessee Multi-Sector Permit for Industrial Storm Water discharges would be made for the addition of new storm water outfalls.
- JSF’s Storm Water Pollution Prevention Plan would be revised to include the closed Bottom Ash Impoundment.

# CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the baseline environmental conditions potentially affected by the proposed closure of the Bottom Ash Impoundment and an assessment of impacts of the project on the environmental resources identified. This assessment tiers off the impact analysis presented in Part I, Chapter 3 and, based on the specific activities proposed for closure of the impoundment, TVA was able to focus its environmental review on specific resources and eliminate others from further evaluation.

The analysis presented here does not contain detailed discussions on resources not found in the planning area, or where site-specific conditions would not change the impact analysis presented in Chapter 3 of the Programmatic NEPA review. These include:

- Air Quality
- Climate Change
- Land Use
- Prime Farmland
- Geology and Seismology
- Socioeconomics and Environmental Justice
- Visual Resources
- Solid and Hazardous Waste
- Public Health and Safety

A discussion of resources retained for detailed analysis is provided in the following sections.

## 3.1 Groundwater

### 3.1.1 Affected Environment

#### *3.1.1.1 Physiographic Setting and Regional Aquifer*

JSF is located in the Valley and Ridge Physiographic Province, a northeast-southwest trending series of parallel ridges and valleys composed of folded and faulted Paleozoic sedimentary rock. The primary geomorphological features are mainly the result of differential weathering of various rock types, which include limestone, dolomite, shale, sandstone and siltstone. Residual soil typically ranges in thickness from about 10 to 150 ft. Larger valleys may have a comparatively thin mantle of alluvial soils ranging in size from clay to coarse sand to boulders and deeply weathered alluvium in the vicinity of streams and rivers may be found both in low-lying areas and on hills, reflecting the dynamic geologic nature of the province.

JSF is located in the Holston River floodplain and adjacent to an older, higher river terrace to the southeast. The floodplain has an average surface elevation of about 1,080 ft above mean sea level and averages about 800 ft in width. The older terrace rises to an average elevation of about 1,140 ft above mean sea level and extends southeastward approximately 2,500 ft to the base of a low ridge. The terrace is dissected by tributary streams. Dodson Creek is located to the southwest of JSF. Three shallow geologic units of relevance are present beneath the 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) (TVA 2010).

As described in Part I, Section 3.6, the CCR Rule allows for the differentiation of the uppermost aquifer and the point at which groundwater is first encountered. Currently, the groundwater monitored at JSF has not been confirmed to be from the uppermost aquifer. In 40 CFR § 257.60(a), the term uppermost aquifer is defined as including a shallow, deep, perched, confined or unconfined aquifer, provided it yields usable water, which may include considerations of water quality and yield (EPA 2015). TVA is in the process of studying groundwater characteristics at JSF for the purposes of better identifying the uppermost aquifer.

#### *3.1.1.2 Groundwater Use*

An inventory of water supply wells on the south side of the Holston River within 1 mi of the Bottom Ash Impoundment was conducted using a database search (EDR 2015). In addition to the JSF water supply wells, one private water supply well was identified within 1 mi (not used for domestic drinking water), and 10 private water supply wells were identified within 2 mi of the JSF. Most wells obtain water from the Sevier shale or possibly the alluvial deposits. No water quality data were available for these wells (TVA 2011).

#### *3.1.1.3 Groundwater Quality*

A monitoring well network in the vicinity of the JSF consists of one well upgradient of the Bottom Ash Impoundment (W-31) and three wells located downgradient (W-32, 10-36 and 10-37) (Figure 3-1). These four wells were installed in the upper portion of the unconfined aquifer. Wells W-31 and W-32 are sampled monthly for water quality purposes as part of the Dry Fly Ash Stack permit.

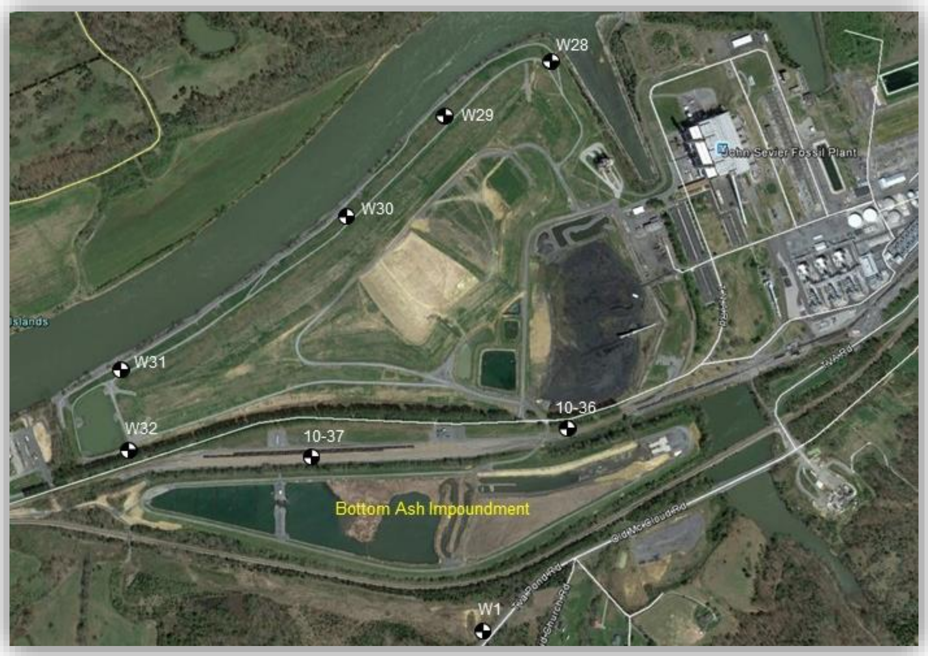


**Figure 3-1. Array of Compliance Groundwater Monitoring Wells at JSF**

Well W1 is an upgradient well near the intersection of Old Tennessee 70 road and TVA Pond Road, approximately 620 ft south of the Bottom Ash Impoundment. Existing well W32 is downgradient of the Main Ash Impoundment on the southeast corner of the Dry Fly Ash Stack, slightly northwest of the Main Ash Impoundment (TVA 2011).

Analysis has been performed on downgradient monitoring wells 10-36 and 10-37 using laboratory analytical results from 2011 through August 2014. Time series have been developed for antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, cyanide, lead, mercury, nickel, selenium, silver, sulfide, thallium, tin, vanadium and zinc. The metals series are developed using the total metals analysis results. Groundwater concentrations have not exceeded the Groundwater Protection Standards (GWPS) for any parameter sampled. Overall the trends appear stable or non-detectable.

### 3.1.2 Environmental Consequences

#### *3.1.2.1 Alternative B – Closure-in-Place*

As part of this alternative, the dewatering and subsequent stabilization of the CCR materials in the Bottom Ash Impoundment would provide an immediate reduction in the potential influx of leachate water moving from the impoundment though the vadose zone (unsaturated zone) beneath it. Under Alternative B, reduction of the hydraulic head in the Bottom Ash Impoundment is expected to reduce mounding of the surficial aquifer, reduce vertical leaching of CCR constituents and reduce groundwater contamination. Additionally, the installation of an approved closure system would further reduce infiltration and subsurface flow to the groundwater. This conclusion is supported by TVA's on-going monitoring of similar ash management facilities at JSF. GWPS for facility constituents falling under Appendix II of Rule 0400-11-01-.04 are defined in Section IV(1)(d) of TDEC Ground Water Monitoring Guidance for Solid Waste Landfill Units Policy. Per Policy, GWPS are the constituent Maximum Contaminant Level listed in Appendix III of Rule 0400-11-01-.04. The GWPS were established in May 2012. Groundwater analytical data from the most recent sampling event are available on TVA's project Web site and show no GWPS exceedances for Appendix II constituents from the Dry Fly Ash Landfill at JSF (https://www.tva.com/Environment/Environmental-Stewardship/Environmental-Reviews/Closure-of-Coal-Combustion-Residual-Impoundments).

As discussed in Part I, Chapter 2, TVA will implement any supplemental mitigation measures required pursuant to a unilateral administrative order that TDEC issued in August 2015, which could include additional monitoring, assessment, or corrective action programs. These measures would further minimize risk from the closed Bottom Ash Impoundment.

TVA reviewed EPRI's qualitative analysis of JSF using site-specific data from JSF (EPRI 2016a). However, it should be noted that subsequent to the release of the results of the EPRI study the estimate of volume of CCR at JSF was refined and the EPRI analysis was based on a previous estimate (lower) of CCR volume. However with respect to groundwater, EPRI's sensitivity analysis indicated that other features of this alternative were similar to the analysis of the hypothetical site and that it had a more beneficial impact as compared to Alternative C with respect to high mobility constituents under the non-intersecting groundwater condition (EPRI 2016b) (high mobility and low mobility constituents are defined in Part I, Section 2.3). By comparison, for high-mobility constituents EPRI found that this alternative had a less beneficial impact for only high mobility constituents under the intersecting groundwater condition. EPRI also found that there was a negligible difference from Alternative C with respect to low mobility constituents both groundwater scenarios.

Consistent with EPA's determination in the CCR Rule and the results of the EPRI model, groundwater impacts would be reduced under the Closure-in-Place Alternative when the hydraulic head is removed and the facilities are capped. Removal of potential additional hydraulic inputs from precipitation, surface water run off or other water additions to the impoundment through the capping process would effectively reduce potential subsurface flows to groundwater. The activities associated with Alternative B would therefore, reduce or potentially eliminate groundwater risk related to this impoundment.

For the reasons discussed above, the impacts of this alternative on groundwater are beneficial as compared to the No Action alternative.

#### *3.1.2.2 Alternative C – Closure-by-Removal*

Groundwater contamination risk near the Bottom Ash Impoundment would be reduced by the implementation of this alternative. As EPA identified in the CCR Rule, removal of the CCR materials would reduce groundwater risk in the impoundment area. The CCR being removed from an impoundment would have to be dried to an acceptable level prior to being loaded for off-site transport. The permitted landfills that receive CCR will be lined and have groundwater monitoring systems as required by their respective permits to minimize potential impacts to groundwater.

Groundwater benefits associated with this alternative include minimizing the potential interaction between the CCR and the uppermost aquifer and substantially reducing the risk of groundwater constituents of concern (COC) migrating off-site. No federal post-closure care measures are required if the ash impoundment is closed under this alternative.

The impacts of this alternative are beneficial and considerable as it substantially reduces subsurface flows and substantially reduces COC from the former ash impoundment. EPRI's model results indicate that the risk of groundwater contamination would be reduced under both the Closure-in-Place Alternative and the Closure-by-Removal Alternative. However, the Closure-by-Removal Alternative results in a greater reduction of groundwater risk with respect to both low and high mobility constituents under the non-intersecting groundwater condition. EPRI also found that there was a negligible difference from Alternative C with respect to low mobility constituents under both groundwater scenarios.

## 3.2 Surface Water

### 3.2.1 Affected Environment

JSF is located at Holston River Mile (HRM) 106.2 (Figure 3-2). The Holston River is impounded at HRM 52.3 by Cherokee Dam and the impoundment extends upstream approximately 54 mi to the John Sevier Detention Dam and Pool at HRM 106.3. The John Sevier Detention Reservoir is 305 ac in size, with a surface area of 10.7 square miles ($mi^2$). The John Sevier Detention Dam, constructed in 1954, is a concrete gravity dam. It has an overall length of 1,110 ft, a maximum discharge of 229,000 cubic feet per second (cfs) and a capacity of 5,500 ac-ft. This concrete dam was constructed to create a detention pool in order to supply cooling water to JSF.

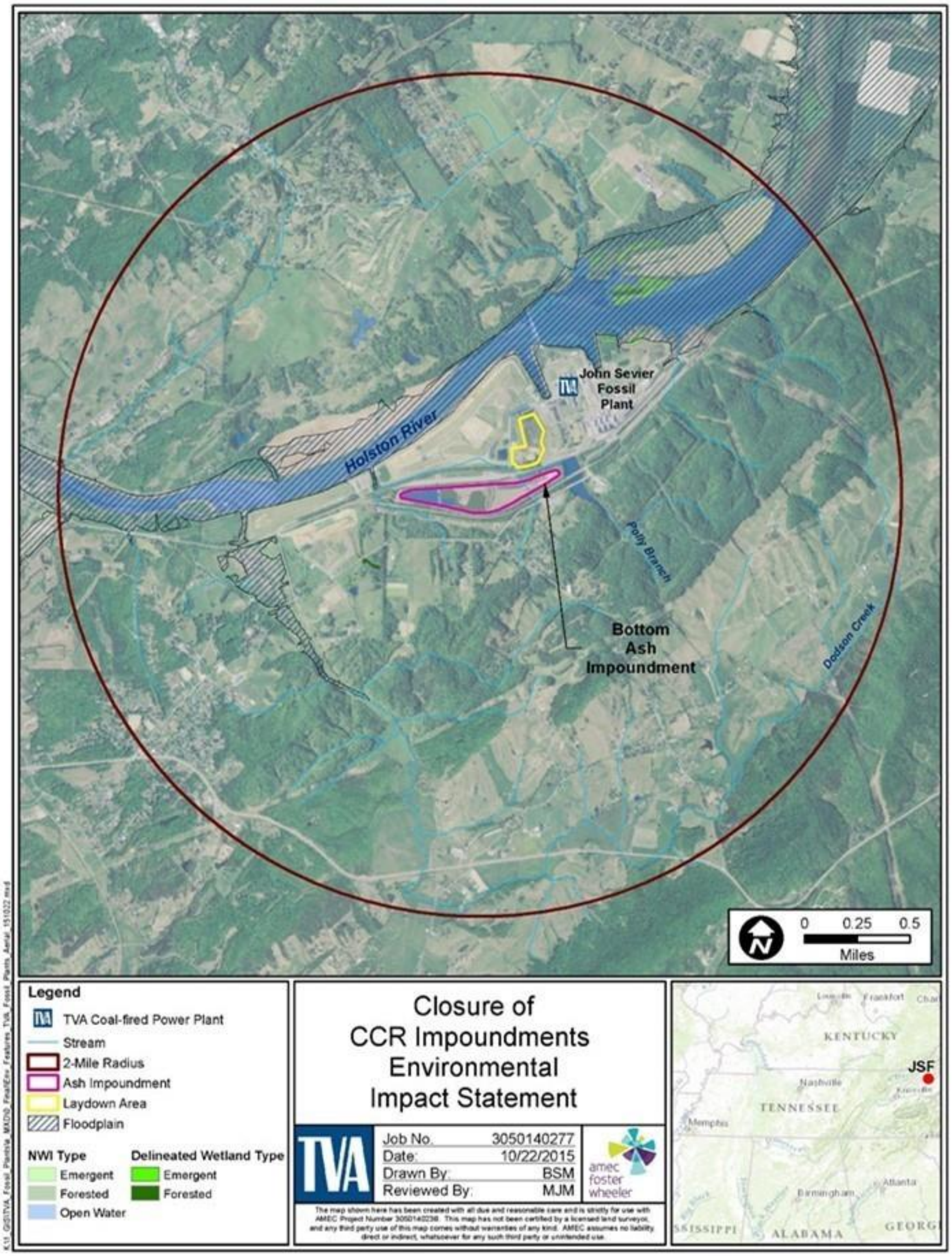


**Figure 3-2. Environmental Features in the Vicinity of JSF**

## Cherokee Reservoir

The reach of the Holston River adjacent to JSF has been changed from its former free-flowing character by: (1) control of river flow by upstream dams, primarily Fort Patrick Henry Dam; and (2) the presence of the John Sevier Detention Dam and the downstream Cherokee Dam. Cherokee Reservoir is the farthest downstream and largest impoundment of the Holston River. It has an annual pool level variation of about 40 ft during normal years. This fluctuation is necessary to provide for flood storage and for economical augmentation of flows during the drier seasons of the year. The average flow of the Holston River at Cherokee Dam is 4,500 cfs. JSF formerly used water withdrawn from the John Sevier Detention Pool for plant service water and for cooling water for its condensers. Prior to shutdown, the maximum JSF withdrawal with four coal-fired units operating was estimated to be 1,013 cfs (655 million gallons per day [MGD]). The John Sevier Combined Cycle Plant intake continues to withdraw water from the John Sevier Detention Pool at an estimated current maximum withdrawal of about 11.16 cfs (7.21 MGD).

TVA monitors two locations on the Cherokee Reservoir. These are the forebay and the middle part of the reservoir. Monitoring is usually done on a 2-year cycle. The ecological health of the Cherokee Reservoir was rated “poor” in 2012, which is consistent with most previous years. Cherokee rated “fair” in 1995 and 2008. In these 2 years, several ecological indicators concurrently rated at the upper end of their historical range. Cherokee is a relatively deep storage impoundment with a long retention time and plenty of nutrients, resulting in low DO levels and high chlorophyll levels.

Dissolved oxygen (DO) rated “poor” at both locations, which is consistent with previous years’ results. Much of the water column had low DO levels during the summer months and there were extended periods of time when virtually no oxygen was present in the water near the bottom. TVA has installed aeration equipment to add oxygen to the deep water above Cherokee Dam and to improve conditions immediately downstream in the Holston River. Chlorophyll rated “good” at the forebay but “poor” at the mid-reservoir monitoring location because concentrations were elevated during several sample periods. Chlorophyll typically rates “poor” or at low end of the “fair” range at the mid-reservoir location. Ratings for the forebay site have fluctuated between “good,” “fair,” and “poor;” annual variations in the amount of rainfall and runoff have been an important factor (TVA 2012b).

TDEC classified the Holston River for use as a domestic water supply, industrial water supply, fish and aquatic life, recreation, livestock watering and wildlife and irrigation. Presently, the latest TDEC 303(d) report (TDEC 2014) states that water quality on the Holston River was assessed and that 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 atmospheric deposition and sources outside Tennessee (Tennessee Wildlife Resources Agency [TWRA] 2014a). Additionally, the Holston River is listed for low DO and flow alterations, as discussed above, due to the upstream impoundment dams.

EPA Region 3 is currently completing an assessment and determining remedial obligations concerning historical releases of mercury from Olin Corporation into the North Fork Holston River and Holston River that have impacted sediments behind and downstream of the JSF Detention Dam. The JSF detention dam is considered an obstacle, reducing the migration of mercury impacted sediment continuing downstream in the Holston River. Based on available information, EPA does not believe that the subsurface sediment referenced above presents a risk of concern at this time.

Mercury releases occurred for an extended period until the Olin Corporation plant was closed in 1972. The plant site is located more than 100 mi upstream of JSF. 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 EPA investigation (EPA 2002) of the North Fork Holston and Holston rivers and an associated ecological risk assessment reported results indicating elevated mercury levels in sediment cores collected upstream of the JSF Detention Dam, downstream from the JSF intake channel.

The EPA Superfund Remedial Investigation of the Saltville Waste Disposal Ponds Site in Virginia has detected elevated levels of mercury associated with subsurface sediments just upstream of the JSF Detention Dam. Based on a preliminary evaluation of available Remedial Investigation results, EPA believes that mercury in the subsurface sediments may potentially present an unacceptable risk to human health and/or the environment if the dam is deconstructed or if other activities disturb and/or mobilize the subsurface sediment. Deconstruction of the dam is not proposed as part of this project (EPA 2015a).

TWRA continues to monitor mercury levels in fish tissues in the Holston River (TWRA 2014b), which includes a precautionary fish consumption advisory for the South Holston River from HRM 89 to HRM 142 and includes the JSF reservoir at HRM 106. Olin Corporation and EPA may also sample Holston River sediments in conjunction with assessments of the Saltville Waste Disposal Ponds Superfund Site.

No Nationwide Rivers Inventory streams or Wild and Scenic Rivers are near the proposed action.

### 3.2.2 Environmental Consequences

#### *3.2.2.1 Alternative B – Closure-in-Place*

##### 3.2.2.1.1 Bottom Ash Impoundment Closure Impacts

Under this alternative, any water currently entering the existing Bottom Ash Impoundment will be rerouted to other areas of the site. However, no alteration or modification of surface water resources would occur within the immediate project site or associated laydown area.

Under this alternative, the JSF Bottom Ash Impoundment would be dewatered and all remaining CCR material would be consolidated and compacted. An approved cover system consisting of a geosynthetic liner and a protective soil cover layer would be installed as described in Chapter 2.

Wastewaters generated during the proposed project may include construction storm water runoff, dewatering of work areas, non-detergent equipment washings, dust control and hydrostatic test discharges. Potential impacts and BMPs to minimize effects of these wastewater streams are provided in Part I, Section 3.7.

3.2.2.1.2 Operational Impacts

The main operational change that would take place with the closure of the impoundments would be the change in management of the on-site storm water and process waste water that is currently treated in impoundments and discharged from the Bottom Ash Impoundment. This re-routing would conceptually utilize on-site non-CCR impoundments and a new ditch to enable the proper handling and treatment of the waste streams. BMPs and waste water treatment would be employed, as needed, to mitigate any pollutant discharge.

The dry stack at JSF has been capped and closed. The coal yard runoff impoundment has been removed and a lined process water impoundment has been constructed to discharge the leachate and toe drain waters at Outfall 008 in the Holston River, along with storm water.

To evaluate and characterize the future toe drain and leachate discharges from Outfall 008, a study was performed that evaluated current data and evaluated future conditions. A mass balance of the new process impoundment was conducted to thoroughly evaluate the discharge characteristics. These results are presented in Table 3-1.

**Table 3-1. JSF Projected Leachate and Toe Drain Mixing Concentrations**

| | Current Baseline | Current Operations | | |
|---|---|---|---|---|
| Element | Intake (mg/L) | Future Discharge from Outfall 008 (mg/L) | Total Mixing Concentration at Holston at Holston River 1Q10 (mg/L) | Water Quality Criteria[(1)] (mg/L) |
| Aluminum | 0.260 | 3.560 | 0.2601571 | |
| Antimony | <0.001 | 0.003 | 0.0005001 | 0.0056 |
| Arsenic | <0.001 | 0.02 | 0.0005009 | 0.01 |
| Barium | 0.039 | 0.047 | 0.0390004 | 2.0 |
| Beryllium | <0.002 | <0.001 | 0.0010000 | 0.004 |
| Cadmium | <0.001 | 0.0071 | 0.0005003 | 0.002 |
| Chromium | 0.0012 | 0.1153 | 0.0012054 | 0.1 |
| Copper | 0.0026 | 0.0024 | 0.0026000 | 0.013 |
| Iron | 0.180 | 0.537 | 0.1800170 | |
| Lead | <0.001 | 0.002 | 0.0005001 | 0.005 |
| Manganese | 0.026 | 0.784 | 0.0260361 | |
| Mercury | 0.000007 | 0.00000182 | 0.0000070 | 0.00005 |
| Nickel | 0.0017 | 0.0017 | 0.0017000 | 0.1 |
| Selenium | 0.0014 | 0.208 | 0.0014098 | 0.02 |
| Silver | <0.001 | <0.001 | 0.0005000 | 0.0032 |
| Thallium | <0.001 | <0.001 | **0.0005000**[(2)] | 0.00024 |
| Zinc | <0.01 | <0.01 | 0.0050000 | 0.13 |

Notes: lbs/day = conc. in mg/L X flow in MGD X 8.34 lbs/gal.
Holston River flow = 567 MGD; process water pond flow= 0.0270 MGD
[(1)]TDEC Criteria, Rule 1200-4-3-03
[(2)]**bold**-exceeds Water Quality Criteria

Results of the mixing analysis summarized in Table 3-1 shows that all of the constituents would be expected to meet all NPDES discharge limits and TDEC Water Quality Criteria, except for thallium. The thallium exception is an artifact produced by the method of treating censored data in calculations (i.e., values below detection limits set equal to one-half detection limit) and the fact that the thallium detection limit of 0.001 mg/L exceeds the TDEC criterion of 0.00024 mg/L. The mixing calculations analysis indicates that the overall impact of future discharges from this outfall would not be expected to have negative impacts to surface water quality. Under future operating conditions, waste water treatment would be introduced as appropriate, to ensure compliance of discharge waters with NPDES permit limits and TDEC water quality criteria.

Lateral movement (seepage) from berms at the Bottom Ash Impoundment is not known to occur. Nonetheless, this alternative would reduce the potential for any future lateral movement from berms and groundwater and their subsequent release to surface waters. Consequently, any pathways for transport of COCs as a result of lateral movement through the berm or groundwater flow to adjacent surface waters would be minimized.

As described in Part I, Section 3.7, a study conducted by EPRI has evaluated the impact of impoundment closure on surface water for a hypothetical CCR impoundment in Tennessee. Under a closure scenario similar to Alternative B, EPRI analyzed the potential for COC releases from groundwater and the resultant effect on receiving surface waters. EPRI analyzed two scenarios: one in which all CCR materials were located above the water table, and a second in which the groundwater intersected the CCR materials. Under both closure scenarios, EPRI found that the in-place closure scenario provided a positive impact compared to baseline (i.e., concentrations of all COCs, with the exception of Arsenic (V), are less than 100 percent of baseline), ranging from a 2.5 to 7-fold increase in positive impact. Arsenic (V) migrates very slowly, thus, surface water concentrations are the same for all scenarios including baseline (EPRI 2016b).

EPRI also qualitatively compared its hypothetical site analysis to JSF using site-specific data (EPRI 2016a). With respect to surface water, EPRI's sensitivity analysis indicated that this alternative had a negligible difference from the hypothetical site with respect to both low and high mobility constituents under both the non-intersecting groundwater condition and the intersecting groundwater condition.

Because surface water flow and potential lateral movement and groundwater flow to surface waters would be minimized and because all work would be done in compliance with applicable regulations, permits and best management practices, potential direct and indirect impacts of this alternative to surface waters would be negligible.

#### *3.2.2.2 Alternative C – Closure-by-Removal*

No alteration or modification of surface water resources would occur within the immediate project site or associated laydown area. Water withdrawals and discharges impacts would be essentially the same as those described for Alternative B and would include re-routing of project flows and the drawdown of the free water in the Bottom Ash Impoundment.

In contrast to Alternative B which includes consolidating and compacting the CCR, this alternative would entail the removal and transport of approximately 145,000 $yd^3$ of CCR material from the project site to an existing permitted landfill. As a result, any pathways for transport of COCs as a result of lateral movement through the berm or groundwater flow to adjacent surface waters would be substantially reduced. Material placed within the receiving landfill is assumed to be fully contained by an approved liner system such that no sub-surface flow or discharge of COCs to receiving waters would occur.

The construction activities associated with the closure of impoundments impacts would be similar to those described above in Alternative B. Excavation of the CCR material may require working with steeper slopes adjacent to existing structures than Alternative B. The duration of the construction process has the potential to be longer and to require borrow material to be brought on-site and require protective BMPs. The borrow material would be obtained from a previously permitted/developed site shown in Figure 2-2. However, as long as BMPs and mitigation measures are implemented, as needed, no negative or adverse impacts during the construction phase would be expected.

The operational activities associated with the closure of impoundments impacts would be similar to those described above in Alternative B. As long as mitigation measures are utilized as needed, such as water treatment, proper drainage and BMPs, the risk of adverse surface water quality impacts would be reduced.

Because surface water flow, potential lateral movement and groundwater releases to surface waters would be minimized and because all work would be done in compliance with applicable regulations, permits and best management practices, potential direct and indirect impacts to surface waters would be negligible.

## 3.3 Floodplains

### 3.3.1 Affected Environment

The Bottom Ash Impoundment at JSF is located at Holston River Mile 106.1, in Hawkins County, Tennessee. The 100- and 500-year flood elevations on the Holston River at this location are 1078.0 and 1082.3 ft, respectively.

According to Hawkins County, Tennessee, Flood Insurance Rate Maps, the Bottom Ash Impoundment is located outside the limits of the 100-year floodplain of the Holston River, which would be consistent with EO 11988 (see Figure 3-2). The low berm crest elevation of the Bottom Ash Impoundment is 1143.9 ft, which is well above both the 100- and 500-year flood elevations of the Holston River.

### 3.3.2 Environmental Consequences

#### *3.3.2.1 Alternative B – Closure-in-Place*

Under this alternative, ash material would be consolidated within the existing footprint of the Bottom Ash Impoundment. This facility is located outside the 100-year floodplain, which would be consistent with EO 11988. The laydown area is within the old coal yard and above the 100-year floodplain elevation. There would be no impacts to floodplains or floodplain resources due to construction of the final closure system of the Bottom Ash Impoundment.

#### *3.3.2.2 Alternative C – Closure-by-Removal*

As with Alternative B, since the Bottom Ash Impoundment and the coal yard laydown area are not located in the 100-year floodplain, no impacts to floodplains are anticipated. The CCR would be transported to a permitted landfill and, therefore, no floodplain impacts would occur as a result of this alternative.

## 3.4 Vegetation

### 3.4.1 Affected Environment

JSF is located in the Southern Shale Valleys Ecoregion, 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. This 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. The Southern Shale Valleys Ecoregion consists 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. 2001).

Lands associated with JSF have been heavily disturbed by construction, operation and maintenance of the coal-fired generating units and associated structures. Buildings and impervious surfaces cover much of the site, but mowed lawns with scattered landscape trees are also common. The plant community found on-site is intensively managed (i.e., frequently mowed) and is dominated by nonnative herbaceous species. A row of planted pine trees, mowed grass and ornamental trees and shrubs exists alongside buildings and parking lots. A limited number of white ash, sugar maple and American elm trees are located in the open lawn area between the parking lots and discharge channel. Sensitive plant communities or other noteworthy botanical areas are not known to occur on or adjacent to the project area (TVA 2010; TVA 2015).

Within a 2-mi radius of the plant, hay/pasture (3389.7 ac) and deciduous forest (2501.4 ac) are dominant (Table 3-2). The Bottom Ash Impoundment is characterized by predominantly open water (18.7) and early successional herbaceous land cover types (11.9 ac) within exposed ash in the upper portion of impoundment (Figure 3-3). The berms are vegetated by an herbaceous mix dominated by fescue and other grasses. No unique plant communities are present within the proposed project footprint at JSF.

**Table 3-2. Land Use/Land Cover within the Vicinity of JSF**

| Land Cover Type | Permanent[1] and Temporary[2] Use Areas (ac) | 2-Mi Radius (ac) |
|---|---|---|
| Barren Land | 0.4 | 75.1 |
| Cultivated Crops | 0 | 88.5 |
| Deciduous Forest | 0 | 2501.4 |
| Developed, High Intensity | 0 | 14.7 |
| Developed, Low Intensity | 5.2 | 141.1 |
| Developed, Medium Intensity | 0 | 48.0 |
| Developed, Open Space | 0 | 707.7 |
| Emergent Herbaceous Wetlands | 4.0 | 0 |
| Evergreen Forest | 0 | 114.4 |
| Hay/Pasture | 0 | 3389.7 |
| Herbaceous | 11.9 | 411.8 |
| Mixed Forest | 0 | 125.6 |
| Open Water | 18.7 | 358.6 |
| Shrub/Scrub | 0[3] | 48.6 |
| Woody Wetlands | 0 | 16.9 |
| **Total** | **40.2** | **8042.1** |

Source: USGS 2011.

Notes:

(1)Existing CCR Impoundment;

(2)Laydown Area

(3) Scrub shrub wetlands included based on inaccuracies of Land Use/Land Cover mapping. Not actually present in impoundment or laydown area

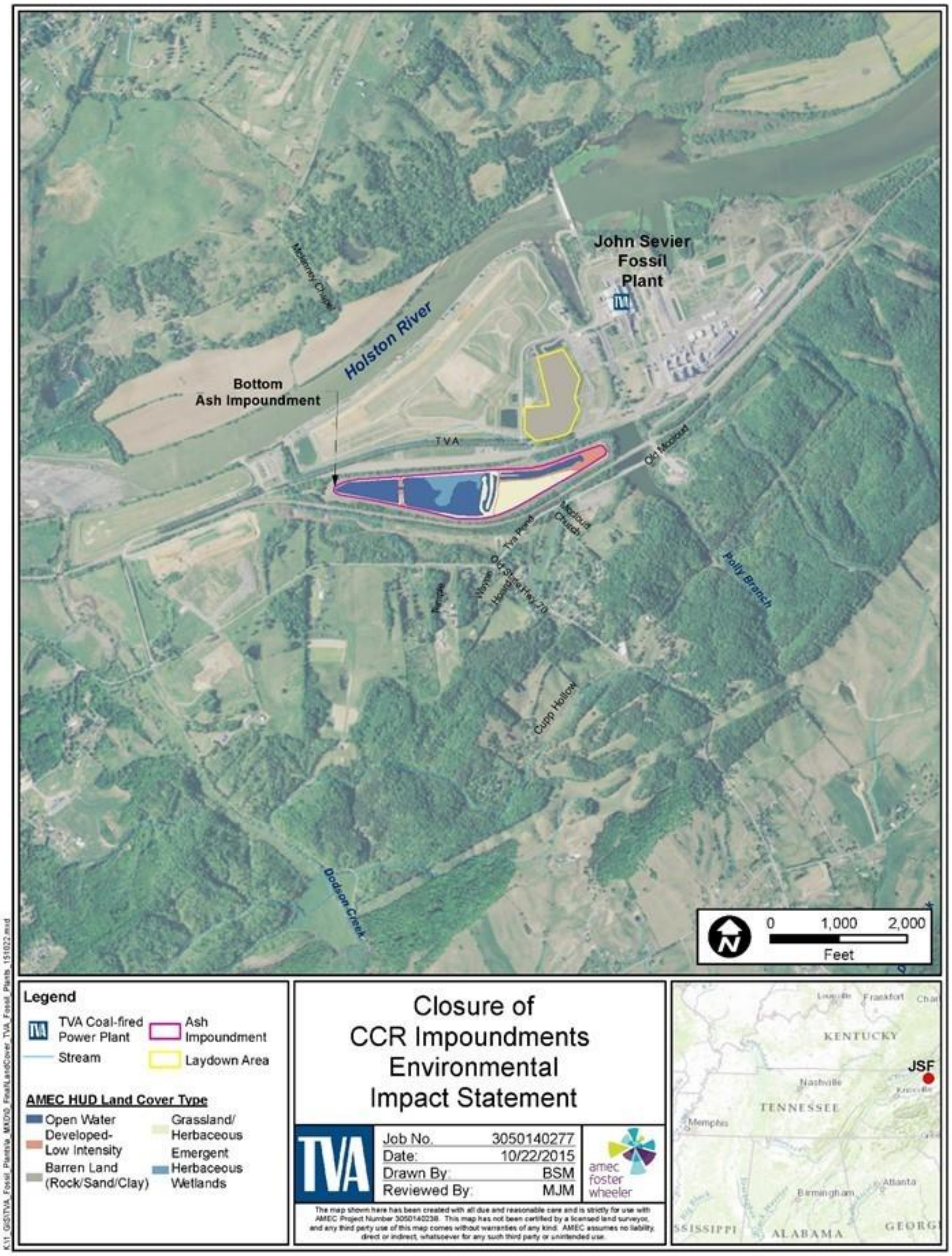


**Figure 3-3. Land Cover Types Associated with Ash Impoundment Closure at JSF**

### 3.4.2 Environmental Consequences

#### *3.4.2.1 Alternative B – Closure-in-Place*

As discussed in Part I, Section 3.9, impacts to vegetation would result from earthmoving activities related to shaping and filling the ash within the impoundment and inward reconfiguration of berms. Because plant communities are poorly represented at JSF (limited to early successional herbaceous land cover types within exposed ash in upper portion of impoundment) and potential impacts are very small relative to the abundance of similar cover types within the vicinity, direct impacts from site construction activities would be negligible. No tree removal would be required under this alternative.

Under Alternative B, the impoundment would be covered with material from a previously permitted borrow site (Sanders Property) located immediately west of the Bottom Ash Impoundment. Potential indirect impacts of the transport of borrow material are associated with the deposition of fugitive dust on adjacent vegetation. However, this potential impact would be minimized by use of BMPs that include covering loads during transport.

Lands within the ash impoundments will also be restored with a cover system that includes the establishment of an herbaceous cover. Temporary use areas will be revegetated with herbaceous vegetation. Transportation of borrow material has the potential to introduce invasive plants that may be transported by trucks. However, BMPs consisting of erosion control measures and use of approved, non-invasive seed mixes designed to establish desirable vegetation would mitigate that risk. Therefore, impacts to vegetation under the Closure-in-Place Alternative would be minor and adverse in the short term, but beneficial in the long term.

#### *3.4.2.2 Alternative C – Closure-by-Removal*

As discussed for Alternative B, impacts to vegetation would result from earthmoving activities related to construction. For this alternative vegetation impacts would occur in conjunction with excavation of the CCR materials and demolition/grading of berms. No tree removal is anticipated to be required to support closure activities under this alternative. Because plant communities within the impoundment and laydown area are poorly represented at JSF (primarily limited to early successional herbaceous land cover types) and potential impacts are very small relative to the abundance of similar cover types within the vicinity, direct impacts from site construction activities would be minor.

Under Alternative C, the excavated impoundments would be filled with material from a previously permitted borrow site located adjacent to JSF. Potential indirect impacts of the transport of borrow material are associated with the deposition of fugitive dust on adjacent vegetation. However, this potential impact would be minimized by use of BMPs that include covering loads during transport.

Lands within the former ash impoundment will also be restored using an approved, non-invasive seed mixes designed to establish desirable vegetation. Ash impoundment re-use would be determined on a site-specific basis, but much of the former ash impoundment may be expected to revert to or naturalized landscapes. Following removal and backfilling of the former Bottom Ash Impoundment, naturalized plant communities similar to those of surrounding cover types are expected to reestablish within the former impoundment. Consequently, this alternative is expected to result in short term impacts to existing disturbed land cover types but would result in potential long-term establishment of natural plant communities. Impacts of this alternative are therefore, minor and adverse in the short term, but minor and positive in the long term.

## 3.5 Wildlife

### 3.5.1 Affected Environment

The area evaluated for wildlife impacts incudes the existing Bottom Ash Impoundment and their immediate surroundings, which include roads and maintained grassed berms. Much of the area within JSF has been heavily impacted and altered as a result of construction and operation of the existing facility. Terrestrial habitat within the project area includes some scattered trees along the ash impoundment. The impoundment may intermittently support variable numbers of waterfowl, wading birds, shorebirds, gulls and other wildlife.

The maintained pond areas and grassed berms offer little suitable habitat for wildlife species, but can be used by many common species, especially when the landscape still retains a few trees. Birds potentially using grassy areas on site include Canada goose, eastern phoebe, eastern kingbird, eastern meadowlark, killdeer, purple martins, red-tailed hawk and rock dove, among others. Mammals potentially using grassed berms and other marginal habitat include common mole, cottontail rabbit, groundhog, least shrew, white-footed mouse, Virginia opossum and white-tailed deer. Examples of birds that utilize planted trees and buildings in industrialized areas include American robin, American goldfinch, blue jay, Carolina chickadee, Carolina wren, chimney swift, eastern towhee, osprey, tufted titmouse, northern cardinal, northern mockingbird and yellow breasted chat (TVA 2015). Reptiles found in these areas are fence lizards, five-lined skinks, rat and ring-necked snakes.

The TVA Natural Heritage database in 2015 indicated one cave within 3 mi of the project area (TVA 2015). No caves or other unique or important terrestrial habitats are known to occur in the immediate project area and no heronries have been reported within 3 mi of the project area. However, one aggregation of migratory birds (swallows, common to bridges and open buildings) and four osprey nests were encountered during field reviews at JSF in 2015 (TVA 2015). In addition, bank swallows have historically nested in the ash stacks at John Sevier Fossil Plant. However, none of these resources were identified in the vicinity of the Bottom Ash Impoundment or associated laydown area.

### 3.5.2 Environmental Consequences

#### *3.5.2.1 Alternative B – Closure-in-Place*

The project site occurs within a highly fragmented, industrial landscape that offers minimal habitat for wildlife. Under this alternative, the resident, common and habituated wildlife found in the project area would continue to opportunistically use available habitats within the project area. No tree clearing would occur in conjunction with closure activities within the ash impoundment area or associated laydown area (see Table 3-2 and Figure 3-3). Additionally, in consideration of the large distance to documented heron rookeries or established osprey nesting sites, no impacts to these species are expected. During construction, most wildlife present within the project site would likely disperse to adjacent and/or similar habitat.

The closure of the Bottom Ash Impoundment would result in a loss of marginally suitable waterfowl and wading bird habitat. There is adequate waterfowl habitat elsewhere in the project vicinity along the Holston River and the loss of this on-site bird habitat would be minor. Work activities should not affect heron rookeries or other aggregations of migratory birds.

Following the construction period, some limited wildlife use of the closed impoundment may be expected. The Bottom Ash Impoundment is proposed to be closed by using a geosynthetic and protective soil cover system and may, therefore, be expected to provide limited foraging and nesting habitat for grassland species. The resulting habitat would be of marginal quality and is not anticipated to support large populations of these species.

In consideration of the highly disturbed habitats present within the project area and associated temporary laydown area, the availability of higher quality wildlife habitat in the proximity and the potential functional value of the installed vegetated cover system, potential direct and indirect impacts to associated wildlife are expected to be minor and potentially slightly beneficial in the long term.

#### *3.5.2.2 Alternative C – Closure-by-Removal*

As discussed for Alternative B, the area of permanent and temporary impact is primarily comprised of developed/disturbed land that is generally low quality habitat for wildlife. Construction-related activities and associated impacts with Alternative C are similar to those described above and effects of habitat alteration on wildlife would be similar. As with Alternative B, the former impoundment would be filled with material from a previously permitted borrow site located adjacent to JSF. Lands within the former ash impoundment will be restored using an approved, non-invasive seed mixes designed to establish desirable vegetation that would support periodic use by wildlife.

In consideration of the highly disturbed habitats present within the project area and the associated temporary laydown area, the availability of higher quality wildlife habitat in the proximity and the potential restoration of the former impoundment, potential direct and indirect impacts to associated wildlife are expected to be minor and beneficial in the long term.

## 3.6 Aquatic Ecology

### 3.6.1 Affected Environment

JSF is located along the Holston River near Rogersville in Hawkins County, Tennessee at HRM 106.5. The reach of the Holston River adjacent to JSF has changed from its former free-flowing character by the presence of the John Sevier Detention Dam and Cherokee Dam, approximately 35.5 mi downstream. The area affected by the Cherokee Reservoir extends to the tailwaters of the John Sevier Detention Dam.

The Bottom Ash Impoundment is located south of the facility along Polly Branch Creek, just upstream of its confluence with the Holston River in Cherokee Reservoir. TVA conducted baseline sampling in the vicinity of JSF in 2011 and in 2012. It is expected that aquatic resources within Polly Brach Creek are similar to the Cherokee Reservoir, given adjacency and backwater influence in the lower portions of Polly Branch Creek near the facility.

Shoreline and substrate sections were evaluated for aquatic habitat upstream and downstream of JSF in 2012. The shoreline sections had average scores of “fair.” The substrate was dominated by clay (73.7 percent), bedrock (21.0 percent) and detritus (4.9 percent) downstream of JSF and by silt (75.8 percent), detritus (10.7 percent) and sand (7.0 percent) upstream of JSF (TVA 2013).

TVA has evaluated the health of the fish community near HRM 106.3, downstream of JSF and at HRM 109.4, upstream of JSF. The fish community rated “fair” at both of these locations in 2012. Historically, the fish community has rated “good” or “fair” at these locations.

During the 2012 study, 21 indigenous species were collected at the downstream site and 18 at the upstream site; this includes 10 commercially valuable and 13 recreationally valuable species:

- Common centrarchid species present at JSF included black crappie, bluegill, redear sunfish, warmouth, green sunfish and redbreast sunfish.
- Benthic invertivore species present included northern hogsucker, golden redhorse, black redhorse and logperch.
- Top carnivore species present included largemouth bass, smallmouth bass, rock bass, spotted bass, black crappie and flathead catfish.
- Intolerant species present included northern hogsucker, smallmouth bass, bigeye chub, rock bass, black redhorse and brook silverside. In addition, two thermally sensitive species, bigeye chub and logperch, were present.
- One aquatic nuisance species, the common carp, was collected at the downstream and upstream sites (TVA 2013).

In 2008, the last year TVA conducted Sport Fishing Index analysis, Cherokee Reservoir rated better than average for largemouth bass and striped bass; the Sport Fishing Index rating was below average for black basses, channel catfish, smallmouth bass, spotted bass and walleye.

Benthic community data was collected from two sites, upstream and downstream of JSF, in 2011 and 2012 at HRM 106.7 and 109.3. The upstream control site was scored using transition zone criteria and the downstream site using forebay zone criteria, due to the differences in flow regime at the locations. As such, taxa richness and species densities varied between sites and year. However, monitoring scoring results for 2011 and 2012 support the conclusion that balanced indigenous populations of benthic macroinvertebrates are maintained downstream of JSF. This parallels benthic community scores in Cherokee Reservoir from 2000 to 2010.

### 3.6.2 Environmental Consequences

#### *3.6.2.1 Alternative B – Closure-in-Place*

Under Alternative B, no direct impacts to aquatic ecosystems are expected from the in-place closure of the Bottom Ash Impoundment at JSF. The former coal yard used for plant deconstruction will be used as a temporary laydown area to support closure activities. Consequently, no direct impacts to aquatic ecosystems would occur in conjunction with planned closure activities.

The wastewater discharges during dewatering will meet existing permit limits and compliance sampling will continue to be performed at the approved outfall structure (Outfall 006) in accordance with the NPDES permit to demonstrate compliance. Additionally, any construction activities would adhere to permit limit requirements and would utilize BMPs to minimize indirect effects on aquatic resources in Polly Brach Creek and the Holston River. The use of the former coal yard is currently permitted under a Storm Water

Pollution Prevention Plan (SWPPP). Therefore, adverse effects to aquatic resources under this alternative are expected to be minor and temporary.

#### *3.6.2.2 Alternative C – Closure-by-Removal*

Under Alternative C, no direct impacts to aquatic ecosystems are expected from the proposed closure of Bottom Ash Impoundment at JSF. The former coal yard used for plant deconstruction will be used as a temporary laydown area to support closure activities. Consequently, no direct impacts to aquatic ecosystems would occur in conjunction with planned closure activities.

The wastewater discharges during dewatering will meet existing permit limits and compliance sampling will continue to be performed at the approved outfall structure (Outfall 006) in accordance with the NPDES permit to demonstrate compliance. Additionally, any construction activities would adhere to permit limit requirements and would utilize BMPs to minimize indirect effects on aquatic resources in Polly Brach Creek and the Holston River. The use of the former coal yard is currently permitted under a SWPPP. Therefore, effects to aquatic resources under this alternative are expected to be minor and temporary.

## 3.7 Threatened and Endangered Species

### 3.7.1 Affected Environment

A review of the TVA Natural Heritage Database in September 2015 revealed occurrence records for three listed species within a 2-mi radius of JSF as summarized in Table 3-3. Two additional federally listed bat species, the Indiana bat and northern long-eared bat (NLEB), are known to occur throughout the region and thus are included in Table 3-3. Occurrence records for listed aquatic species or plant species do not occur within the 2-mi vicinity. In addition, one cave and one colonial wading bird rookery is known to occur within 2-mi of JSF.

**Table 3-3. Species of Conservation Concern within the Vicinity of JSF**

| Common Name | Scientific Name | Status | |
|---|---|---|---|
| | | Federal[1] | State[2] (Rank[3]) |
| **Birds** | | | |
| Bald eagle | *Haliaeetus leucocephalus* | DM | NMGT (S3) |
| Virginia rail | *Rallus limicola* | -- | TRKD (S1) |
| **Mammals** | | | |
| Northern long-eared bat[4] | *Myotis septentrionalis* | LT | (S1S2) |
| Indiana bat[4] | *Myotis sodalis* | LE | END (S1) |
| Southern bog lemming | *Synaptomys cooperi* | -- | NMGT (S4) |

Source: TVA Regional Natural Heritage database, accessed 09/18/2015; Species documented within 2 mi of JSF

[1] Federal Status Codes: DM = Delisted, Recovered and Being Monitored; LE = Listed Endangered; LT = Listed Threatened; PE = Proposed Endangered; CAND = candidate for federal listing;

[2] State Status Codes: END = listed endangered; NMGT = Listed in Need of Management; S-CE = special concern, commercially exploited; SPCO = species of special concern; THR = listed threatened; TRKD = tracked as sensitive but has no legal status; NOST = no status

[3] State Rank: S1 = Extremely rare and critically imperiled; S2 = Very rare and imperiled; S3 = Vulnerable; S4 = Apparently secure, but with cause for long-term concern; SH = Historic in Tennessee; S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2).

[4] Known throughout the region but no occurrence records within 2 mi of the project site.

Southern bog lemmings are typically found in wet grasslands, marshes and wetlands. They can also be found in upland deciduous/coniferous forests. Southern bog lemmings require dense, matted groundcover for nesting and tunneling. The location of a historical record of this species occurs within two mi of JSF. Suitable habitat for the southern bog lemming is lacking within the project area (TVA 2015).

A single dead Virginia rail was collected in 2009 from the north side of JSF during a stream survey. Virginia rails prefer marshes and wetlands with shallow water, cattails, bulrushes and an abundance of invertebrates on which to forage. Suitable habitat for Virginia rail is lacking from within the project area (TVA 2015).

Bald eagles have been delisted from the federal Endangered Species Act of 1973 (ESA) but are protected under the Bald and Golden Eagle Protection Act and managed in accordance with the National Bald Eagle Management Guidelines (Pruitt and TeWinkel 2007). This species is associated with large, mature trees capable of supporting its massive nests. These nests are usually found near larger waterways over which eagles forage. Records document the occurrence of four bald eagle nests within 2 mi of JSF. These nests were documented along the edges of fields adjacent to the Holston River. The closest of these recorded nests is approximately 0.9 mi from the project area. Three of these nests are thought to be secondary nests rather than a primary nesting site. Suitable nesting habitat does not exist for bald eagles in JSF. No bald eagle nests or resident bald eagle pairs were observed within the project area during field surveys conducted in July 2014 (TVA 2015).

Indiana bats hibernate in caves and typically roost during summer in mature forests with open understories, suitable roost trees and nearby sources of water (USFWS 2007). Roosts are formed under the exfoliating bark of live and dead trees (Pruitt and TeWinkel 2007; Kurta et al. 2002). A known Indiana bat cave hibernacula is located approximately 12.5 mi from the project area. No caves have been documented within the project area; the nearest documented cave is approximately 2.0 mi from the project area. Although limited foraging habitat may exist on site, suitable summer roosting habitat for the Indiana bat is absent from within the project site. Tree clearing is not anticipated in the ash impoundment and temporary laydown area.

Roosting habitat for the northern long-eared bat includes caves or cave-like structures as well as live and dead trees with exfoliating bark and crevices. NLEBs tend to forage within the midstory and canopy of upland forests on hillsides and ridges (USFWS 2014). Although limited foraging habitat may exist on site, suitable summer roosting habitat for the NLEB is absent from within the project site. Tree clearing is not anticipated in the ash impoundment and temporary laydown area.

### 3.7.2 Environmental Consequences

#### *3.7.2.1 Alternative B – Closure-in-Place*

The area of permanent and temporary impact subject to project activities under this alternative is primarily comprised of developed or disturbed land that is generally unsuitable for the listed species in Table 3-3. The Bottom Ash Impoundment and temporary laydown area have been severely degraded and are populated with weedy, non-native species. Although low-quality foraging habitat for the listed bat species may occur in the open water areas of the ash impoundment, suitable roosting habitat for the bald eagle and listed bat species is absent from within the project area and tree clearing is not anticipated with the proposed action.  Furthermore, suitable habitat for the southern bog lemming and Virginia rail does not occur within the project area.

Because suitable habitat for the species in Table 3-3 is either absent or degraded within the ash impoundment and temporary laydown area and because no tree removal would occur, no impacts to threatened and endangered species are expected with this alternative.

#### *3.7.2.2 Alternative C – Closure-by-Removal*

As discussed for Alternative B, the area of permanent and temporary impact is primarily comprised of developed/disturbed land that is generally unsuitable for the listed species in Table 3-3.  Construction related activities and associated impacts with Alternative C are similar to those described above.  For these reasons, impacts to listed threatened and endangered species are not anticipated.

## 3.8 Wetlands

### 3.8.1 Affected Environment

JSF is located in the Holston River watershed and within the Southern Shale Valleys Ecoregion, 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 (Griffith et al. 2001). The relatively steep and rolling topography of the region affects the type, location and extent of wetlands.  In general, low-lying, poorly drained areas are confined to floodplains and large (greater than 10 ac) wetlands are uncommon.

The proposed construction footprint includes the Bottom Ash Impoundment and a temporary laydown area as depicted in Figure 3-2.  National Wetland Inventory mapping includes 6.6 ac of open water within the ash impoundment.  The temporary laydown area is located within the former coal yard and lacks any wetland resources.  The NPDES outfall from the Bottom Ash Impoundment discharges through a riprapped channel to the Holston River.  However, the majority of the process waste water flows on-site have either ceased completely or have greatly been reduced due to the closure of the facility.

Although the USFWS mapped the National Wetland Inventory features within the ash impoundment, this water feature is a JSF treatment system and would not be regulated as waters of the United States under Section 404 of the CWA.  Based on site photographs and aerial imagery, the impoundment appears to consist mostly of open water, riprap banks and some opportunistic wetland vegetation.  The temporary laydown area is located in a disturbed open area on the JSF site as depicted in Figure 3-2.

### 3.8.2 Environmental Consequences

#### *3.8.2.1 Alternative B – Closure-in-Place*

Closure of the impoundment would include installation of an approved cover system consisting of a geosynthetic liner and a protective soil cover using borrow material from an established borrow site.  The temporary laydown area would be used to store equipment and materials during the construction phase and would be restored with herbaceous cover upon completion.  Because existing ash impoundments are not jurisdictional wetlands and the laydown area is upland, permanent direct impacts to jurisdictional wetlands are not anticipated.

Indirect impacts to nearby jurisdictional or non-jurisdictional wetlands as a result of the alteration of hydrologic inputs to the wetland system due to the closure of the impoundments are not anticipated. Jurisdictional wetlands adjacent to the ash impoundments have a hydrology that is dominated by water levels within the adjacent Holston River. Therefore, any modification of hydrologic inputs from the ash impoundment is expected to have a negligible effect on these wetlands. Adjacent non-jurisdictional wetlands that may be perpetuated by lateral movement of water from the impoundment berms (seepage) (typically small, linear wetlands) may be reduced in size or eliminated by reductions in hydrology associated with impoundment closure. Additionally, flow from the impoundment has been greatly reduced due to retirement of the four coal units. This cannot be avoided if these facilities are closed under either closure method. In terms of EO 11990, there is no practicable alternative that would avoid impacting such wetlands.

Potential indirect impacts resulting from construction activities may also include erosion and sedimentation from storm water runoff during construction into off-site or nearby jurisdictional and non-jurisdictional wetlands. BMPs in accordance with site-specific erosion control plans would be implemented to minimize this potential. Any temporary indirect impacts to wetland areas due to construction activities would be short-term and minor.

#### *3.8.2.2 Alternative C – Closure-by-Removal*

Impacts to jurisdictional wetlands are not expected to occur within the Bottom Ash Impoundment because ash impoundments are considered treatment systems and are excluded from regulation under Section 404 of the CWA. Similarly, use of temporary laydown areas would not result in impacts to wetlands.

Potential indirect impacts resulting from construction activities may also include erosion and sedimentation from storm water runoff during construction into off-site or nearby jurisdictional and non-jurisdictional wetlands. BMPs in accordance with site-specific erosion control plans would be implemented to minimize this potential. Any temporary indirect impacts to wetland areas due to construction activities would be short-term and minor.

As removed, CCR will be transported to a permitted landfill. Therefore, no wetland impacts are anticipated from this part of the closure activity.

## 3.9 Natural Areas, Parks and Recreation

### 3.9.1 Affected Environment

Three managed areas (i.e. natural areas, parks, wildlife management areas, recreational areas, etc.) occur within 2 mi of the Bottom Ash Impoundment (Figure 3-4) (TVA 2015). This section addresses managed areas that are on or near the Bottom Ash Impoundment as potential impacts from closure activities would generally occur in areas in the vicinity of the impoundment.

Public use recreational areas located on JSF property include a boat launching ramp and loop walking trail located approximately one mile below the John Sevier Detention Dam and a shoreline fishing walkway located just below the dam. The ramp and walking trail are located about 0.2 mi northwest of the Bottom Ash Impoundment. In the past, a small campground was also located in this area. This facility was permanently closed in 2013 due to safety and security issues and low levels of public use. Access to the ramp and trail is from TVA Road, which also provided access to the retired coal plant.

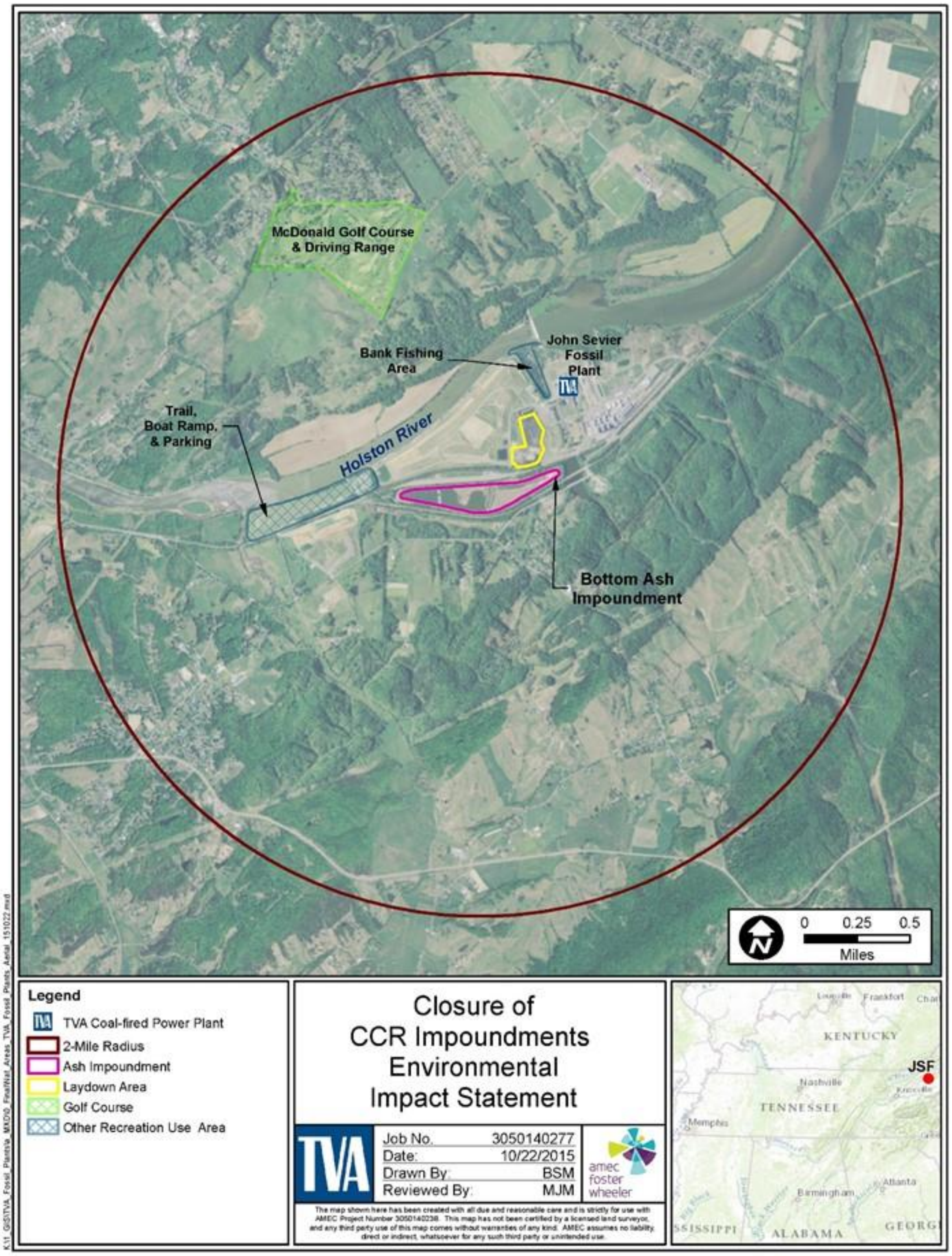


**Figure 3-4. Natural Areas, Parks and Recreational Facilities Near JSF**

Facilities at the bank fishing area include a gravel parking lot and a concrete walkway that extends along both banks of the fossil plant cooling water discharge channel and also provides access to the waters just below the detention dam. This area was closed to the public in 2013 due to public safety and security issues related to construction at the adjacent Dry Ash Pond (TVA 2015). Access to this facility is also provided via TVA Road.

### 3.9.2 Environmental Consequences

#### *3.9.2.1 Alternative B – Closure-in-Place*

Under Alternative B, TVA would close the Bottom Ash Impoundment in place. As discussed in Part I, Section 3.15, there would be no direct impact to natural areas, parks or recreation areas as the ash impoundment is located on an industrial area and borrow material would be obtained from a previously permitted site. However, because of the long-term need to adequately secure and manage the closed ash impoundment and to ensure the safety of the public, TVA is considering permanent closure of all existing recreation facilities at JSF. This would impact recreation uses. Accordingly, TVA is determining how the resulting impacts on public recreation users could be mitigated including development of new boat launching and bank fishing facilities in the area. After additional study, if TVA proposes such new facilities it would assess the impacts of this as appropriate in an additional environmental review. This would include an opportunity for public input.

As discussed in Chapter 2, off-site borrow material to complete the closure would be obtained from a previously permitted site located just west of the plant and would require transport of material approximately 0.7 mi on surrounding public roadways (Old Tennessee 70 to TVA Road). There are no parks, wildlife management areas or recreational areas in the vicinity of these roadways and there would be no indirect impact to recreational facilities or natural areas from transportation of borrow.

#### *3.9.2.2 Alternative C – Closure-by-Removal*

As discussed for Alternative B, there would be no direct impact to natural areas, parks or recreational areas under this alternative as the ash impoundment is located in an industrial area. Borrow material would be obtained from a previously permitted site and all CCR material would be hauled to an off-site permitted landfill for disposal. As with Alternative B, TVA is considering permanent closure of all existing recreation facilities at JSF. TVA would conduct additional studies to determine if the impact on recreation use could be mitigated by development of new boat launching and bank fishing facilities in the area.

As identified under Alternative B, there would be no indirect impacts from on-site construction activities given the existing industrial setting of the project location and the distance between the natural areas, parks or recreational facilities and the construction site.

As with Alternative B, borrow material would be obtained from a permitted site located just west of the plant and the haul route would not impact any recreational facilities or natural areas. The landfill being considered for the disposal of CCR from JSF is the Carter Valley Landfill located approximately 25 mi northeast of the facility (see Figure 2-2). As noted in the Chapter 2, the proposed haul route includes US 11 and TN 70 and there are no parks, recreation or natural areas located along that route. Therefore there should be no indirect impact to natural areas, parks or recreation associated with the transport of CCR to the Carter Valley Landfill.

## 3.10 Transportation

### 3.10.1 Affected Environment

JSF is served by highway, railway and waterway modes of transportation. Traffic generated by JSF is expected to be composed of a mix of cars and light duty trucks, as well as medium duty to heavy duty trucks. Immediate access to and from the ash impoundment is to and from TVA Road, which intersects Old Tennessee 70 approximately 1.5 mi west of JSF.

Roadways to be considered as the proposed haul route for transport of borrow and for transport of CCR are identified in Figure 2-2. These proposed haul routes would incorporate several local roadways in the affected environment. There are no published daily traffic records for TVA Road and Old Tennessee 70. Traffic volumes on roads in close proximity to TVA Road and Old Tennessee 70 are under 1,000 vehicles per day. Due to the similar nature of the roads along the proposed borrow haul route, it is expected that the traffic volumes on these roads are also less than 1,000 vehicles per day. However, as a conservative estimate, 1,000 vehicles per day is assumed (Table 3-4).

**Table 3-4. Average Daily Traffic Volume (2013) Along the JSF Proposed Haul Routes**

| Roadway | Average Annual Daily Traffic (AADT) |
|---|---|
| TVA Road | 1,000 |
| Old Tennessee 70 | 1,000 |
| State Hwy. 66 between Old Tennessee 70 and US 11W | 12,114 |
| US 11W east of Stanley Valley Road | 10,541 |

Source: Tennessee Department of Transportation 2013.

### 3.10.2 Environmental Consequences

#### *3.10.2.1 Alternative B – Closure-in-Place*

Traffic generated by the closure of the Bottom Ash Impoundment would consist of the construction workforce, shipments of goods and equipment and the hauling of borrow material to the site to be used in the Closure-in-Place activities. Borrow material for the impoundment closure would come from the Sanders property, located 0.7 mi west of the Bottom Ash Impoundment. The peak period of transportation-related closure activities are not expected to last more than 12 months. The number of daily truckloads (of borrow material) would be 45 and would be done by 15-yard tandem dump trucks. This would result in a traffic count of 90 trucks per day.

The construction workforce traveling to and from JSF would contribute to the traffic on the local transportation network. A construction workforce of 75 to 100 could be expected to support closure activities under this alternative. This workforce volume would occur at the beginning and ending of the work day. Additional construction-related vehicles (dozers, backhoes, graders, loaders, etc.) would be delivered to the Bottom Ash Impoundment on flatbed trailers under both the mobilization and demobilization stages of the project. Overall, the traffic volume generated by the construction workforce and the construction-related vehicles would be relatively minor and it is assumed that these motorists would disperse throughout the transportation network and use interstate highways or major arterial roadways as much as possible. Once construction is completed, maintenance phase traffic associated with the closed impoundment would be negligible.

The existing traffic volume on Old Tennessee 70 is assumed to be very low (approximately 1,000 vehicles per day) and extremely localized. The increase in the traffic count as a result of the hailing of borrow to the site is 90 trucks per day. Because this traffic increase is projected to be minor, the effects of the Closure-in-Place of the Bottom Ash Impoundment at JSF on transportation are minor and temporary.

#### *3.10.2.2 Alternative C – Closure-by-Removal*

Traffic generated by the removal of CCR and closure of the Bottom Ash impoundment would consist of the construction workforce, shipments of goods and equipment, the hauling of CCR off site to a permitted landfill and the hauling of borrow material to the site to be used to cover the site after removal of the CCR.

As with Alternative B, the traffic volume generated by the construction workforce and the construction-related vehicles would be relatively minor and it is assumed that these motorists would disperse throughout the transportation network and use interstate highways or major arterial roadways as much as possible. Once construction is completed, maintenance phase traffic associated with the closed impoundment would be negligible.

Removal within a reasonable construction schedule would result in 77,000 truckloads of CCR to a Subtitle D landfill. It is anticipated that up-front permitting and planning will take 6 months and post-closure site restoration and permit close-out will take 6 months. TVA expects the rate of removal would result in the transport of an average of up to 100 truckloads of CCR per day (Figure 2-3). This would equate to a daily traffic count of 200 trucks passing by a given location each day (22 per hour). Due to the amount of CCR to be hauled from the site (770,000 $yd^3$) the duration of the hauling operation would exceed the 5-year timeframe that EPA set for completing impoundment closures. However as previously noted, this scenario is evaluated in the EIS given the reasonable nature of construction.

The number of daily haul (of borrow material) trips would be 45 and would be done by 15-yard tandem dump trucks over a period of not more than 12 months. Borrow material for the impoundment closure would come from the Sanders property, located 0.7 mi west of the Bottom Ash Impoundment. This results in a traffic count of 90 trucks per day. Therefore, traffic generated by the haul off of CCR is the controlling factor in assessing impacts to the local roadway network for Alternative C. For the purposes of this analysis, the bounding level of truckloads (100 per day), as set in Part I of this EIS, is used to assess impacts to the roadway network.

Transport of CCR is assumed to take the following route from the Bottom Ash Impoundment to the Carter Valley landfill in Hawkins County: west on TVA Road to Old Tennessee 70; then west on Old Tennessee 70 to SH 66/70; then north on SH 66/70 to US 11W; then east on US 11W to Bradley Creek Road; then north on Bradley Creek Road to West Carter Valley Road; then across Carter Valley Road to Landfill Road to the landfill. The total one-way haul distance is approximately 25 mi. Traffic impacts associated with the hauling off of CCR are reflected in Table 3-5.

**Table 3-5. Traffic Impacts Associated with the Closure-by-Removal of the Bottom Ash Impoundment**

| Roadway | 2013 Traffic (AADT) | Construction Phase Traffic (AADT)[1] | Traffic Increase (Percent) |
|---|---|---|---|
| TVA Road | 1,000 | 1,200 | 20.0 |
| Old Tennessee 70 | 1,000 | 1,200 | 20.0 |
| State Hwy. 66/70 between Old Tennessee 70 and US 11W | 12,114 | 12,314 | 1.6 |
| US 11W east of Stanley Valley Road | 10,541 | 10,741 | 1.9 |

[1] Based on CCR Haul Truck Traffic = 200 vehicles per day

The existing traffic volumes on TVA Road and Old Tennessee 70 is assumed to be very low (approximately 1,000 vehicles per day) and extremely localized. The total increase from the hauling of CCR would increase traffic counts by 20 percent. However, even with this increase, the volumes on TVA Road and Old Tennessee 70 would still result in good levels of service on these roadways and the increase would only be temporary and last for approximately five months. The percentage increases in traffic volume on State Highway 66 and on US 11W are relatively minor. Therefore, the potential impacts of hauling CCR on roadway transportation from the Bottom Ash Impoundment to Carter Valley Landfill are expected to be minor and temporary.

## 3.11 Cultural and Historic Resources

### 3.11.1 Affected Environment

JSF has been previously surveyed for cultural resources. These surveys were conducted to satisfy the requirements of Section 106 of the National Historic Preservation Act of 1966. No archaeological sites or architectural properties listed or eligible for listing on the National Register of Historic Places (NRHP) were identified within the footprint of the Bottom Ash Impoundment. The JSF plant has been recommended as eligible for listing on the NRHP. The ash impoundment, however, is not included as a contributing element in the eligibility recommendation.

### 3.11.2 Environmental Consequences

#### *3.11.2.1 Alternative B – Closure-in-Place*

Under Alternative B, TVA would close the Bottom Ash Impoundment in place. As discussed in Part I, Section 3.18, there would be no direct impact to cultural resources as the ash impoundment is located in a previously disturbed area and the proposed laydown area is the coal yard. The Tennessee Historical Commission concurred that the project will have no effect on any cultural resources listed on or eligible for the NRHP (Tennessee Historical Commission 2016) (see Part I, Appendix C).

Off-site borrow material to complete the closure would be obtained from a previously permitted site located just west of the plant and would require transport of material for a short distance on surrounding public roadways (Old Tennessee 70 to TVA Road). No known cultural resources have been identified along the public roadways. Therefore, no direct or indirect impacts to cultural resources would occur with Alternative B.

#### *3.11.2.2 Alternative C – Closure-by-Removal*

The site-specific impacts for Alternative C – Closure-by-Removal for the Bottom Ash Impoundment are similar to the impacts for Alternative B. The ash impoundment is located in a previously disturbed area. The proposed laydown area is the former coal yard and no known cultural resources have been identified in this previously disturbed area. In addition, all CCR removed from the ash impoundment would be transported to a permitted landfill and this landfill would have previously undergone Section 106 review to evaluate potential impacts to historic resources. Transporting CCR to a permitted landfill would have similar temporary impacts as those discussed under Alternative B for transporting borrow material. Indirect impacts would be minor and would not impair or have an adverse effect on historic properties. The Tennessee Historical Commission concurred that the project will have no effect on any cultural resources listed on or eligible for the NRHP (Tennessee Historical Commission 2016) (see Part I, Appendix C).

## 3.12 Noise

### 3.12.1 Affected Environment

The area surrounding JSF consists of open farmland, residential properties and the Holston River. The closest sensitive receptor is a residence located along Old Tennessee 70, approximately 633 feet south of the Bottom Ash Impoundment.

Operational changes have reduced the overall noise generated at JSF. The coal plant itself does not generate much noise outdoors since ceasing operations in 2012. Ambient noise levels in the vicinity of JSF were measured in 2009 (TVA 2015). Noise measurements at residences just south of the Bottom Ash Impoundment on McCloud Church Road averaged 46 A-weighted decibels (dBA) during periods without trains or coal unloading. Because JSF is no longer operational and subject to deconstruction, this is representative of current conditions at JSF.

There are no federal, state, or local regulations for community noise in Hawkins County, Tennessee, however, EPA (1973) guidelines recommend that Day-Night Sound Level (Ldn) not exceed 55 dBA. HUD considers an Ldn of 65 dBA or less to be compatible with residential areas (HUD 1985).

### 3.12.2 Environmental Consequences

#### *3.12.2.1 Alternative B – Closure-in-Place*

As discussed in Part I, Section 3.19, noise impacts under this alternative would be associated with on-site closure activities, transport of borrow material and construction-related traffic (construction workforce and the shipment of goods and equipment) to and from the closure site.

Typical noise levels from construction equipment are expected to be 85 dBA or less at a distance of 50 ft from the construction site. Based on straight line noise attenuation, it is estimated that noise levels from these sources would attenuate to 62.9 dBA at the nearest residence south of the Bottom Ash Impoundment. However, the actual noise would probably be lower in the field, where objects and topography would cause further noise attenuation. This level exceeds the EPA noise guideline for Ldn of 55 dBA, but is less than the HUD guideline for Ldn of 65 dBA. However, given the temporary and intermittent nature of construction noise, the noise impact associated with on-site closure activities is expected to be minor.

There is a potential for indirect noise impacts associated with the increase in construction-related traffic and the transport of borrow material to the closure site. Construction-related traffic on local roads in the vicinity of JSF could increase traffic volumes and the associated traffic noise. Off-site borrow material to complete the closure would be obtained from a previously permitted site located less than one mile from the site and there would be minimal use of public roads to transport borrow material to the closure site (see Figure 2-2).

As identified in Section 3.10, the percentage increases in traffic on the surrounding road network is minor and therefore the increase in current noise levels is estimated to be less than 3 dBA and as such traffic noise is not anticipated to increase perceptibly. There are no noise sensitive receptors proximate to the haul route and given the increase in construction-related truck traffic (45 loaded trucks per day), the impact to residents in the surrounding area would be negligible. Therefore given the temporary and intermittent nature of closure activities and negligible increase in noise levels, indirect impacts would be negligible.

#### *3.12.2.2 Alternative C – Closure-by-Removal*

As identified for Alternative B, based on straight line noise attenuation, it is estimated that noise levels from on-site construction activities would attenuate to 62.9 dBA at the nearest residence south of the Bottom Ash Impoundment. However, the actual noise would probably be lower in the field, where objects and topography would cause further noise attenuation. This level exceeds the EPA noise guideline for Ldn of 55 dBA, but is less than the HUD guideline for Ldn of 65 dBA. However, given the temporary and intermittent nature of construction noise, the noise impact associated with on-site closure activities is expected to be minor.

Indirect impacts associated with the transport of borrow material and other construction related traffic would be similar as those described for Alternative B.

The landfill being considered for the disposal of CCR from JSF is the Carter Valley Landfill located approximately 25 mi northeast of JSF. The proposed route to the landfill is identified in Figure 2-2. This route traverses pockets of developed commercial and residential areas along US 11W and SH66/70. Given the volume of CCR estimated within the Bottom Ash Impoundment at JSF (770,000 $yd^3$), CCR removal operations would extend beyond that needed for Alternative B and would add 100 truck trips per day (traffic count of 200) to these roadways. This temporary increase in traffic would not yield a substantive enough change in traffic volume to have a perceptible increase in traffic noise. However, the additional 200 truck trips per day (0.4 vehicles per minute) during the closure period would result in noise emissions corresponding to the frequency of these trips. Therefore this alternative would have a greater noise impact than for Alternative B. Given the temporary and intermittent nature of closure activities and negligible increase in noise levels, indirect impacts associated with this alternative would be moderate and temporary.

## 3.13 Cumulative Effects

This section tiers from the analysis in Part I. Based on the resources of potential concern and the geographic area in which potential adverse effects from site-specific activities have the potential to alter (degrade) the quality of the regional environmental resource. The appropriate geographic area of analysis for JSF is therefore limited to the immediate project area and vicinity (2-mi radius) surrounding JSF and the associated haul route. For air quality, the geographic area is the county.

This analysis is limited to only those resource issues potentially adversely affected by project activities. Resources that are not affected or that have an overall beneficial impact as a result of the proposed action are not considered for cumulative effects. Accordingly, land use, prime farmland, geology and seismology, floodplains, surface water, groundwater, vegetation, wildlife, aquatic ecology, threatened and endangered species, socioeconomics, environmental justice, natural areas, visual, cultural, hazardous materials/waste and safety resources are not included in this analysis as these resources are either not adversely affected, or the effects are considered to be minimal or beneficial. Primary resource categories specifically considered in this cumulative effects assessment include air quality, transportation and noise.

### 3.13.1 Identification of "Other Actions"

Past, present and reasonably foreseeable future actions that are appropriate for consideration in this cumulative analysis are listed in Table 3-6. The deconstruction of JSF was identified as the only additional action (above the baseline condition) that warranted consideration as part of the cumulative effects analysis. No other past, present, or reasonably foreseeable future actions were identified.

**Table 3-6. Summary of Other Past, Present or Reasonably Foreseeable Future Actions in the Vicinity of the Proposed Project**

| Actions Description | Description | Timing and Reasonable Foreseeability |
|---|---|---|
| JSF Plant Deconstruction | Demolition of fossil plant and return of the site to brownfield conditions | Present, Reasonably Foreseeable Future |

The coal-fired power generation produced at JSF was replaced with a natural gas-fired combined-cycle plant on the John Sevier reservation in April 2012. Generation at this site was transferred from coal to natural gas to help TVA maintain base-load generation and help TVA meet obligations to reduce emissions under the Clean Air Act. The four JSF coal-fired units are shut down and disconnected from TVA's transmission system. TVA has determined that the abandoned structures, roads and parking lots associated with the coal-fired facility will be demolished and the site turned into a brownfield area for future development. This demolition project is expected to last 15 to 18 months.

### 3.13.2 Analysis of Cumulative Effects

To address cumulative impacts, the existing affected environment surrounding the Bottom Ash Impoundment was considered in conjunction with the environmental impacts presented in Chapter 3. These combined impacts are defined by the Council on Environmental Quality as "cumulative" in 40 CFR 1508.7 and may include individually minor but collectively significant actions taking place over a period of time. The potential for cumulative effects to each of the identified environmental resources of concern are analyzed below.

*Air Quality:* The demolition of the coal plant would have minor short-term impacts to air quality during the demolition phase. Demolition of the buildings and structures would likely generate fugitive dust. Likewise, removal of demolition debris and other materials off-site, backfilling structures and grading would generate some amounts of fugitive dust and would affect air quality in the form of equipment and vehicle exhaust emissions. TVA would implement on-site BMPs and mitigation measures to decrease emissions, therefore potential effects to local air quality would be minor and temporary.

As discussed in the Part I, Section 3.1, Alternative B would involve several activities that would potentially result in temporary air emissions and dust. These activities include equipment removal, grading and compaction of CCR, transport of borrow material and installation of approved closure systems. Alternative C would potentially have greater air quality impacts than Alternative B. However, because demolition of the coal plant would have only minimal and localized air quality impacts and be short term in duration, no cumulative effects to air quality are anticipated as a result of this alternative.

*Transportation*: During the demolition of JSF, demolition debris would be hauled to an off-site landfill. Potential contaminants removed would also be hauled to an off-site permitted landfill. These combined hauling activities could cause an increase in truck traffic to and from the facility for some period of time, having a short-term impact on the level of service for roads in that area.

Traffic generated by the closure of the Bottom Ash Impoundment under Alternative B would consist of the construction workforce, shipments of goods and equipment and the hauling of borrow material to the site to be used in the closure activities. While the existing roadway network is expected to have sufficient capacity to absorb the expected temporary construction traffic increase, potential localized impacts (i.e., reduced travel speed due to congestion) on local roadway transportation may occur if these activities coincide with the demolition activities. If needed, TVA will coordinate with the Tennessee Department of Transportation and County transportation officials to develop appropriate mitigative measures, such as altering traffic light timing (if appropriate), to reduce localized transportation effects. Once closure of the impoundment is completed, associated maintenance phase traffic would be negligible. Therefore, longer-term cumulative effects to transportation resources are not anticipated as a result of this alternative.

Alternative C would have greater transportation impacts than Alternative B due to longer duration of construction and hauling of CCR offsite to a permitted landfill. However, because impacts to the transportation network under this alternative are expected to be minor and temporary, no cumulative impact to roadway transportation are anticipated.

*Noise*: Demolition activities of JSF would mostly occur during the day on weekdays. Nearby residences could be impacted by intermittent noise as a result of increased traffic on the roads near the plant. During the demolition phase, noise would be generated by a variety of construction equipment, including explosives, compactors, front loaders, backhoes, graders and trucks. As discussed in Part I, Section 3.25 the potential for cumulative noise impacts would be associated with the transportation of borrow material from off-site locations and the transport of CCR material to receiving landfills. Noise emissions from trucking operations would therefore have the potential to be additive to those associated with trucking operations related to removal of demolition debris from the site. However, due to the temporary and intermittent nature of all construction activities and the site's rural location, the cumulative effects of noise emissions are not expected to cause significant adverse impacts.

Alternative C would have greater noise impacts than Alternative B due to the longer duration of construction and hauling of CCR offsite to a permitted landfill. However, given the rural natural of the site, the cumulative effect of noise emissions under this alternative are also not expected to cause significant adverse impacts.

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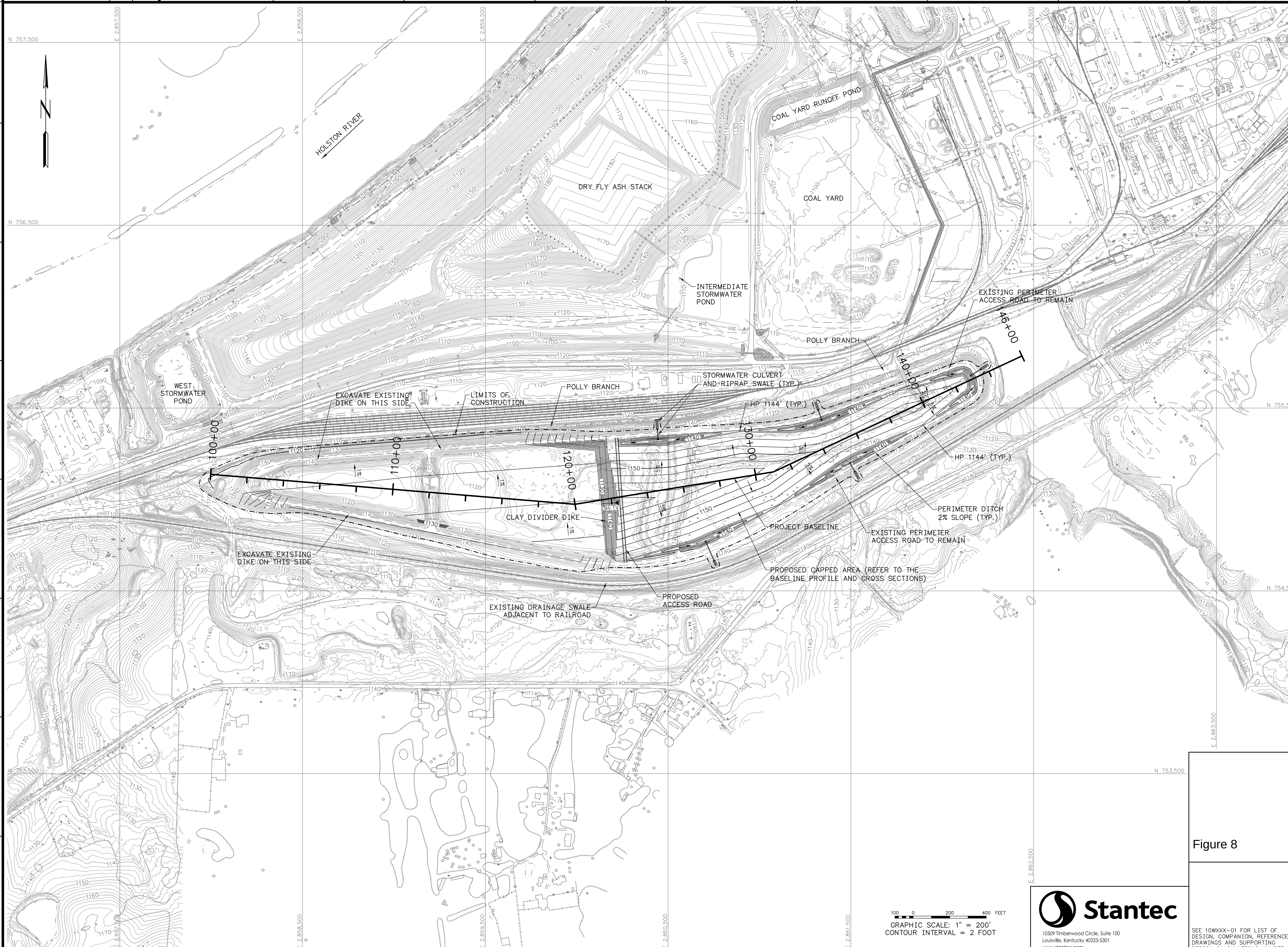
# Appendix A – Conceptual Closure Plans, Preferred Alternative




## SURVEY CONTROL NOTE:

A GLOBAL POSITIONING SYSTEM (GPS) BASE STATION HAS BEEN ESTABLISHED AND TRANSFORMATION PARAMETERS DETERMINED BY TVA USING SELECTED SURVEY CONTROL MONUMENTS. CONTACT WITH TVA SURVEYING DEPARTMENT (423)751-8416 OR (423)751-2571 SHALL BE MADE BEFORE ANY SURVEY OR CONSTRUCTION WORK IS COMMENCED. BASE STATION FREQUENCIES AND TRANSFORMATION PARAMETERS WILL BE PROVIDED TO THE CONTRACTOR FOR USE IN CONSTRUCTION ACTIVITIES AT THE SITE. PREVIOUSLY USED OR ESTABLISHED CONTROL POINTS AND MONUMENTS SHALL NOT BE USED BY THE CONTRACTOR WITHOUT PRIOR APPROVAL BY TVA SURVEYING DEPARTMENT.

## MAPPING SOURCE NOTE:

BASEMAP DEVELOPED FROM TOPOGRAPHIC SURVEY DATA PROVIDED BY TVA AND BASED ON DATA COMPILED FROM TUCK MAPPING SOLUTIONS AERIAL SURVEY FLOWN ON 11/10/2014 AND BATHYMETRIC SURVEY OF THE BOTTOM ASH POND DATED 10/02/14.

### LEGEND

- EXISTING CONTOUR
- PROPOSED GRADING CONTOUR (FINISHED GRADE)
- PROPOSED ACCESS ROAD
- SURFACE WATER FLOW DIRECTION
- PERIMETER DITCH
- EXISTING RAILROAD
- EXISTING ACCESS ROAD (UNPAVED)
- EXISTING ACCESS ROAD (PAVED)

**30% SUBMITTAL**
**ISSUED FOR REVIEW**
**NOT FOR CONSTRUCTION**

Figure 8

SEE 10WXXX-01 FOR LIST OF DESIGN, COMPANION, REFERENCE DRAWINGS AND SUPPORTING DESIGN CALCULATIONS NUMBER.

Stantec
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Louisville, Kentucky 40223-5301
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| REV. NO. | DATE | DSGN | DRWN | CHKD | SUPV | RVWD | APPD | ISSD | PROJECT | AS CONST |
|---|---|---|---|---|---|---|---|---|---|---|
| R A | 06/30/15 | PSS | RRP | MCV | DWF | SEB | MST | JCK | – | – |
| ISSUED FOR REVIEW | | | | | | | | | | |

SCALE: 1"=200' EXCEPT AS NOTED

YARD
BOTTOM ASH POND

# BOTTOM ASH POND CLOSURE GRADING PLAN

| DESIGNED BY: | DRAWN BY: | CHECKED BY: | SUPERVISED BY: | REVIEWED BY: | APPROVED BY: | ISSUED BY: |
|---|---|---|---|---|---|---|
| P.S. SRIDHAR | R.R. PETTY | M.C. VAUGHAN | D.W. FULLER | S.E. BENNETT | M.S. TURNBOW | J.C. KAMMEYER |

JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 06/30/15 | 41 | C | 10WXXX-04 | R A

STANTEC | A
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:XX
W_TVA

C.A.D. DRAWING DO NOT ALTER MANUALLY