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BULL RUN FOSSIL PLANT
ASH IMPOUNDMENT CLOSURE PROJECT
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT
Anderson County, Tennessee

Prepared by:
TENNESSEE VALLEY AUTHORITY
Chattanooga, TN

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Symbols, Acronyms, and Abbreviations

BRF	Bull Run Fossil Plant
CAA	Clean Air Act
CCR	Coal Combustion Residuals
CWA	Clean Water Act
EIP	Environmental Investigation Plan
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
GWPS	Ground Water Protection Standard
MGD	Million Gallons Per Day
mg/L	Milligrams Per Liter
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
PEIS	Programmatic Environmental Impact Statement
PWB	Process Water Basin
SEA	Supplemental Environmental Assessment
TDEC	Tennessee Department of Environment & Conservation
TVA	Tennessee Valley Authority
ug/L	Micrograms Per Liter

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CHAPTER 1 – PURPOSE AND NEED FOR ACTION

1.1 Introduction and Background

The Bull Run Fossil Plant (BRF) is in Anderson County, Tennessee, about 5 miles east of downtown Oak Ridge, TN and 13 miles west of Knoxville, TN (Figure 1-1). BRF is operated by Tennessee Valley Authority (TVA) and is located on a 750-acre reservation on the east side of Melton Hill Reservoir at Clinch River Mile 48. Most nearby lands are United States Department of Energy reservation properties for the Oak Ridge National Laboratory facilities, but there are also residential and recreational land uses in the vicinity.

The BRF plant was built between 1962 and 1966. Commercial operation began in June 1967. Nameplate generating capacity for the single unit is 950 megawatts; BRF is the only single-generator coal-fired power plant in the TVA system. Winter net-dependable generating capacity is about 881 megawatts. BRF generates over 6 billion kilowatt-hours of electric power in a typical year, which is enough electrical energy to meet the needs of approximately 430,000 homes.

View of Main Ash Impoundment (Right) and Stilling Pond (Left) along Separator Berm

The coal combustion residuals (CCR) generated by the plant include fly ash, bottom ash, and flue gas desulfurization gypsum. Disposal areas for CCR include a dry fly ash stack located east of the plant and a system of wet CCR disposal areas located south of the plant, ending at the convergence of Bullrun Creek and the Clinch River.

Programmatic Environmental Impact Statement – June 2016

TVA ceased sluicing CCR material at BRF in 2015 and began to address closure of the CCR facilities at the plant. As originally proposed in a June 2016 Ash Impoundment Closure Programmatic Environmental Impact Statement (PEIS) (TVA 2016), (Record of Decision issued on August 5, 2016), the approximately 33-acre Main[1] Ash Impoundment and Sluice Channel would be Closed-in-Place, which would entail dewatering, grading and covering with an approved cover system. Under the originally proposed action, non-CCR process water from the plant and storm water continued to be discharged into the system, and ultimately into the Stilling Pond. However, process wastewater flow would be conveyed to the Stilling Pond through a new lined ditch prior to release at Outfall 001.

[1] In previous documents this area was referred to as the “Fly Ash Impoundment”. Going forward in this SEA, TVA will now refer to this area as the “Main Ash Impoundment” to conform to other reports, however the extents and description of this area have not changed.

Figure 1-1. BRF Project Location

Supplemental Environmental Assessment – October 2017

Subsequent to the completion of the 2016 PEIS, TVA determined that there is a long-term need for wastewater treatment at BRF and revised the closure plan to support a wastewater treatment system at BRF. To support the revised closure plan, TVA issued a Supplemental Environmental Assessment (SEA) in 2017 (TVA 2017a) (Finding of No Significant Impact issued on October 23, 2017) which revised the selected alternative to closure of the Main Ash Impoundment and Stilling Pond in place using an approved cover system. In addition, the Stilling Pond and a portion of the Main Ash Impoundment would be repurposed for use as process water basins (PWB). The capping system for the Closure-in-Place would serve as a bottom liner for the PWBs. The system would handle only storm water flow and non-CCR process water flow from the plant.

Supplemental Environmental Assessment – Draft Released August 2018

TVA revised the closure plan evaluated in October 2017 by issuing a second SEA in 2018 (Draft SEA issued August 23, 2018). Under the revised plan, an approximately 20-acre portion of the Main Ash Impoundment, containing approximately 2,900,000 yd^3 of CCR

materials would be Closed-in-Place. The remaining portion (approximately 13 acres) of the Main Ash Impoundment would be Closed-by-Removal with up to an estimated 595,000 yd^3 of CCR materials being removed and transported to an onsite landfill. The portion of the Main Ash Impoundment that would be Closed-by-Removal would then be repurposed into a PWB (subsequently designated as PWB2). In addition, the Stilling Pond would be Closed-by-Removal, which would entail removal and transport of up to an estimated 71,000 yd^3 of CCR and residual materials to an existing onsite landfill. The Stilling Pond would also be repurposed as a PWB (subsequently designated PWB1).

Supplemental Environmental Assessment – Draft Re-Released April 2019

Subsequent to the issuance of the August 2018 Draft SEA, TVA has gained additional insight on conditions of the Main Ash Impoundment and Stilling Pond at BRF. TVA has encountered worker safety and stability issues related to characteristics of the stored CCR. As a result, TVA recommends changes for construction of PWB2 (the PWB in the area of the Main Ash Impoundment). The new proposed plan will make the construction effort safer and more feasible. It includes a proposed interim action to leave the CCR in the Main Ash Impoundment in place and construct an interim PWB2 on top of the existing CCR impoundment. This interim solution would be implemented until a decision on a permanent solution for the disposition of the underlying CCR is made.

TVA's insight on conditions of CCR in the Main Ash Impoundment and Stilling Pond is related to the specific characteristics of CCR material. The material in these areas originates from argillaceous coal (i.e., coal containing silt to clay-sized particles) which results in fine-grained CCR material. This characteristic leads to CCR that takes longer for pore water to drain as compared to CCR that is characterized as having higher coarse-grain content. Tests from several samples in the Stilling Pond confirm that the CCR has high percentages of fine-grained material. These conditions make it difficult to dry the ash to a degree necessary for excavation and placement in a lined landfill.

During early excavation activities associated with closure of the Stilling Pond and construction of PWB1, working with this wet, fine-grained CCR became a safety concern, due to the material's loss of strength when saturated, and subsequent detrimental effect on local stability. Excavation of the CCR under these conditions is difficult and time-consuming, which can cause construction schedule delays, increasing worker exposure to unsafe conditions. Specialty amphibious equipment with lower than expected production rates is necessary to ensure operator safety.

The Main Ash Impoundment and Stilling Pond are adjacent to one another and likely have similar characteristics. As PWB2 would require excavation of approximately 10 times the amount of material as PWB1, the effects of the fine-grained CCR would be compounded and made more complex. As with PWB1, the soft fine-grained nature of this material would require specialized, less efficient, amphibious equipment and dewatering methods to prevent local stability issues from posing a safety risk for construction personnel. There is also a smaller footprint available for material from PBW2 to be handled and dried which adds to the complexity of the work (e.g., extended drying durations).

The new proposed PWB system (PWB1 coupled with PWB2) is designed to work in series. The conveyance channel would discharge to PWB2, which would drain to PWB1 where water is discharged through an NPDES permitted outfall (Outfall 001). PWB1 does not have the capacity to manage storm water and non-CCR process water as a single system. During the period of construction proposed under either the Closure-by-Removal or Closure-in-Place Alternatives, TVA is at risk for exceeding NPDES permit limits during storm events or exceeding the basin's capacity. Because of the measures necessary to safely work with the material in the Main Ash Impoundment, the construction timeline would be significantly extended, which in turn extends the period during which TVA would be at risk for exceeding NPDES permit limits.

Therefore, given the issues associated with constructability/timing/safety and environmental compliance, as explained above TVA added an additional alternative for closure of the Main Ash Impoundment at BRF. Specifically, TVA is considering closing the Main Ash Impoundment in place using an approved interim cover system and repurposing a portion of the closed area for use as interim PWB2. TVA estimates Closure-in-Place of the Main Ash Impoundment and repurposing a portion of the impoundment as interim PWB2 would take approximately 10 months.

All of the proposed designs are technically sound and protective of the environment. TVA recognizes that in addition to state and federal water and waste regulations, TVA's CCR disposal areas at BRF, including the impoundments, are subject to the administrative order entered by TDEC (Commissioner's Order OGC15-0177). In Section Vll.D.1 of TDEC Order, TDEC recognizes that TVA may, in compliance with CCR Rule requirements, elect to close CCR surface impoundments and/or landfills before completion of the investigative process outlined in the Order. While TVA may be forced to complete construction by deadlines established by the CCR Rule, TVA remains dedicated to completing the site-wide investigation, the comprehensive environmental assessment, and any corrective actions that are identified as necessary. TVA also acknowledges that any actions taken before the Order process is complete are subject to the potential for TDEC to subsequently require TVA to take other and/or further remedial actions as a result of the investigative process. Accordingly, PWB2 is described herein as "Interim" because TVA acknowledges that additional or different actions may be required under the Order with respect to the CCR that remains underneath Interim PWB2, and in that event, TVA could be required to remove Interim PWB2 in order to take the necessary actions.

The purpose of this document is to present a supplement to the PEIS, Part II Site-Specific NEPA Review: Bull Run Fossil Plant and the previous October 2017 Bull Run Fossil Plant Ash Impoundment Closure Project Supplemental Environmental Assessment (TVA 2016, TVA 2017a). This new SEA has been prepared to account for changes to the closure plan for the Main Ash Impoundment and Stilling Pond identified in the NEPA review and in the previous SEA. In addition, this SEA includes an analysis of a new alternative for closure of the Main Ash Impoundment and Stilling Pond that was developed upon review of results of further studies of the composition of materials in the Main Ash Impoundment. This alternative was not evaluated in the 2018 Draft SEA.

1.2 Decision to be Made

TVA must decide how to develop PWBs at BRF to support wastewater treatment at the plant. TVA's decision considers factors such as potential environmental impacts, economic issues, worker health and safety, availability of resources and TVA's long-term goals.

1.3 Purpose and Need

The purpose of the proposed action is to support the implementation of TVA's stated goal to transition from wet to dry storage of CCR at its coal plants by closing the Main Ash Impoundment and Stilling Pond at BRF, and to assist TVA in complying with state requirements such as the National Pollutant Discharge Elimination System (NPDES) permit, and the U.S. Environmental Protection Agency's (EPA) CCR Rule. This project would support a long-term need for wastewater treatment at BRF by providing a facility for processing of non-CCR wastewater in the near-term and storm water in the long-term.

1.4 Other Environmental Reviews and Documentation

The following environmental reviews are relevant to the proposed action:

Final Ash Impoundment Closure Environmental Impact Statement (TVA 2016). The EIS was prepared to address the closure of CCR impoundments at all of TVA's coal-fired power plants. The report consists of two parts: Part I – Programmatic NEPA Review and Part II – Site-Specific NEPA Review. In Part I, TVA programmatically considered environmental effects of closure of ash impoundments using two primary closure methods: (1) Closure-in-Place and (2) Closure-by-Removal. A Record of Decision was released in July 2016 that would allow future environmental reviews of CCR impoundment closures to tier from the PEIS. In Part II, TVA considered site-specific ash impoundment closure activities at each of six fossil plants, including BRF. The preferred alternative at BRF was determined to be Closure-in-Place. This SEA is intended to tier from the PEIS (TVA 2016) and revise the October 2017 SEA (TVA 2017a) to evaluate the revised closure plan for the existing ash impoundments at BRF.

Bull Run Fossil Plant Ash Impoundment Closure Project Supplemental Environmental Assessment (TVA 2017a). This supplemental EA revised the selected alternative to the closure of the Fly Ash Impoundment and Stilling Pond in place using an approved cover system and repurposing a portion of the closed area for use as a PWB. The capping system for the Closure-in-Place would serve as a bottom liner for the PWB. The proposed PWB would handle only storm water flow and non-CCR process water flow from the plant.

Potential Bull Run Fossil Plant Retirement Environmental Assessment (TVA 2019). In August 2015, TVA published the 2015 Integrated Resource Plan (IRP; TVA 2015b) and associated environmental impact statement (EIS) (TVA 2015a) which was developed with input from stakeholder groups and the general public. The 2015 IRP identified a range of potential resource additions and retirements throughout the TVA power service area. Since that time TVA has experience flat to declining demand and has conducted economic analyses of all its generating assets considering load outlook, economic benefits and costs, performance, and environmental and social impacts. Under the current load outlook, economic analysis indicates that Bull Run capacity would eventually be replaced with a combination of solar and gas generating resources at lower cost and lower risk. The EA was prepared to assess impacts of the potential retirement of BRF.

The findings in these documents related to this SEA are incorporated in Chapter 3 for each relevant environmental resource, as appropriate.

1.5 Permits, Licenses and Approvals

TVA had previously identified some permits and approvals required to support the closure of the Sluice Trench and Main Ash Impoundment at BRF. Authorizations required for the proposed action could include the following:

- National Pollutant Discharge Elimination Permit (NPDES) Construction Storm Water Permit for storm water runoff from construction activities.
- BRF's Storm Water Pollution Prevention Plan would be revised to include both the temporarily covered portions of the Main Ash Impoundment, the closed Stilling Pond, and the new PWBs.

1.6 Scope of the Supplemental Environmental Assessment

The geographic scope of this supplemental analysis includes the 41.6-acre area that contains the Main Ash Impoundment and the Stilling Pond (see Figure 1-1). All activities associated with the proposed action would be limited to previously disturbed areas. Alternatives B and C would entail regrading and consolidating existing CCR materials and would require less offsite borrow than was predicted in the PEIS Part II analysis. This SEA addresses the potential impacts of the development and operation of the actions associated with the proposed alternatives.

TVA prepared this SEA to comply with NEPA and regulations promulgated by the Council on Environmental Quality and TVA's procedures for implementing NEPA. This assessment tiers off the impact analysis in the PEIS (TVA 2016) and the previous SEA (TVA 2017a) and evaluates existing conditions for the proposed alternative actions that are based upon the previous SEA and FONSI (2017a).

Based on the specific activities proposed for this project, TVA focused its environmental review on specific resources and eliminated others from further evaluation. This SEA does not contain detailed discussions of resources not found in the project area or where site-specific conditions would not change the impact analysis presented in the PEIS and the site-specific analysis contained in Part II of the PEIS (TVA 2016) or previous SEA (2017a).

In consideration of the nature and scope of the proposed action, TVA determined that the potential impacts of the alternatives under consideration on the following environmental resources are bounded by the prior PEIS and SEA including the site-specific assessment of the closure and or repurposing of the Sluice Trench, Main Ash Impoundment and Stilling Pond at BRF:

- air quality
- climate change
- land use
- prime farmland
- vegetation
- wildlife
- aquatic ecology
- threatened and endangered species
- parks
- public recreation
- cultural and historic resources
- visual resources
- hazardous materials and hazardous waste
- solid waste
- noise
- transportation

- geology
- wetlands
- floodplains
- natural areas
- socioeconomics
- environmental justice
- public health and safety

Because the proposed action is primarily associated with the closure, consolidation, and reconfiguration of the Main Ash Impoundment and Stilling Pond, the only resources not bounded by the previous site-specific analyses and therefore retained for detailed analysis in this SEA are groundwater and surface water. Although Alternatives B and C include Closure-by-Removal of the Stilling Pond, and Alternative B includes Closure-by-Removal of a portion of the Main Ash Impoundment, any potential impacts on noise, air quality, or climate change (i.e., greenhouse gas emissions) related to the transport and storage of CCR to an onsite BRF landfill are anticipated to be negligible as the transport of CCR is short-term and limited to onsite vehicle movements. In addition, the volume of offsite borrow is substantially reduced from that considered in the previous site-specific analysis in Part II of the PEIS (TVA 2016). Therefore, potential effects on air quality, noise, climate change and transportation are not assessed in this SEA.

TVA's action under this SEA would satisfy the requirements of Executive Order (EO) 11988 (Floodplains Management), EO 11990 (Protection of Wetlands), EO 12898 (Environmental Justice), EO 13112 as amended by EO 13751 (Invasive Species), and applicable laws including the National Historic Preservation Act, Endangered Species Act (ESA), Clean Water Act (CWA), and Clean Air Act (CAA).

1.7 Public and Agency Involvement

The Draft SEA was posted on TVA's Web site for a 20-day public review period on August 23, 2018. The availability of the draft SEA was announced in local publications. TVA notified local, state, and federal agencies and federally recognized tribes of its availability through their required consultations.

TVA received comments on the Draft SEA from the Tennessee Department of Environment and Conservation (TDEC), the Sierra Club, the United States Environmental Protection Agency, and two members of the public. TVA considered the substantive comments it received on the Draft SEA and edited the Draft SEA as appropriate. Subsequent to the public review period for the Draft SEA, TVA received results of additional studies of the composition of the materials in the Stilling Pond and Main Ash Impoundment that initiated the development of a new alternative for consideration in this SEA. Therefore, TVA posted a revised Draft SEA for a 20-day public review period on April 22, 2019. The availability of the revised Draft SEA was announced in local publications. TVA notified local, state, and federal agencies and federally recognized tribes of its availability through their required consultations.

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CHAPTER 2 – ALTERNATIVES

2.1 Description of Alternatives

Alternatives evaluated in detail for this SEA are described below.

2.1.1 Alternative A – The No Action Alternative

Under the No Action Alternative TVA would close the Stilling Pond and Main Ash Impoundment in place as previously described in the October 2017 SEA (TVA 2017a). The Stilling Pond and a portion of the Main Ash Impoundment would be repurposed as process water basins (PWB) as previously described in the October 2017 SEA.

2.1.2 Alternative B – Closure-in-Place of a Portion of the Main Ash Impoundment, Closure-by-Removal of the Remaining Portion of the Main Ash Impoundment and Repurposing into a Process Water Basin (PWB2), Closure-by-Removal of the Stilling Pond and Repurposing into a Process Water Basin (PWB1), and Development of a Process Water Basin Emergency Spillway

Under this alternative, TVA proposes to cover, with an approved cover system, an approximately 20-acre portion of the Main Ash Impoundment containing approximately 2,900,000 yd^3 of CCR materials. The remaining portion (13 acres) of the Main Ash Impoundment would be Closed-by-Removal with up to an estimated 595,000 yd^3 of CCR materials being removed and transported to an onsite landfill. The portion of the Main Ash Impoundment that is Closed-by-Removal would be repurposed into a process water basin (PWB2) for BRF (Figure 2-1).

In addition, the Stilling Pond would be Closed-by-Removal, which would entail removal and transport of up to an estimated 71,000 yd^3 of CCR and residual materials to an existing onsite landfill. The Stilling Pond would be repurposed as a process water basin (PWB1). A subsurface drainage layer would be installed to be used during construction of PWB1 to handle any water that enters the excavation during the liner placement. Following construction of the subsurface drainage system, the liner for the proposed new PWB1 would be installed. The drainage system is not expected to be needed once construction is completed.

Generalized construction steps for this project include dewatering the Stilling Pond and Main Ash Impoundment and removal of CCR materials from the Stilling Pond and the Closed-by-Removal portion of the Main Ash Impoundment. Handling of wet material would occur inside the footprint of the current Main Ash Impoundment and Stilling Pond. The material would be handled and dried, and once dry, it would be disposed of in the onsite landfill.

During dewatering and construction of PWB2, free water and pore water would be removed from the Main Ash Impoundment, pumped into temporary storage tanks or boxes, where it would be treated, and discharged through the NPDES permitted outfall. Mitigative measures would be introduced to ensure that discharge waters comply with NPDES permit limits and TDEC water quality criteria. These measures could include but would not be limited to implementing BMPs, waste water treatment technologies, and/or rerouting or

recycling water. Once constructed, the PWBs would only manage storm water and non-CCR wastewater from BRF facilities.

For the covered portion of the Main Ash Impoundment, if the CCR materials are suitable for regrading and consolidation, they would remain in the impoundment. If they are not suitable for regrading, the material would be removed, dried, and placed in an onsite landfill. In areas where CCR materials are removed and placed in the onsite landfill, suitable fill material may be imported to grade and support the cover system. The cover system in the Main Ash Impoundment would be constructed to the same standards as described in Part II of the PEIS.

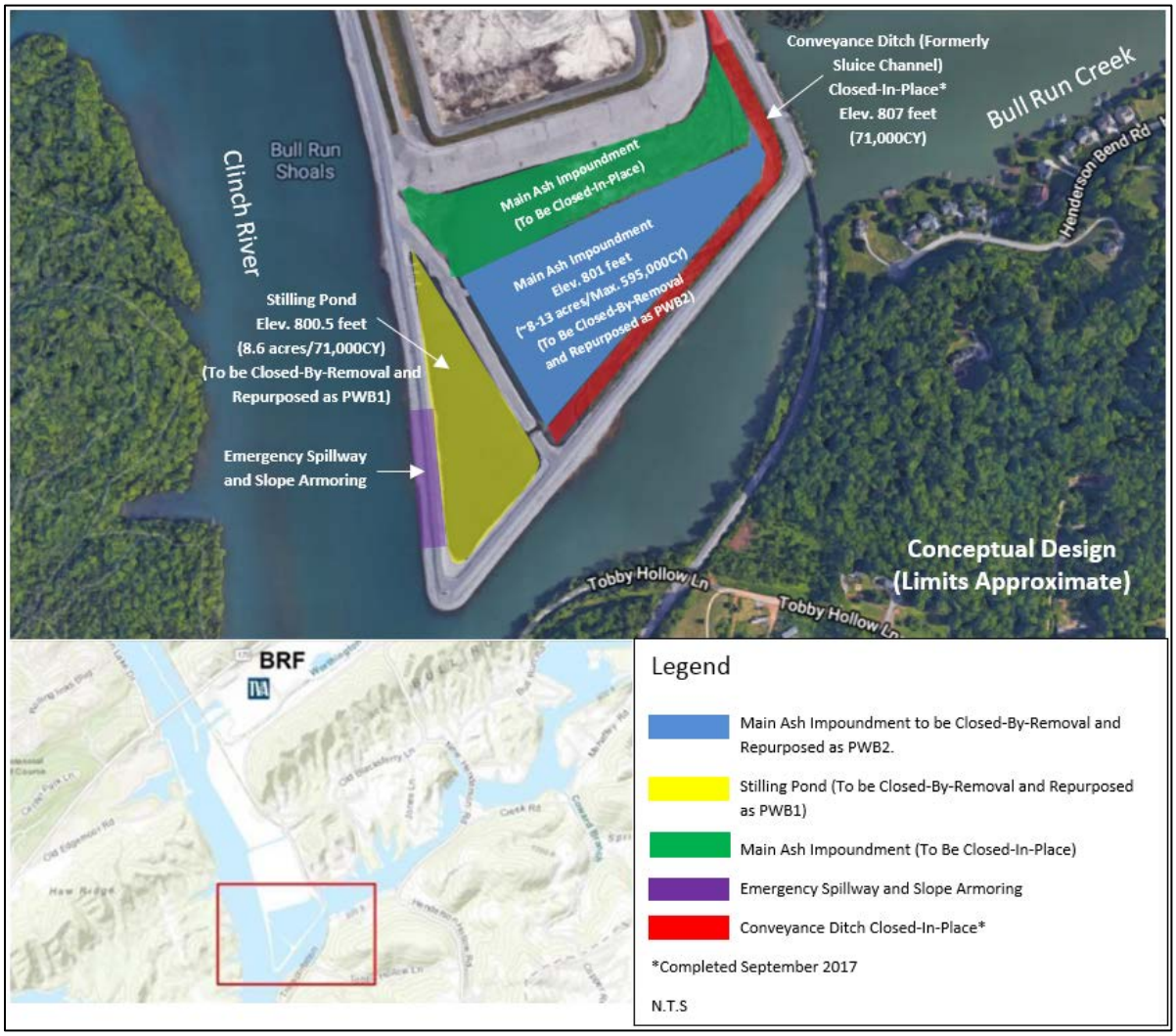

Figure 2-1. Alternative B. Proposed Project Activity Areas.

As part of the PWB infrastructure, an emergency spillway would be constructed along the western side of the perimeter dike that borders the Stilling Pond. (Figure 2-1). The emergency spillway would be created by modifying a section of the existing perimeter dike to have a lower elevation. The spillway would be armored with rip rap, concrete, or a combination of the two on the top and outside slope. Laydown areas would be the same as that described in Part II of the PEIS (TVA 2016) and the prior SEA (TVA 2017a).

2.1.3 Alternative C – Interim Cover of the Main Ash Impoundment and Repurposing a Portion for an Interim Process Water Basin (Interim PWB2), Closure-by-Removal of the Stilling Pond and Repurposing into a Process Water Basin (PWB1), and Development of a Process Water Basin Emergency Spillway

Under Alternative C, the Stilling Pond would be Closed-by-Removal and repurposed as a process water basin (PWB1) and the emergency spillway would be constructed as described under Alternative B. However, under this alternative the Main Ash Impoundment would be Closed-in-Place with an interim cover[2]. TVA would repurpose 13 acres of the closed area and use it as an interim process water basin (Interim PWB2). The capping system for the Closure-in-Place would serve as a bottom liner for Interim PWB2 (see Figure 2-2). The new PWBs would receive only storm water flow and non-CCR wastewater from the plant.

To construct this project, the Main Ash Impoundment would be dewatered, regraded and consolidated as necessary to meet closure grades. The Main Ash Impoundment would be capped and Closed-in-Place with an interim cover as described in Part II of the PEIS. A subsurface drainage layer would be installed during construction of PWB1 to manage any water that enters the excavation during the liner placement. Following construction of the subsurface drainage system, the liner for the proposed new Interim PWB2 would be installed. A conceptual grading plan is provided in Appendix B.

During dewatering and construction of Interim PWB2, free water and pore water would be removed from the Main Ash Impoundment, pumped into temporary storage tanks or boxes, where it would be treated, and discharged through the NPDES permitted outfall. Mitigative measures would be introduced to ensure that discharge waters comply with NPDES permit limits and TDEC water quality criteria. These measures could include but would not be limited to implementing BMPs, waste water treatment technologies, and/or rerouting or recycling water. Once constructed, the PWBs would only manage storm water and non-CCR wastewater from BRF facilities.

[2] The Interim Cover of the Main Ash Impoundment is temporary pending TDEC approval of a permanent solution. However, if this temporary plan is approved by TDEC as a permanent solution, TVA would evaluate whether additional NEPA review would be required. If TVA determines that additional review under NEPA is required, an additional public comment period would not be necessary since TVA is disclosing to the public now that it could become permanent.

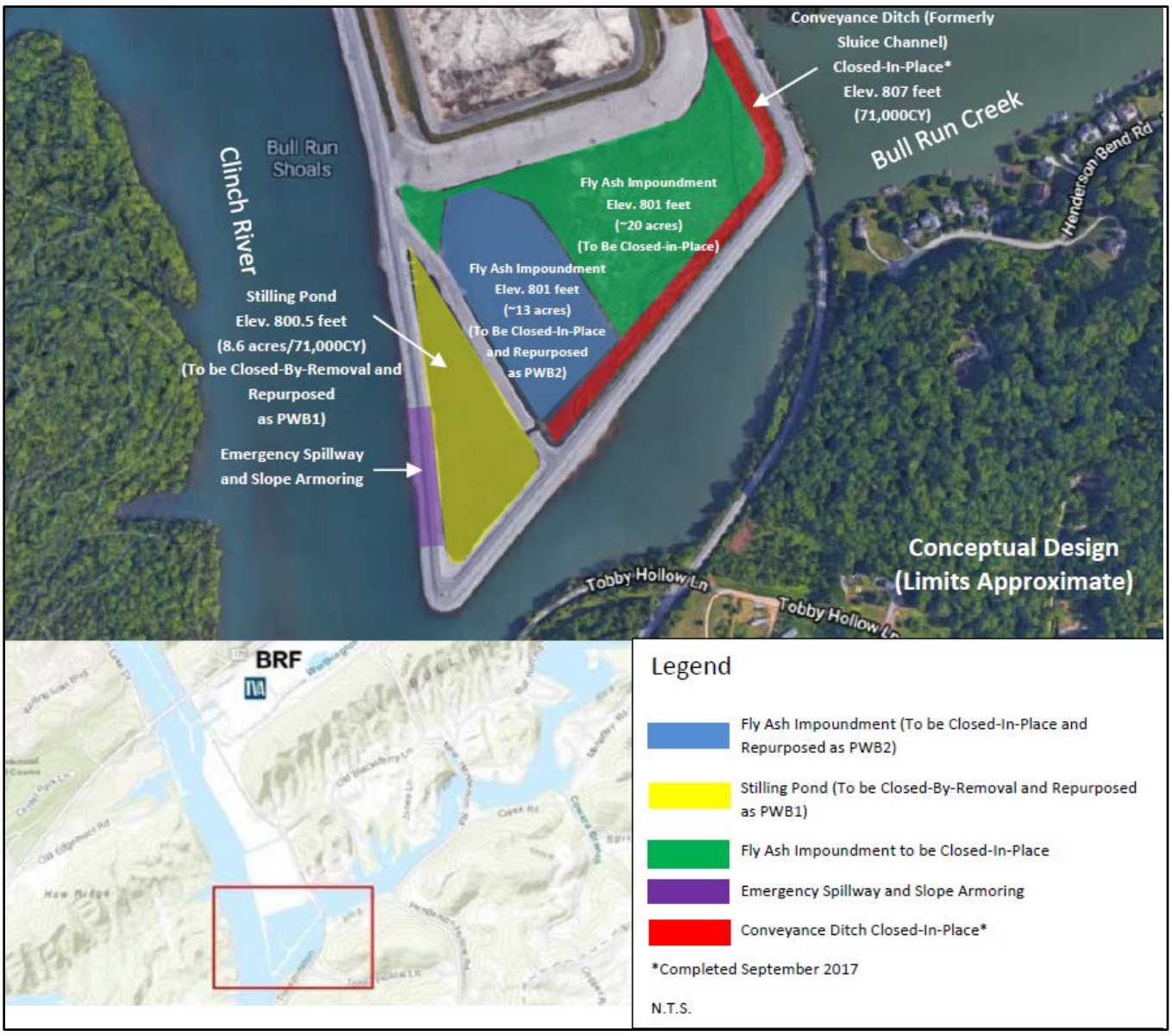

Figure 2-2. Alternative C. Proposed Project Activity Areas.

Table 2-1 summarizes the general characteristics of the Main Ash Impoundment and Stilling Pond under Alternative B and C in comparison to that under the previously considered action described in Part II of the PEIS and the October 2017 SEA.

Table 2-1. Summary of Main Ash Impoundment and Stilling Pond Attributes Under the Original Closure Plan, October 2017 SEA, Alternative B and Alternative C

Attribute	Original Closure-in-Place Alternative Evaluated in Tier II of PEIS	October 2017 Supplemental EA– Main Ash Impoundment Closure-in-Place and Repurposing of the Stilling Pond and a Portion of the Main Ash Impoundment	Alternative B – Closure-in-Place of a Portion of the Main Ash Impoundment, Closure-by-Removal of the remaining portion of the Main Ash Impoundment and Repurposing into a Process Water Basin (PWB2), Closure-by-Removal of the Stilling Pond and Repurposing into a Process Water Basin (PWB1), and Development of a Process Water Basin Emergency Spillway	Alternative C – Interim Cover of the Main Ash Impoundment and Repurposing a Portion for an Interim Process Water Basin (Interim PWB2), Closure-by-Removal of the Stilling Pond and Repurposing into a Process Water Basin (PWB1), and Development of a Process Water Basin Emergency Spillway
Main Ash Impoundment				
Impoundment Status	Inactive	Inactive	Inactive	Inactive
Size (ac)	33	Closed-in-Place Portion per PEIS: 21.4 Repurposed: 11.6 Total: 33.0	Closed-in-Place Portion: ~20 Closed-by-Removal and Repurposed Portion: ~13 Total: 33	Closed-in-Place Portion: ~20 Closed-in-Place and Repurposed Portion: ~13 Total: 33
CCR Material	Bottom Ash/Fly Ash	Bottom Ash/Fly Ash	Bottom Ash/Fly Ash	Bottom Ash/Fly Ash
CCR Volume (yd^3)	3,500,000	Closed-in-Place: 3,500,000	Covered Portion: ~2,900,000 Closed-by-Removal Portion: ~595,000 Total: 3,500,000	Closed-in-Place: ~3,500,000
Borrow Material	250,000	No borrow soil required	61,000	No borrow soil required
Temporary Laydown Areas (ac)	5 to 10	5 to 10	5 to 10	5 to 10

Attribute	Original Closure-in-Place Alternative Evaluated in Tier II of PEIS	October 2017 Supplemental EA– Main Ash Impoundment Closure-in-Place and Repurposing of the Stilling Pond and a Portion of the Main Ash Impoundment	Alternative B – Closure-in-Place of a Portion of the Main Ash Impoundment, Closure-by-Removal of the remaining portion of the Main Ash Impoundment and Repurposing into a Process Water Basin (PWB2), Closure-by-Removal of the Stilling Pond and Repurposing into a Process Water Basin (PWB1), and Development of a Process Water Basin Emergency Spillway	Alternative C – Interim Cover of the Main Ash Impoundment and Repurposing a Portion for an Interim Process Water Basin (Interim PWB2), Closure-by-Removal of the Stilling Pond and Repurposing into a Process Water Basin (PWB1), and Development of a Process Water Basin Emergency Spillway
Stilling Pond				
Impoundment Status	Not included in Original Closure Plan	Inactive	Inactive	Inactive
Size (acres)		Closed-in-Place: 8.6 acres (Pond surface ~7 ac, berms: ~1.6 acres)	Closed-by-Removal: 8.6 acres (Pond surface ~7 acres, berms: ~1.6 acres)	Closed-by-Removal: 8.6 acres (Pond surface ~7 acres, berms: ~1.6 acres)
CCR Material		Bottom Ash/Fly Ash	Bottom Ash/Fly Ash	Bottom Ash/Fly Ash
CCR Volume (yd^3)		CCR: ~51,000	CCR: ~51,000 + 20,000 (residual materials) = 71,000	CCR: ~51,000 + 20,000 (residual materials) = 71,000
Borrow Material Volume (yd^3)		No borrow soil required	Borrow required for re-purposed area less than and bounded by total volume included in Tier II of PEIS	Borrow required for re-purposed area less than and bounded by total volume included in Tier II of PEIS
Temporary Laydown Areas		No additional laydown required	No additional laydown required	No additional laydown required

2.2 Summary of Alternative Impacts

Table 2-2 summarizes a comparison of the PEIS - Part II (TVA 2016), the previous SEA (TVA 2017a) and Alternative B and C of this SEA for impacts of the proposed actions associated with the Main Ash Impoundment and the Stilling Pond. This impact summary is limited to those resources reassessed in this SEA as being potentially affected by the proposed actions.

2.3 Identification of Mitigation Measures

Mitigation measures identified in Parts I and II of the PEIS to avoid, minimize, or reduce adverse impacts to the environment are applicable to the proposed action and are summarized below. TVA's analysis of preferred alternatives includes mitigation, as required, to reduce or avoid adverse effects. In addition to the items listed below, best management practices would be used throughout the project to minimize erosion, prevent spills, reduce noise, and further reduce potential impacts on environmental resources.

- Fugitive dust emissions from site preparation and construction will be controlled by wet suppression and best management practices (CAA Title V operating permit incorporates fugitive dust management conditions).

- Consistent with EO 13112 as amended by EO 13751 (Invasive Species), disturbed areas will be revegetated with native or non-native, non-invasive plant species to avoid the introduction or spread of invasive species.

- TVA will implement supplemental groundwater mitigative measures that could include monitoring, assessment, or corrective action programs as mandated by state and federal requirements. The CCR Rule and state requirements provide an additional layer of groundwater protection to minimize risk.

2.4 The Preferred Alternative

TVA's preferred alternative is Alternative C, under which the Main Ash Impoundment would be Closed-in-Place with an interim cover and a portion (approximately 13 acres) would be repurposed for use as an interim process water basin (Interim PWB2). The Stilling Pond would be Closed-by-Removal and would also be repurposed for use as a process water basin (PWB1). Alternatives B and C both provide long-term benefits and meet the purpose and need of the project as both these alternatives would eliminate future wet CRR storage and provide a facility for wastewater treatment at BRF and both would result in minimal environmental impacts. However, the results of analysis of material in the Stilling Pond and Main Ash Impoundment indicated that closure of the impoundment as described under Alternative B would result in constructability/timing/safety and potential environmental compliance hazards. Therefore, TVA prefers Alternative C, which avoids these potential impacts.

Table 2-2. Summary and Comparison of the Original Closure Plan, October 2017 SEA, and Newly Proposed SEA Alternative B and C (2018) by Resource

Resource	Original Closure-in-Place Alternative Evaluated in Tier II of PEIS	October 2017 Supplemental EA – Fly Ash Impoundment Closure-in-Place and Repurposing of the Stilling Pond and a Portion of the Fly Ash Impoundment	Alternative B – Closure-in-Place of a Portion of the Main Ash Impoundment, Closure-by-Removal of the remaining portion of the Main Ash Impoundment and Repurposing into a Process Water Basin (PWB2), Closure-by-Removal of the Stilling Pond and Repurposing into a Process Water Basin (PWB1), and Development of a Process Water Basin Emergency Spillway.	Alternative C – Interim Cover of the Main Ash Impoundment and Repurposing a Portion for an Interim Process Water Basin (Interim PWB2), Closure-by-Removal of the Stilling Pond and Repurposing into a Process Water Basin (PWB1), and Development of a Process Water Basin Emergency Spillway
Groundwater	Reduction of hydraulic input reduces risk of migration of constituents to groundwater.	Reduction of hydraulic input reduces risk of migration of constituents to groundwater. Low permeability liner at base of repurposed Main Ash Impoundment and Stilling Pond prevents contact of non-CCR wastewater and storm water with groundwater.	Clean closing a portion of the Main Ash Impoundment and the entire Stilling Pond in conjunction with the PWBs and the capping system used for the remaining portion of the Main Ash Impoundment is expected to enhance groundwater protection by removing 666,000 yd^3 of CCR, by reducing hydraulic inputs to the portion temporarily covered, thereby reducing risk of migration of constituents to groundwater. Low permeability liner at base of repurposed portion of Main Ash Impoundment and Stilling Pond prevents contact of non-CCR wastewater and storm water with groundwater.	Reduction of hydraulic input reduces risk of migration of constituents to groundwater. Impervious liner at base of repurposed portion of Main Ash Impoundment and Stilling Pond prevents contact of non-CCR wastewater and storm water with groundwater.
Surface Water	Risk to surface water would be reduced. Construction-related impacts would be negligible.	Risk to surface water would be reduced. Construction-related impacts would be negligible.	Risk to surface water would be reduced. Construction-related impacts would be negligible.	Risk to surface water would be reduced. Construction-related impacts would be negligible.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

Chapter 3 describes existing resources that may be affected by the alternatives and the potential direct and indirect impacts on those resources. Chapter 3 focuses on the impacts resulting from the proposed activities associated with Alternative B. Impacts associated with Alternative A are the same as those summarized in the October 2017 SEA (TVA 2017a) and are not re-assessed in this document.

3.2 Groundwater

3.2.1 Affected Environment

3.2.1.1 Physiographic Setting and Regional Aquifer

BRF 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 surface 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 feet.

Alluvial overburden with variable thickness mantles much of the site and has been derived from flood events of the Clinch River. 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. Four different bedrock units underlie the site. These are the Rome Formation, the Conasauga and Knox groups, and the Chickamauga Limestone (URS 2011).

The plant site straddles Bull Run Ridge which is underlain by the Rome Formation. The valley south of Bull Run Ridge is underlain by rocks of the Conasauga Group while the valley north of the ridge is underlain by several sub-units of the Chickamauga Formation (Stantec 2009). Shallow fractures, enlarged by carbonate dissolution, are more common in this formation than any other at the site. Residuum produced from the Chickamauga is a silty clay containing variable amounts of chert. In the main plant area, the majority of this clayey soil has been removed, and the remaining residuum is expected to range in thickness from 0 to about 25 feet.

Groundwater underlying the BRF site is derived from infiltration of precipitation and from lateral inflow along the northwest boundary of the reservation.

All groundwater originating on or flowing beneath the proposed site ultimately discharges to the Clinch River/Melton Hill Reservoir without traversing private property. The subsurface water flow occurs both in a shallow zone just beneath the land surface and in a deeper zone at the bedrock interface (TVA 2012).

The bedrock underlying the main plant area (Chickamauga Formation) may locally exhibit properties in which flow is dominated by fractures enlarged by carbonate dissolution. These

fractures may alternately store and transmit relatively large volumes of water. At other areas of the site underlain by relatively impermeable strata (i.e., the Rome and Conasauga units), groundwater movement is controlled by fractures that may store fairly large volumes but transmit only limited amounts of water (TVA 2012).

TVA is currently conducting a hydrogeological characterization of BRF to address information requests from TDEC about groundwater flow, including bedding planes, faults and joints. This characterization is conducted in accordance with the requirements of the TDEC Administrative Order issued to TVA on August 6, 2015 (OGC15-0177) to establish a transparent, comprehensive process for the investigation, assessment, and remediation of any risks resulting from the management and disposal of CCR at TVA coal-fired plants in Tennessee, and the groundwater monitoring requirements of the EPA Final CCR Rule (TVA 2017b). The upgraded monitoring system will be used to confirm that CCR management activities at BRF, including closure of CCR facilities, protect human health and the environment.

3.2.1.2 Groundwater Use

As documented previously (TVA 2002), a 1999 survey of water wells in the BRF vicinity indicated there are 17 domestic wells within approximately 1 mile of the BRF dry ash stacking area. The 1999 survey was confirmed by review of a 2004 database update from TDEC (TVA 2005). In accordance with the Environmental Investigation Plan (EIP) developed in cooperation with TDEC, TVA will conduct an updated water-use survey. The purpose of the water-use survey is to determine the amount of surface water and groundwater (i.e., water wells or springs) for domestic usage by local residents and TVA (TVA 2017b). Well depths are unknown, but it is likely that most yield water at a relatively shallow depth in the Chickamauga Formation. Most residences located northeast and northwest of the BRF reservation rely on public water provided by the Clinton Utility Board. None of the residential wells are located downgradient of the proposed facility (TVA 2005). There is no potential for future development of groundwater supplies downgradient of the facility, as all property between the proposed facility and surface water boundaries lies within the BRF reservation (TVA 2012). However, in order to ensure that impacts are minimized, and in accordance with the EIP, TVA in cooperation with TDEC will implement the water use survey, conduct a verification plan to establish well characteristics and groundwater use, and conduct additional sampling and analysis, as appropriate (TVA 2017b).

3.2.1.3 Groundwater Quality

Figure 3-1 identifies the network of existing groundwater monitoring wells in the vicinity of Conveyance Channel and the Main Ash Impoundment. As reported in the PEIS, statistical analyses have been performed on monitoring wells in the immediate vicinity of the Main Ash Impoundment (BRF-1 (background well), BRF-S, BRF-10-51, and BRF-10-52) using laboratory analytical results from 2000 through August 2014. Time series analyses have been developed for antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, silver, thallium, tin, vanadium, zinc, turbidity and total suspended solids. The time series for metals are developed using the total metals analysis results.

Figure 3-1. Network of Groundwater Monitoring Wells Near Main Ash Impoundment and Stilling Pond at BRF

Analytical data indicated from the samples taken from (BRF-10-52) exceeded the state Ground Water Protection Standard (GWPS) for arsenic 10 micrograms per liter (ug/L) since sampling began at this well in 2010. Concentrations ranged from approximately 22 to 32 ug/L from 2010 to 2014. Barium at BRF-1 exceeded the GWPS of 2,000 ug/L during the last sampling event in August 2014. The remaining samples and parameters exhibited trends that appear stable or non-detectable and do not exceed their applicable GWPS.

Groundwater analytical data for the last three years (2016-2018) indicate groundwater exceedances of the GWPS for arsenic in well BRF-10-52 which is consistent with past results in which arsenic at BRF-10-52 has exceeded the state GWPS of 10 ug/L since sampling began at this well in 2010. Concentrations have typically ranged from approximately 26 to 34 ug/L and appear stable. The remaining samples and parameters exhibit trends that appear stable or non-detectable and do not exceed their applicable state GWPS.

3.2.2 Environmental Consequences

3.2.2.1 Alternative A – No Action

Under this alternative, the Stilling Pond and the southern portion of the Main Ash Impoundment would be would be closed in place and repurposed for use as a PWB. Repurposing of the southern portion of the Main Ash Impoundment and the Stilling Pond would entail installation of an approved low permeability liner that would isolate surface water above the liner and prevent groundwater contact.

Consequently, as previously described in the prior SEA (TVA 2017a), potential impacts to groundwater from in-place closure of a portion of the Main Ash Impoundment and repurposing of a portion of the Main Ash Impoundment and the Stilling Pond are expected to be minor and beneficial.

3.2.2.2 Alternative B – Closure-in-Place of a Portion of the Main Ash Impoundment, Closure-by-Removal of the Remaining Portion of the Main Ash Impoundment and Repurposing into a Process Water Basin (PWB2), Closure-by-Removal of the Stilling Pond and Repurposing into a Process Water Basin (PWB1), and Development of a Process Water Basin Emergency Spillway

Under this alternative, a portion of the Main Ash Impoundment and the entire Stilling Pond would be Closed-by-Removal and would be repurposed for use as non-CCR PWBs. The portion of the Main Ash Impoundment that is not included as part of the repurposed area would be Closed-in-Place with a cover system that adheres to the same standards as the closure plan described in the PEIS (TVA 2016).

As described in the PEIS (TVA 2016), the dewatering and subsequent lack of rainfall infiltration into the CCR materials in the covered portion of the Main Ash Impoundment would provide an immediate reduction in the potential downward influx of leachate moving from these areas. Under Alternative B, reduction of the water level or water pressure in the Main Ash Impoundment is expected to reduce mounding of the surficial aquifer, reduce vertical leaching of CCR constituents and reduce groundwater impacts in a manner similar to that previously described in Part II of the PEIS. The Stilling Pond and Closed-by-Removal portion of the Main Ash Impoundment would be regraded, if necessary, and any residual CCR would be removed, dried and placed in a permitted solid waste facility.

Repurposing of the Closed-by-Removal portion of the Main Ash Impoundment and the Stilling Pond would entail installation of an approved low permeability liner that would isolate surface water above the liner and prevent groundwater contact.

Consequently, as previously described in Part II of the PEIS, proposed impacts to groundwater from the covered portion of the Main Ash Impoundment and the repurposed portion of the Main Ash Impoundment and Stilling Pond following Closure-by-Removal are expected to be beneficial. Additionally, TVA would follow a closure plan approved by TDEC and implement any supplemental mitigation measures required pursuant to the 2015 TDEC Administrative Order. Supplemental mitigation could include additional monitoring, assessment, corrective action programs, or other actions deemed appropriate as specified in the EIP (TVA 2017b). Therefore, impacts to groundwater relative to the previous assessment of the proposed action documented in the prior SEA (TVA 2017a) are similar and minor.

3.2.2.3 Alternative C – Interim Cover of the Main Ash Impoundment and Repurposing a Portion for an Interim Process Water Basin (Interim PWB2), Closure-by-Removal of the Stilling Pond and Repurposing into a Process Water Basin (PWB1), and Development of a Process Water Basin Emergency Spillway

Under this alternative, the Stilling Pond would be Closed-by-Removal and repurposed as PWB1 as described under Alternative B.

The Main Ash Impoundment would be Closed-in-Place with an interim cover system, as described in Part II of the PEIS. A portion of the closed impoundment would be repurposed for use as an Interim PWB2. The capping system for the Closure-in-Place would serve as a bottom liner for Interim PWB2.

As described in the PEIS, the dewatering and subsequent lack of rainfall infiltration into the CCR materials in the impoundment would provide an immediate reduction in the potential downward influx of leachate moving from the impoundment. Under Alternative C, reduction of the water level or water pressure in the Main Ash Impoundment is expected to reduce mounding of the surficial aquifer, reduce vertical leaching of CCR constituents and reduce groundwater impacts in a manner similar to that previously described in Part II of the PEIS. The Main Ash Impoundment would be regraded and consolidated and compacted in place. These actions would not increase the potential for leaching of CCR constituents to the groundwater as any CCR material left in place would be similarly dewatered and closed with an approved cover system. A foundation drainage layer would be installed beneath the liner system of the repurposed impoundment to remove water under the liner system during construction, thus reducing the uplift pressure on the liner system.

Repurposing of the southern portion of the Main Ash Impoundment and the Stilling Pond would entail installation of an approved low permeability liner that would isolate surface water above the liner and prevent groundwater contact.

Consequently, as previously described in Part II of the PEIS, proposed impacts to groundwater from in-place closure of a portion of the Main Ash Impoundment and repurposing of a portion of the Main Ash Impoundment and the Stilling Pond are expected to be beneficial. Additionally, TVA would implement any supplemental mitigation measures required pursuant to the 2015 Administrative Order issued by TDEC in August 2015 as well as the closure plan approved by TDEC, which could include additional monitoring, assessment, corrective action programs, or other actions deemed appropriate as specified in the EIP (TVA 2017b).

3.3 Surface Water

3.3.1 Affected Environment

3.3.1.1 Regional Surface Water Systems

The regional surface water features and water quality in the vicinity of the BRF plant is detailed in Part II of the PEIS for Surface Water (TVA 2016).

3.3.1.2 Surface Water of BRF Ash Impoundments

As described in Part II of the PEIS, BRF has several existing wastewater streams that are permitted under NPDES Permit TN0005410. Because the Main Ash Impoundment discharge (Outfall 001) is the primary wastewater stream potentially affected by the proposed project, it is the only existing BRF wastewater discharge stream discussed here. About 8.61 million gallons per day (MGD) of effluent is discharged from the Main Ash Impoundment through NPDES Outfall 001 at river mile 46.3. Primary contributing sources (greater than 1 MGD) include the sump flows and low volume waste streams, boiler bilge sump, main station sump (equipment cooling water and leakage, service bay floor drainage, plant leakage – boilers, and roof drains) and the stack yard sump. The current NPDES permit contains limitations on the ash impoundment discharge with respect to pH, oil and grease, and total suspended solids. This permit also requires reporting of toxicity, total nitrogen, cyanide and 15 metals including total aluminum, antimony, arsenic, barium, beryllium, cadmium, copper, iron, lead, mercury, nickel, selenium, silver, thallium, and zinc. Recent data indicates that the pH of the Main Ash Impoundment discharge ranged from 7.01 to 8.29; the oil and grease levels ranged between 4.27 and 5.88 mg/L; and total suspended solids levels ranged between 2.5 mg/L and 10 mg/L (TVA 2016). All discharges were within regulatory limits. Additionally, BRF has met aquatic whole effluent toxicity monitoring, which further indicates that this plant's discharge is not impacting aquatic organisms or water quality.

To evaluate and characterize discharges from Outfall 001, an analysis was conducted to summarize the average historical discharges and the instream mixing concentration from BRF (Table 3-1).

Results of the mixing analysis summarized in Table 3-1 demonstrates that all of the constituents, except thallium, met the TDEC strictest water quality criteria (i.e., limit equal to the minimum of the applicable stream designated criteria). The thallium exception is an artifact produced by high level calculations that do not account for data with values below detection limits, and the fact that the thallium laboratory analysis detection limit of 0.001 mg/L exceeds the TDEC criterion of 0.00024 mg/L.

Table 3-1. BRF Mixing Analysis of Historical Operations

Element	Current Baseline	Current Operations		Water Quality Criteria * Conc., (mg/L)
	Intake Conc. (mg/L)	Ash Stilling Pond*** Conc. (mg/L)	Total Discharge Conc. at Clinch River 1Q10 (mg/L)	
Aluminum	0.120	0.282	0.13661	
Antimony	<0.001	0.002	0.00062	0.0056
Arsenic	<0.001	0.0089	0.00136	0.01
Barium	0.032	0.046	0.03338	2.0
Beryllium	<0.001	<0.002	0.00055	0.004
Cadmium	<0.001	0.00697	0.00116	0.002
Chromium	<0.001	0.00187	0.00064	0.1
Copper	0.0014	0.0032	0.00159	0.013
Iron	0.130	0.463	0.16414	
Lead	<0.001	0.001	0.00060	0.005
Manganese	0.048	0.108	0.05415	
Mercury	0.00000089	0.00000228	0.0000010	0.00005
Nickel	0.0014	0.00484	0.00175	0.1
Selenium	<0.001	0.006	0.00104	0.02
Silver	0.00051	<0.002	0.00056	0.0032
Thallium	<0.001	<0.001	0.00050	0.00024
Zinc	<0.01	0.0177	0.00226	0.12
lbs/day = conc. in mg/L X flow in MGD X 8.34 lbs/gal.				
CCW Flow	129.3			
Stilling Pond Flow	14.8			
Flows taken from NPDES flow schematic 2013 for permit, except average flow data was taken for Outfall 001 maximum discharges.				
Mass Discharge and Loadings were calculated using 0.5 the Minimum Detection Limit				
*TDEC Criteria, Rule 0400-40-03				

3.3.2 Environmental Consequences

3.3.2.1 Alternative A – No Action

Under this alternative, construction and operational effects would be identical to that described in the prior SEA (TVA 2017a). The mixing analysis indicated that the proposed repurposed PWBs are expected to maintain or improve the quality of water that would be discharged. Additionally, wastewater would be managed and treated in lined basin(s), thus eliminating any potential seepage. Furthermore, mitigative measures would be introduced to ensure that discharge waters comply with NPDES permit limits and TDEC water quality criteria. These measures could include but would not be limited to implementing BMPs, wastewater treatment technologies, and/or rerouting or recycling water. Therefore, with proper treatment implementation, these waste streams from the proposed impoundment would not be expected to negatively impact surface water quality. Additionally, TVA would conduct a characterization to confirm no significant impacts to the Clinch River. The waters would be analyzed for metals and other parameters.

Because surface water flow and potential underseepage and groundwater releases to surface waters would be eliminated, 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.

3.3.2.2 Alternative B – Closure-in-Place of a Portion of the Main Ash Impoundment, Closure-by-Removal of the Remaining Portion of the Main Ash Impoundment and Repurposing into a Process Water Basin (PWB2), Closure-by-Removal of the Stilling Pond and Repurposing into a Process Water Basin (PWB1), and Development of a Process Water Basin Emergency Spillway.

Under this alternative, approximately 20 acres of the 33-acre Main Ash Impoundment would be Closed-in-Place. The remaining portion of the Main Ash Impoundment and the Stilling Pond would be Closed-by-Removal, lined and repurposed for the PWB system.

By using engineering controls such as temporary storage tanks or boxes, the portion of the Main Ash Impoundment that would be Closed-in-Place would be dewatered and ultimately discharged through the NPDES permitted outfall. Mitigative measures would be introduced to ensure that discharge waters comply with NPDES permit limits and TDEC water quality criteria. Once dewatering is completed all remaining CCR material would be consolidated and compacted in place. A cover system would be installed similar to that described in the PEIS (TVA 2016). A foundation drainage layer would be installed during construction of PWB1 to remove water under the liner system during construction, thus reducing the uplift pressure on the liner system. This system would have a discharge that would be directed into the Main Ash Impoundment and is not expected to be needed once construction is completed.

Under the proposed action, all systems currently discharging wastewater to the Main Ash Impoundment and Stilling Pond would be rerouted to the proposed PWB system. Surface water management under this alternative would be similar to that described in the prior SEA.

The proposed emergency spillway of the PWB1 would not impact any surface water under normal operating conditions. Water release at the spillway would be for emergency purposes only.

Wastewater generated during construction activities may include construction storm water runoff, dewatering of work areas, domestic sewage, non-detergent equipment washings, dust control, and hydrostatic test discharges. The scope and magnitude of wastewater generated under this alternative is expected to be similar to that evaluated for the selected alternative in the prior SEA and bounded by the description already provided in the PEIS (Section 3.7 Surface Water) (TVA 2017a)

As stated in the prior SEA, the main operational change to occur with the closure of the Main Ash Impoundment and the Stilling Pond is the onsite storm water and wastewater operation that is currently treated and discharged from the Main Ash Impoundment and Stilling Pond. Re-routing of these waste streams would use onsite non-CCR impoundments and the lined process trench to enable proper handling and treatment of the waste streams. Mitigation measures, such as storm water BMPs and wastewater treatment would be employed, as needed, to mitigate any pollutant discharge.

The proposed repurposed PWBs are expected to maintain or improve the quality of water that would be discharged. Additionally, wastewater would be managed and treated in lined basin(s), thus eliminating any potential underseepage. Furthermore, mitigative measures would be introduced to ensure that discharge waters comply with NPDES permit limits and TDEC water quality criteria. Therefore, potential direct and indirect impacts of this alternative to surface waters would be negligible.

3.3.2.3 Alternative C – Interim Cover of the Main Ash Impoundment and Repurposing a Portion for an Interim Process Water Basin (Interim PWB2), Closure-by-Removal of the Stilling Pond and Repurposing into a Process Water Basin (PWB1), and Development of a Process Water Basin Emergency Spillway

Under this alternative the 33-acre Main Ash Impoundment would be Closed-in-Place with an interim cover and the Stilling Pond would be Closed-by-Removal using a cover system similar to that described in the PEIS (TVA 2016). A portion of the Main Ash Impoundment (an approximately 13 acres) and the Stilling Pond would be repurposed into PWBs.

By using engineering controls, such as temporary storage tanks or boxes, the Main Ash Impoundment would be dewatered and ultimately discharged through the NPDES permitted outfall. Mitigative measures would be introduced to ensure that discharge waters comply with NPDES permit limits and TDEC water quality criteria. A foundation drainage layer would be installed during construction of PWB1 to remove water under the liner system during construction, thus reducing the uplift pressure on the liner system. This system would have a discharge that would be directed into the Main Ash Impoundment and is not expected to be needed once construction is completed.

All remaining CCR material would be consolidated and compacted in place. All systems currently discharging wastewater to the impoundment would be rerouted to the proposed PWBs.

Storm water from the closed Main Ash Impoundment would be routed through the proposed PWBs. Some storm water would be conveyed directly from the approved closure system and the remaining areas would drain to the lined Conveyance Channel, which would discharge into the proposed PWBs.

Wastewater generated during the proposed project would be similar to that described for Alternative B and would be the same as, and bounded by the description already provided in the PEIS (Section 3.7 Surface Water).

As with Alternative B, the proposed repurposed PWB system is expected to maintain or improve the quality of water that would be discharged. Additionally, wastewater would be managed and treated in lined basin(s), thus eliminating any potential underseepage. Furthermore, mitigative measures would be introduced to ensure that discharge waters comply with NPDES permit limits and TDEC water quality criteria. Therefore, potential direct and indirect impacts of this alternative to surface waters would be negligible.

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

There would be no changes in short-term use or long-term productivity of the land designated for ash impoundment closure or repurposing as part of the BRF wastewater

treatment system. These facilities would be located within the property already used by TVA for ash management or water treatment. Additionally, the proposed actions occur within a landscape subject to on-going human disturbance and maintenance; therefore, the short-term use of the land is not expected to significantly alter long-term productivity of wildlife or other natural resources.

3.5 Irreversible and Irretrievable Commitments of Resources

As described in Part I of the PEIS, there would be minor irreversible and irretrievable commitments due to the preferred action. No irreversible and irretrievable commitments associated with groundwater or surface water resources other than those discussed in the PEIS would result from Alternative B or C.

3.6 Cumulative Effects

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

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

The cumulative impacts of the proposed closure and repurposing of the Main Ash Impoundment and the Stilling Pond was assessed in this SEA and in combination with the previous assessments described in the PEIS (TVA 2016) and the October 2017 SEA (TVA 2017a). Relevant past, present, and reasonably foreseeable future actions that have the potential to, in conjunction with the proposed action, have a cumulatively greater effect on the environment are summarized in Table 3-2.

Table 3-2 Summary of Other Past, Present, or Reasonably Foreseeable Future Actions in the Vicinity of the Proposed Action

Action	Description	Timing
Mechanical Dewatering Facility	Construction and operation of a mechanical dewatering facility for dry storage of ash and gypsum at BRF	Past
House Demolition	166 acres purchased adjacent to BRF to expand plant boundary	Past
New CCR Dry Storage Landfill	TVA is evaluating options for management of CCRs generated at BRF, including construction of a landfill	Reasonably foreseeable future action
Future Retirement of BRF	Potential retirement of BRF	Reasonably foreseeable future action
Deconstruction and Demolition of BRF	Future disposition of the plant if TVA decides to retire BRF	Reasonably foreseeable future action
Road Improvements on SR 170	Tennessee Department of Transportation is currently studying improvements, including widening, of 6.2 miles of SR 170 (Edgemoor Road) between SR 9/US 25W (Clinton Highway) and SR 62 (South Illinois Avenue	Reasonably foreseeable future action

To address cumulative impacts, the existing affected environment surrounding the proposed project area 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 Code of Federal Regulations 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.

This analysis is limited only to those resource issues potentially adversely affected by preferred alternative project activities or connected actions. Accordingly, air quality, climate change, geology, soils, aquatic ecology, land use, noise, solid and hazardous waste, environmental justice, transportation. vegetation, wildlife, threatened and endangered species, floodplains, wetlands, cultural and historic resources, managed and natural areas, parks and recreation, socioeconomics, utilities and service systems, and public health and

safety and hazardous materials 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 adverse cumulative effects of the proposed actions as described in the preceding sections of Chapter 3 are related to the potential additive and overlapping effects on groundwater and surface water.

No other foreseeable future actions are known within the immediate project area potentially affected by the proposed action. Because the proposed action would result in environmental effects that are equal to or less than those identified in Part II of the PEIS and would not contribute to impacts to resources potentially affected by the other reasonably foreseeable future actions, no additional cumulative effects are expected with the proposed action.

CHAPTER 4 – LIST OF PREPARERS

4.1 NEPA Project Management

Name:	**Ashley Farless, PE, AICP (TVA)**
Education:	B.S., Civil Engineering
Project Role:	TVA Project Manager
Experience:	Professional Engineer and Certified Planner, 15 years in NEPA Compliance

Name:	**Bill Elzinga (Wood)**
Education:	M.S. and B.S., Biology
Project Role:	Project Manager, NEPA Coordinator
Experience:	34 years experience managing and performing NEPA analyses for electric utility industry, and state/federal agencies; ESA compliance; CWA evaluations

4.2 Other Contributors

Name:	**James Feild, PhD (Wood)**
Education:	M.S., Hydrogeology and B.S., Marine Geology
Project Role:	Groundwater
Experience:	18 years experience in Remediation, Investigation, Compliance, Drilling and Well Installation, Subsurface Hydrogeology, Fractured Rock Hydrogeology, Quality Assurance, Health & Safety, Waste Management and Restoration)

Name:	**A. Chevales Williams (TVA)**
Education:	B.S. Environmental Engineering
Project Role:	Surface Water
Experience:	12 years of experience in water quality monitoring and compliance; 10 years in NEPA planning and environmental services.

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