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October 17, 2018  
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Revision 0

Tennessee Valley Authority  
1101 Market Street  
Chattanooga, Tennessee 37402

**RE: Wetlands  
Active Ash Pond 2  
EPA Final Coal Combustion Residuals (CCR) Rule  
TVA Johnsonville Fossil Plant  
New Johnsonville, Tennessee**

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## **1.0 PURPOSE**

As described in 40 CFR § 257.61(a), an owner or operator of an existing CCR surface impoundment is required to demonstrate that the unit is not located in wetlands unless the unit meets certain requirements. This letter documents Stantec's certification that Active Ash Pond 2 at the TVA Johnsonville Fossil Plant (JOF) complies with the location restrictions for wetlands in the EPA Final CCR Rule at 40 CFR § 257.61(a).

## **2.0 SUMMARY OF FINDINGS**

The attached demonstration documents that Active Ash Pond 2 meets the requirements set forth in 40 CFR § 257.61(a).

## **3.0 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION**

I, Stephen H. Bickel, being a Professional Engineer in good standing in the State of Tennessee, do hereby certify, to the best of my knowledge, information, and belief:

1. that the information contained in this certification is prepared in accordance with the accepted practice of engineering;
2. that the information contained herein is accurate as of the date of my signature below;  
and
3. that the TVA Johnsonville Active Ash Pond 2 meets the requirements specified in 40 CFR § 257.61(a).



## Wetland Demonstration

Active Ash Pond 2  
Johnsonville Fossil Plant New  
Johnsonville, Humphreys County  
Tennessee



Prepared for:  
Tennessee Valley Authority

Prepared by:  
Stantec Consulting Services, Inc.

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Revision 0

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## List of Acronyms

CCR – coal combustion residuals  
CWA – Clean Water Act  
DMR – Discharge Monitoring Report  
EAP – Emergency Action Plan  
ECHO – Enforcement and Compliance History Online  
EPA – US Environmental Protection Agency  
FAC – Facultative Plants  
FACU – Facultative Upland Plants  
FACW – Facultative Wetland Plants  
FOS – factor of safety  
FEMA – Federal Emergency Management Agency  
IPaC – Information for Planning and Conservation  
JOF – Johnsonville Fossil Plant  
MGD – million gallons per day  
NPDES – National Pollutant Discharge Elimination System  
NRCS – Natural Resource Conservation Service  
NWI – National Wetlands Inventory  
OBL – Obligate Wetland Plants  
ONRW – Outstanding National Resource Waters  
SSURGO - Soil Survey Geographic Database  
TDEC – Tennessee Department of Environment and Conservation  
TRM – Tennessee River Mile  
TVA – Tennessee Valley Authority  
UPL – Upland Plants  
USACE – US Army Corps of Engineers  
USFWS – US Fish and Wildlife Service  
USGS – US Geological Survey

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# 1.0 BACKGROUND

## 1.1 PURPOSE

On April 17, 2015, the United States Environmental Protection Agency (EPA) published the "Disposal of Coal Combustion Residuals (CCR) from Electric Utilities" final rule in the Federal Register. The Tennessee Valley Authority (TVA) contracted Stantec Consulting Services Inc. (Stantec) to evaluate Active Ash Pond 2 at the Johnsonville Fossil Plant (JOF) regarding the requirements for the Wetlands Location Restriction as required by the EPA Final CCR Rule, 40 C.F.R. §257.61.

## 1.2 OUTLINE OF RULE REQUIREMENTS

Section 257.61(a) of the EPA Final CCR Rule states that new landfills, existing and new surface impoundments, and lateral expansions of CCR units must not be located in wetlands unless the owner/operator can demonstrate that the CCR unit meets the requirements of § 257.61(a)(1) through (a)(5).

For the purpose of this report, the existing CCR surface impoundment being assessed at JOF is referred to as the "CCR Unit" or "Active Ash Pond 2". The wetlands location restriction does not apply to existing CCR landfills.

Wetlands are defined under Section 404 of the Clean Water Act (CWA) as:

Areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

For purposes of existing CCR surface impoundments, the most reasonable interpretation of "located in wetlands" means adjacent to wetlands.

- Adjacent wetlands include those that could be inundated by a breach of the CCR Unit.
- The definition of a wetland in 40 C.F.R. §232.2 includes both jurisdictional and non-jurisdictional wetlands.

If the CCR Unit contributes to significant degradation of wetlands (as defined above), the facility can comply with the location criterion by compensatory steps that must be taken to achieve no net loss of wetlands. The demonstration should evaluate and address the following items to determine impacts for existing impoundments:

- i. Applicable Water Quality Standards
- ii. Clean Water Act

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- iii. Endangered Species Act
- iv. Marine Protection Act
- v. Erosion, Stability, and Migration Potential
- vi. CCR Volume and Chemical Nature
- vii. Wildlife Impacts
- viii. Potential Effects from Catastrophic Release
- ix. Additional factors, as necessary

### 1.3 SITE DESCRIPTION

JOF is located in New Johnsonville, Humphreys County, Tennessee. The facility lies on a man-made area in Kentucky Lake, an impounded portion of the Tennessee River at Tennessee River Mile (TRM) 100. Figure 1 shows an overview map of JOF including its facilities and CCR disposal areas. Ash Pond 2 has a surface area of 87 acres with an approximate total volume capacity of 2,840 acre-feet. JOF was constructed between 1949 and 1959 and began operations in October 1951. Coal-fired power generation at JOF ended in December 2017.

The coal combustion process at JOF results in the production of by-products that include fly ash and bottom ash (Dewberry 2013). The plant currently manages these CCRs in Active Ash Pond 2 in accordance with Tennessee Department of Environment and Conservation (TDEC) Division of Water Resources National Pollutant Discharge Elimination System (NPDES) Permit No. TN0005444.



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Figure 1. Site Overview



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### 1.4 DATA SOURCES

This section summarizes available data used to assess conditions at the site of the CCR Unit and determine the likelihood of the CCR Unit being located adjacent to a wetland.

#### 1.4.1 Issued Permits

The CCR disposal facilities at JOF are currently operated under TDEC NPDES Permit TN0005444, which allows several industrial discharges, including the discharge from the ash pond.

#### 1.4.2 TVA Documentation

In the development of this document, Stantec reviewed reports, data, tables, plans, maps, etc. that have been provided by TVA or prepared by Stantec regarding the Johnsonville Facility, and especially pertaining to the Active Ash Pond 2. Relevant resources are cited within the document.

#### 1.4.3 Publicly Available Data

Data available to the public was collected and reviewed for information pertaining to site conditions at the JOF facility. Available data included the following:

- National Pollutant Discharge Elimination System Permit No. TN0005444 authorizes the discharge and effluent limitations for Outfall 001 (from the CCR Unit).
- National Wetlands Inventory (NWI) maps produced by the United States Fish and Wildlife Service (USFWS) (USFWS 2015a) were created in this area using photointerpretation of imagery from 1981. Spatial data showing the location and extent of mapped wetlands was reviewed for the area surrounding the JOF plant.
- Tennessee River Navigation Charts from the US Army Corps of Engineers (USACE) (USACE 2015) show the summer pool elevations for Kentucky Lake at the project site is 359.0 ft.
- United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) (USDA-NRCS 2018) soil survey data provides information on hydric soils adjacent to the CCR Unit.
- Federal Emergency Management Agency (FEMA) (FEMA 2009) floodplain information was reviewed to determine the annual percentage chance flood area in which the CCR Unit and surrounding areas fall.
- Historic US Geological Survey (USGS) Topographic Quadrangles were reviewed for surface water features and relevant structures (1936, 1952, 1970, and 1988).
- The EPA's Enforcement and Compliance History Online (ECHO) (USEPA 2018) database was consulted to provide background information regarding water quality discharge compliance with issued NPDES permits.
- USFWS's website (Information for Planning and Conservation (IPAC) data and county lists) was accessed to determine federally threatened and endangered species that may be

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impacted by the CCR Unit (USFWS 2015b). The lists provided by this information are not considered "official". Additional coordination with USFWS, outside the scope of this document, would be required to obtain official lists of species that may be impacted by the CCR Unit.

- Initial Structural Stability Assessment (Stantec 2016a) provides documentation on the construction, operation, and maintenance in relation to structural stability requirements.
- Coal Combustion Residue Impoundment Round 11 – Dam Assessment Report (Dewberry 2013) provides information on condition and potential of release from the CCR unit.

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## 2.0 ASSESSMENT OF SITE WETLANDS

Areas on and adjacent to JOF were first assessed for the presence of wetlands by desktop review, using aerial photography, USFWS National Wetland Inventory (USFWS 2015a), publicly available geospatial data (USDA-NRCS 2017), and FEMA floodplain data (2009) (Figure 2). Confirmation of remote findings was conducted during onsite reconnaissance.

The 1987 USACE Delineation Manual defines wetlands as areas with the following general environmental characteristics: 1. Hydric soils; 2. Wetland Hydrology; and 3. Hydrophytic Vegetation.

Initially, Stantec reviewed available data for the presence or absence of wetlands adjacent to the Active Ash Pond 2. In the absence of on-site delineations, the desktop analysis used other historic and current data to determine the potential for wetlands. After desktop analysis, a site reconnaissance was conducted to help determine if wetland indicators were in fact located within the study area as suggested by the desktop analysis. The data review and subsequent site reconnaissance indicated the likely presence of wetlands adjacent to Active Ash Pond 2 (Figure 3). The evidence supporting the presence and estimated extent of wetlands is outlined in the following sections.

### 2.1 LOCATION AND CONDITION OF WETLANDS

#### 2.1.1 Desktop Assessment

A preliminary assessment of existing wetlands and adjacent areas that could potentially be inundated by a breach of Active Ash Pond 2 was investigated. These wetlands were identified through review of NWI data and the presence of wetland indicators were confirmed through site reconnaissance. The wetlands described do not include obvious non-wetland waterbodies identified in NWI data such as the ash impoundment itself, other engineered impoundments on site, or the impounded Tennessee River (identified as riverine habitat). The NWI identified one probable wetland located adjacent to the CCR Unit and within the potential breach inundation area, totaling 0.44 acre.

Hydric soils were identified using the Soil Survey Geographic Database (SSURGO) soils downloader and include 9.9 acres of the CCR Unit. Soils were not identified within the NWI wetland, as it is identified as water in SSURGO. Other areas within the potential inundation area are not indicated as hydric.

The CCR Unit is not within a mapped FEMA floodplain (FEMA 2009). Areas immediately adjacent to the Tennessee River/Kentucky Lake outside of the facility dikes are included in the 1% annual chance floodplain which indicates that hydrology may be sufficient to support wetlands.

NWI wetlands and areas adjacent to Ash Pond 2 were examined to determine the proximity of potential wetlands to the current CCR Unit. The area containing the Ash Pond is shown as a L2UBFx, L1UBHx, and PUBHx on the NWI map. See Figure 2 below for mapped NWI wetlands within the estimated breach inundation zone.

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Figure 2. CCR Wetlands Demonstration Desktop Assessment



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### 2.1.2 Field Reconnaissance

A preliminary site assessment of the potential wetlands in a quarter mile buffer surrounding the CCR Unit was conducted by Stantec staff on August 21, 2018, to identify if indicators of wetlands are present adjacent to the CCR Unit. Potential wetland areas are identified on Figure 3.

Wetland indicators were observed in three potential wetland areas on the eastern side of Active Ash Pond 2, and a fourth potential wetland area was noted along the southern limits of the study area. All potential wetland areas occur at the water's edge along the margins of the land on which Active Ash Pond 2 exists and their extent varies depending on water elevation within Kentucky Lake/Tennessee River. None of these areas were identified as wetlands on NWI by the U.S. Fish and Wildlife Service.

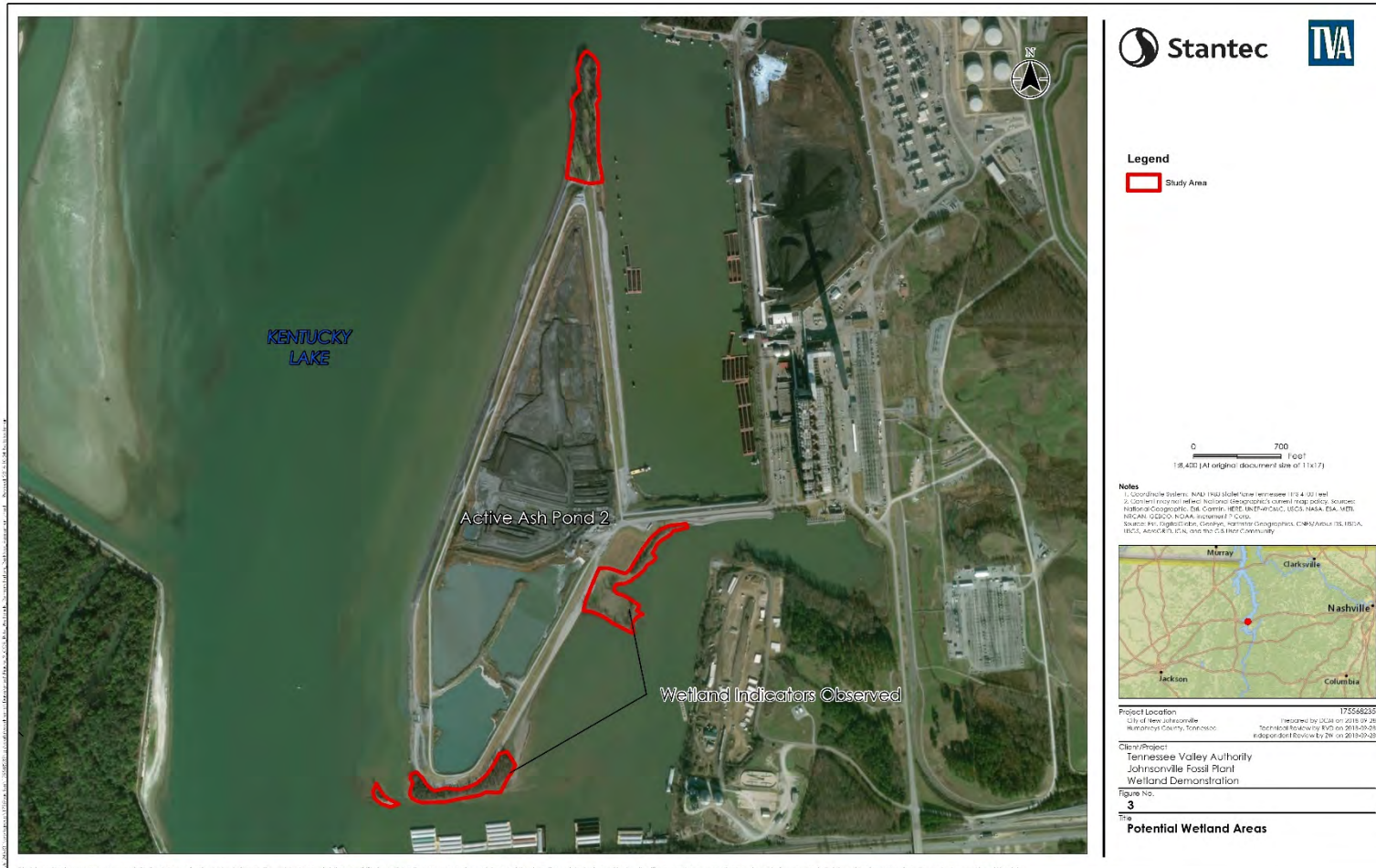
Observed soils in much of the project area were homogenous in color with brown or red matrices, were well drained due to a high gravel content, and would not be considered hydric soils. However, soils in the potential wetland areas were poorly drained due to a high clay content, were gray to dark gray in color, and contained redoximorphic features typically exhibited in hydric soils. The National Wetland Plant List published by the USACE in partnership with other federal agencies classifies vegetation species based on how likely each plant is to be found in a wetland environment within a particular region. The classification system ranges from upland (UPL) to obligate (OBL- wetland) with three facultative categories in between ranging from facultative upland (FACU) to facultative (FAC) to facultative wetland (FACW).

Areas exhibiting wetland characteristics were dominated with facultative wetland (FACW) to obligate (OBL) vegetation, suggesting these areas are consistently saturated. Species observed in these areas include silver maple, black willow (*Salix nigra* – OLB) and green ash in the canopy layer with swamp rosemallow (*Hibiscus moscheutos* – OBL), buttonbush (*Cephalanthus occidentalis* – OBL), water willow (*Justicia americana* – OLB) alligator weed (*Alternanthera philoxeroides* – OBL), smartweed (*Persicaria pensylvanica* – FACW) and sedges (*Carex* spp.) in the understory. The field reconnaissance confirmed that wetlands likely exist in areas that would be impacted by a breach of the CCR Unit. Thus, the requirements of § 257.61(a)(1) through (a)(5) of the EPA Final CCR Rule must be addressed.

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Figure 3. Field Reconnaissance Potential Wetland Areas



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### 3.0 IMPACTS

The following sections summarize the requirements of the EPA Final CCR Rule regarding the wetlands demonstration for the Active Ash Pond 2 at JOF.

As part of the wetland location restriction, the operator must show that the operation of the CCR Unit does not violate applicable laws or standards, as well as ensure that the unit does not cause or contribute to significant wetland degradation. A qualified, independent professional engineer must be able to verify these location restrictions. To evaluate potential impacts of the CCR Unit on wetlands, each of the following subsections was considered for the identified wetlands.

#### 3.1 §257.61(a)(1) LOCATION ALTERNATIVES

*(a) New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in wetlands, as defined in § 232.2 of this chapter, unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that the CCR unit meets the requirements of paragraphs (a)(1) through (5) of this section. (1) Where applicable under section 404 of the Clean Water Act or applicable state wetlands laws, a clear and objective rebuttal of the presumption that an alternative to the CCR unit is reasonably available that does not involve wetlands.*

The EPA Final CCR Rule states that the party must make a “clear and objective rebuttal of the presumption that an alternative to the CCR unit is reasonably available that does not involve wetlands”.

The criterion is not applicable under Section 404 because the CCR Unit was built before Section 404 of the Clean Water Act was promulgated, and before the regulations for jurisdictional wetlands were promulgated in 1972. Additionally, the surface impoundment itself is not a wetland because surface impoundments are wastewater treatment systems and are exempted as such from the definition of a jurisdictional wetland.

#### 3.2 §257.61(a)(2)(i&ii) APPLICABLE WATER QUALITY STANDARDS AND EFFLUENT LIMITATIONS

*(2) The construction and operation of the CCR unit will not cause or contribute to any of the following: (i) A violation of any applicable state or federal water quality standard; (ii) A violation of any applicable toxic effluent standard or prohibition under section 307 of the Clean Water Act.*

The EPA Final CCR Rule states that the operation of the CCR unit must not violate any applicable state or federal water quality standard. The issued permits for the pond discharge require regular discharge monitoring reports (DMRs). As part of this analysis, a subset of the DMRs was reviewed for compliance with the issued NPDES permit, and it was determined that discharges from Outfall 001 are currently within the acceptable limits of the permit.



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### 3.2.1 Tennessee Water Quality Standards

Surface water quality in the State of Tennessee is regulated, in part, by Tennessee Code 69-3-101, which establishes authority of the Water Quality Control Board to set water quality standards, and Rule 0400-40-03 defines these standards. These standards set the surface water quality criterion and list the maximum allowable concentrations for specific pollutants. These regulations will supersede the federal standards where more stringent.

The Tennessee River between TRM 49.1 and 215.1 is designated for the following uses: domestic water supply, industrial water supply, fish and aquatic life, recreation, livestock watering and wildlife, irrigation, and navigation (TDEC 2013). The most stringent criteria of these uses will be applicable.

Tennessee also has an antidegradation policy (Chapter 0400-40-3-0.6) for surface waters of notable quality (i.e., categorized as an outstanding national resource water (ONRW), exceptional water). At JOF, water from the CCR Unit is discharged from the Active Ash Pond 2 through Outfall 001, at the southwest corner of the Active Ash Pond 2 into the Tennessee River/Kentucky Lake TRM 100.2. This portion of the Tennessee River/Kentucky Lake is designated as an exceptional Tennessee Water due to supporting federally and state listed threatened or endangered aquatic species. Degradation in Exceptional Waters cannot be authorized unless there is no reasonable alternative to the proposed activity that would render it non-degrading and the activity is in the economic or social interest of the public.

Groundwater sampling is being performed in accordance with and meets the performance standard in the EPA Final CCR Rule (Stantec 2018). Data and results of this sampling will be addressed in separate reports.

### 3.2.2 Clean Water Act

Section 307 of the Clean Water Act, entitled Toxic and Pretreatment Effluent Standards, states that toxic pollutants named by the EPA (126 pollutants total) shall be subject to effluent limitations based on the application of best available technology for point sources. Other federal laws may be applicable to maintaining water quality standards. These include Sections 401, 402, and 404 of the CWA. In addition, the operation of the CCR unit must not violate applicable toxic effluent standard or prohibition under Section 307 of the CWA (U.S. Congress 1972b).

Based on Tennessee's 303(d) list (TDEC 2017), the Tennessee River/Kentucky lake in the vicinity of JOF is not listed as impaired.

One current NPDES discharge permit issued in accordance with Section 402 of the CWA has been identified as being associated with JOF (TN0005444). This permit approves several process waters and stormwater discharges, including the discharge from the Active Ash Pond 2 at Outfall 001. The section 307 toxic pollutant list is often used as a basis for developing permitted discharge standards for NPDES permits.

The permit authorizes ash pond discharge consisting of treated ash transport water, chemical and nonchemical metal cleaning wastes, miscellaneous equipment cooling and lubricating water, floor washing and other low volume wastes, boiler makeup water leakage, boiler blowdown, ash system leakage and boiler bottom overflow, Co-generation Building treated groundwater,

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combustion turbine area wastewater, groundwater seepage, Coal Crusher Building and crane unloading building sumps, stack wash water, non-thermal sump discharge, coal pile runoff, ash landfill leachate and stormwater runoff through Outfall 001.

The EPA's Enforcement and Compliance History Online Database (USEPA 2018) was reviewed. Additionally, Stantec reviewed a subset of DMR data collected during the past decade. Based on this review, DMR data was within the permitted limits of their current NPDES issued permit. Compliance information was available from April 2015 to March 2018.

Based on available information, it appears that CCR Unit Outfall 001 is in compliance with the current NPDES permit.

Whole Effluent Toxicity (WET) biomonitoring tests have been performed with fathead minnows and daphnia (*P. promelas* and *C. dubia*) in accordance with JOF NPDES permit requirements for outflow from Outfall 001. No violations of WET standards for Outfall 001 were found during a review of JOF compliance information from April 2015 to March 2018 (TVA 2018a).

No known federal or state water quality standards are being violated as a result of construction and operation of the CCR Unit.

### 3.3 §257.61(a)(2)(iii) ENDANGERED SPECIES ACT

(2) The construction and operation of the CCR unit will not cause or contribute to any of the following: (iii) Jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of a critical habitat, protected under the Endangered Species Act of 1973

The operation of the CCR unit must not jeopardize the continued existence of endangered or threatened species or critical habitats, as protected under the Endangered Species Act of 1973. The following species are identified by USFWS as threatened or endangered and have potential to occur in or adjacent to (within a 5-mile radius) the JOF CCR Unit.

- Orangefoot Pimpleback (*Plethobasus cooperianus*) – Endangered
- Pink Mucket (*Lampsilis orbiculata*) - Endangered
- Ring Pink (*Obovaria retusa*) – Endangered
- Rough Pigtoe (*Pleurobema plenum*) – Endangered
- Clubshell (*Pleurobema clava*)- Endangered
- Slabside Pearlymussel (*Pleuronaia dolabelloides*)- Endangered
- Spectaclecase (*Cumberlandia monodonta*)- Endangered
- Pygmy Madtom (*Noturus stanauli*)- Endangered

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- Indiana Bat (*Myotis sodalis*) – Endangered: Critical habitat for the species has been identified, the Active Ash Pond 2 is outside the critical habitat.
- Northern Long-Eared Bat (*Myotis septentrionalis*) – Threatened
- Gray Bat – (*Myotis grisescens*) – Endangered

In addition to the species listed within a 5-mile radius of JOF, the following species have been known to occur within Humphreys County, Tennessee:

- Bald Eagle (*Haliaeetus leucocephalus*) – while not currently listed as threatened or endangered, the Bald Eagle is protected under the Bald and Golden Eagle Protection Act. No designated critical habitat is located in the vicinity of the CCR unit.
- Golden Eagle (*Anquila chrysaetos*) - while not currently listed as threatened or endangered, the Golden Eagle is protected under the Bald and Golden Eagle Protection Act. No designated critical habitat is located in the vicinity of the CCR Unit.

Mussel habitat surveys were conducted in 2009, 2011, and 2013 in areas of the northeast dike that were repaired in 2010 with riprap. Multiple transects were made in the area that faces an embayment of the Tennessee River between the Active Ash Pond 2 and the plant. In 2009 high quality mussel habitat was found with the highest mussel densities of 20 to 26 mussels/m<sup>2</sup>. A total of 16 species were sampled as well as one weathered dead pink mucket shell, no other federally listed species were encountered. In 2011 the same transects were sampled with an additional six transects. A total of 2,792 mussels of 17 different species were sampled, no federally listed species were encountered. In 2013 the same transects from 2011 were surveyed, a total of 2,443 mussels of 20 different species were sampled, no federally listed species were encountered (Third Rock Consultants 2013).

No designated critical habitat for these any of the mussel species listed occurs in the Tennessee River in the vicinity of JOF. Likewise, the federally listed endangered Pygmy Madtom (*Noturus stanauli*) is present in the Duck River but does not occupy the mainstem Tennessee River/Kentucky Reservoir (Appendix A).

Biological monitoring of the Tennessee River near the Johnsonville plant was conducted in 2011 (TVA 2012). The monitoring included aquatic habitat, benthic macroinvertebrates, fish, wildlife, flow, temperature, and water quality surveys. No federally endangered or threatened species were found during this survey. A visual wildlife encounter survey was conducted in August and October of 2011, numbers of wildlife observed were estimated and identified to general categories and by common name when possible. Both surveys consisted primarily of birds associated with riparian habitat including one juvenile bald eagle (TVA 2012). Other bird species observed included: egret, great blue heron, osprey, green heron, mallard, double crested cormorant, American white pelican, American coot, ring-billed gull, killdeer, common tern, and undetermined songbirds (TVA 2012). Shoreline habitat was fair, aquatic vegetation covers the majority of shoreline upstream of JOF but only 25% on one shoreline downstream. The river bottom both upstream and downstream of JOF is primarily composed of clay and mollusk shells (TVA 2012).

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The Indiana bat and Northern Long-eared bat are known for roosting in trees and foraging along riparian areas and uplands within the summer months. No suitable roosting habitat for forest-dwelling bats exists within the JOF CCR Unit. However, high quality roosting and foraging habitat for the two forest-dwelling bat species exists immediately adjacent to the JOF plant site in wetlands and streams, and along the Tennessee River (Appendix A). Gray bats are primarily cave-dwelling bats year-round and forage over open water and riparian areas. A review of the TVA Regional Natural Heritage database in December 2014 found no records of caves within 3 miles of the JOF facility (TVA 2015). Current TVA information indicated there are no records of caves within 5 miles of the JOF CCR Unit (Appendix A). Gray bats are known to be a cave-dwelling species, with the lack of suitable habitat in the area, there are no anticipated impacts to Gray bats.

TVA Environmental Compliance and Operations has determined that the current operation of the JOF CCR Unit would have no direct, indirect or cumulative effects on federally listed species, and therefore is not likely to jeopardize the existence of listed species or result in the destruction or adverse modification of designated critical habitat (Appendix A).

### 3.4 §257.61(A)(2)(iv) MARINE PROTECTION ACT

*(2) The construction and operation of the CCR unit will not cause or contribute to any of the following: (iv) A violation of any requirement under the Marine Protection, Research, and Sanctuaries Act of 1972 for the protection of a marine sanctuary.*

The Marine Protection, Research, and Sanctuaries Act of 1972 (U.S. Congress 1988) does not apply to any TVA sites, does not apply to federal facilities and also does not apply to TVA existing surface impoundments because the CCR Unit is not classified as "marine" as per 15 C.F.R. § 922.3.

### 3.5 §257.61(a)(3)(i&ii) EROSION, STABILITY, AND MIGRATION POTENTIAL

*(3) The CCR unit will not cause or contribute to significant degradation of wetlands by addressing all of the following factors: (i) Erosion, stability, and migration potential of native wetland soils, muds and deposits used to support the CCR unit; (ii) Erosion, stability, and migration potential of dredged and fill materials used to support the CCR unit.*

TVA monitors for potential erosion and stability issues, pursuant to 40 CFR 257.83, and addresses them when/if identified. Inspection requirements of 40 CFR 257.83 are as follows:

- Weekly visual inspections must be performed to identify any potential structural issues that could negatively affect the function or safety of the CCR Unit.
- Inspections of all hydraulic discharges are also required weekly, observing for any indication of abnormal coloration of discharge, as well as any debris or sediment in discharge.
- Monthly inspections are required of all CCR Unit instrumentation.

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An assessment of the stability and functionality of the JOF CCR Unit in 2011 found the active ash disposal area to be “satisfactory” for continuous safe and reliable operation. The rating reflects studies performed by TVA in 2012. No other existing or potential safety deficiencies were found (Dewberry 2013). Conclusions from the stability and functionality report were based on review of technical documentation provided by TVA and a one-day site visit on September 20, 2011. The report evaluated the condition and potential of residue release from the CCR unit and determined the hazard potential classification of the CCR unit.

A structural stability assessment conducted by Stantec in 2016 found the Active Ash Pond 2 impoundment to meet the structural stability requirements set forth in 40 CFR 257.73(d)(1)-(2) (Stantec 2016a).

After reviewing the FY2018 intermediate inspection (TVA 2018b) conducted February 2018, no known critical deficiencies or potential structural weaknesses currently exist around the Active Ash Pond 2. No erosion or stability issues were observed during the inspection. The complete inspection report is available through the TVA CCR Rule Compliance Data and Information website.

TVA will continue to monitor the perimeter dikes of the CCR Unit as part of the operations and maintenance plan to proactively address future erosion and stability issues that may occur. With rigorous stability inspections and maintenance, it is unlikely that wetlands are being impacted because of erosion and soil migration. It is unlikely that the CCR Unit is contributing to significant degradation of wetlands due to erosion, instability, or migration of soils, muds, or deposits from or used to support the CCR Unit.

### 3.6 §257.61(a)(3)(iii) CCR VOLUME AND CHEMICAL NATURE

*(3) The CCR unit will not cause or contribute to significant degradation of wetlands by addressing all of the following factors: (iii) The volume and chemical nature of the CCR.*

Ecological resources in wetlands must be sufficiently protected, including consideration of the volume and chemistry of the CCR managed in the unit.

According to the 2018 Intermediate Inspection of CCR Facilities (TVA 2018b) the Active Ash Pond 2 currently impounds 319,700 cubic yards of water with 478,300 cubic yards of storage remaining. Approximate thickness of the CCR material since the previous annual inspection is between 15.5 and 55.6 feet. The plant has ceased coal firing operations as of December 2017.

When JOF was in operation, the Active Ash Pond 2 received approximately 260,000 tons of wet-sluided bottom ash a year. Approximately 30,000 tons per year of bottom ash was wet-sluided to the Active Ash Pond 2 and approximately 32 million gallons per day (MGD) of water was discharged into the Active Ash Pond 2 (Dewberry 2013).

### 3.7 §257.61(A)(3)(IV) FISH AND WILDLIFE IMPACTS

*(3) The CCR unit will not cause or contribute to significant degradation of wetlands by addressing all of the following factors: (iv) Impacts on fish, wildlife, and other aquatic resources and their habitat from release of CCR.*

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Biological Monitoring of the Tennessee River near the Johnsonville plant was conducted in 2011(TVA 2012). The monitoring included aquatic habitat, benthic macroinvertebrates, fish, wildlife, flow, temperature, and water quality surveys; those results are summarized below.

The benthic macroinvertebrate community was rated “excellent” at all sites near JOF during the summer and autumn of 2011. Benthic macroinvertebrates were sampled within the thermal plume, just downstream of the thermal plume and at two upstream sites. All sites scored high during both summer and autumn sampling. All sites received an “excellent” ecological health rating and several native mussel species were sampled.

Fish communities upstream and downstream of JOF were similar and considered balanced indigenous populations. During the autumn both upstream and downstream sites as well as the upstream site during the summer received high scores for number of intolerant species while the downstream site receive a mid-range score during the summer. Fish assemblage sampling has been conducted upstream and downstream of JOF biennially from 2001 to 2007 and during 2010 and 2011. During these years the average fish assemblage index score was “good” for both upstream and downstream sites. Both upstream and downstream sites in autumn 2011 and the upstream site in summer 2011 were also scored as “good”, the score for the downstream site in 2011 was “fair”. Throughout these surveys the average number of indigenous fish species collected at the downstream site was 30 and 32 at the upstream site. During the summer of 2011 tolerant individuals made up 46.0% and 33.9% of the downstream sample during electrofishing and gillnet surveys respectively, while tolerant individuals made up 46.7% and 24.4% of the upstream site. During the autumn of 2011 tolerant individuals made up 31.0% and 14.6% of the downstream sample during electrofishing and gillnet surveys respectively, while tolerant individuals made up 45.5% and 2.1% of the upstream site. Overall during summer 2011 the downstream fish assemblage exhibited fewer intolerant and tolerant species and was less dominated by a single species than the upstream assemblage. During the autumn both sites were similar in their assemblages.

Although unlikely due to adequate slope stability factors of safety, aquatic species existing within the Tennessee River, including freshwater mussels, would be impacted by a catastrophic release of CCR. Tennessee Water Quality Criteria, as outlined in T.C.A. Rule 0400-40-03 Section 3, seek to protect aquatic life in warm water aquatic habitats. Parameters and associated criteria are set for the protection of productive warm water aquatic communities, fowl, animal wildlife, arboreous growth, agricultural, and industrial uses. The JOF NPDES permit follows these parameters, with certain exceptions as granted by law, under the discharge permit.

Water released from Outfall 001 of the CCR Unit meets the required NPDES permitted discharge limits. Should a catastrophic release of CCR occur, the plant also maintains emergency response procedures that would be implemented. The emergency response to a release would limit and minimize the amount and duration of an unauthorized discharge to waterbodies as much as possible, thus minimizing the impact to aquatic habitat and organisms.

In general, the routine stability inspections and maintenance of the CCR Unit are intended to minimize the likelihood of an accidental release, thereby minimizing risk to wildlife and aquatic habitats. No direct discharges of CCR to wetlands have been discovered; therefore, it is unlikely that the CCR Unit is impacting fish, wildlife, or other aquatic resources as a result of routine CCR releases.

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### 3.8 §257.61(a)(3)(v) POTENTIAL EFFECTS FROM A CATASTROPHIC RELEASE (ENVIRONMENTAL IMPACTS)

*(3) The CCR unit will not cause or contribute to significant degradation of wetlands by addressing all of the following factors: (v) The potential effects of catastrophic release of CCR to the wetland and the resulting impacts on the environment.*

The Final CCR Rule requires that the CCR Unit will not cause or contribute to significant degradation of wetlands and the environment due to the potential effects from a catastrophic release of CCR. In the unlikely but hypothetical event of a breach, CCR material would be discharged directly into Kentucky Lake. Additionally, CCR material could be carried downstream in the Tennessee River. Trees and other vegetation as well as any existing wildlife in the area inundated by the breach may be impacted. Land areas immediately adjacent to Active Ash Pond 2 would likely be affected, but it is not anticipated that significant land impacts outside of this area would be incurred.

While there are potential wetlands adjacent to Active Ash Pond 2, that would likely be affected by a catastrophic release, there is little to no risk of a catastrophic failure. Thus, the threat to wetlands from such a release is minimal. The likelihood of a release is minimal for the following reasons.

The JOF inflow design flood control system plan was analyzed by Stantec for TVA (Stantec 2016b) and found to adequately manage flow into and from the CCR Unit during the 1,000-year inflow design flood, with a water surface elevation of 385.9 feet; the lowest embankment elevation being 390.0 feet. The plan and results show that the impoundment meets the requirements set forth in 40 CFR 257.82(a) and (b).

Stantec conducted a structural stability assessment based on the sudden drawdown for the Active Ash Pond 2 perimeter dike (Stantec 2016a). Results showed calculated factors of safety (FOS) for a critical cross section was 1.5, surpassing the EPA required factor of safety of 1.1.

Stantec conducted an initial structural integrity evaluation as required by EPA Final CCR Rule 40 CFR 257.73(d). No indications of global foundation issues have been noted on historic inspection reports, recent inspections note no significant signs of tension cracking, settlement, deformations or similar instabilities (Stantec 2010, 2011, 2014, Dewberry 2013). Significant repairs associated with slope protection issues have been documented, these include a series of riprap areas along the western dike occurring from 1994 to 1997, 2004, and 2005. A site visit by TVA in 2018 indicated that the riprap was performing well. The report found that the impoundment met structural stability requirements identified in 40 CFR 256.63(d)(1)-(2).

In an EPA Seismic Assessment for the Active Ash Pond 2 conducted by Geocomp (2016), an evaluation was conducted for seismic loading for the seismic FOS and liquefaction FOS. Five cross sections were evaluated, the seismic FOS (pseudo-static stability) ranged between 1.37 and 1.86, exceeding the EPA's required FOS of 1.0 for the EPA Final CCR Rule. The Liquefaction FOS (post-earthquake stability) ranged from 1.25 to 1.32, exceeding the EPA's required FOS of 1.2.

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Stantec assessed the static safety factor of the Active Ash Pond 2 regarding long-term, maximum storage pool loading condition as well as maximum surcharge pool loading condition at a critical cross section (Stantec 2016c). Maximum storage pool loading condition was 1.50 at cross section K-K' meeting EPA's CCR required FOS of 1.50. The maximum surcharge pool loading FOS was 1.45 at cross section K-K', exceeding EPA's required FOS of 1.40.

There are 62 piezometers and three slope inclinometers currently being monitored at the Active Ash Pond 2. Instrumentation data in automated slope inclinometers and piezometers is analyzed monthly by TVA for significant fluctuations. Manual instruments are analyzed semi-annually. Additionally, no structural deficiencies or unstable areas were observed during the most recent Facilities Inspection (TVA 2018b).

A Hazard Potential Classification Assessment for the Active Ash Pond 2 at JOF was performed by Stantec in 2016 as required per the EPA Final CCR Rule. Based on the applicable hazard classifications defined in the EPA Final CCR Rule, the Active Ash Pond 2 is classified as a "significant hazard potential" CCR surface impoundment, which is defined below:

Significant hazard potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.

TVA has an Emergency Action Plan (EAP) in the unlikely event of a catastrophic failure of the CCR Unit (TVA 2017c).

### 3.9 §257.61(a)(4) WETLAND MITIGATION

*(4) To the extent required under section 404 of the Clean Water Act or applicable state wetlands laws, steps have been taken to attempt to achieve no net loss of wetlands (as defined by acreage and function) by first avoiding impacts to wetlands to the maximum extent reasonable as required by paragraphs (a)(1) through (3) of this section, then minimizing unavoidable impacts to the maximum extent reasonable, and finally offsetting remaining unavoidable wetland impacts through all appropriate and reasonable compensatory mitigation actions (e.g., restoration of existing degraded wetlands or creation of man-made wetlands).*

Because Section 404 of the CWA and state wetlands laws were not found to be violated due to the day-to-day operation of the CCR Unit, and because the unit was built prior to the implementation of regulations governing fill in wetlands, no known net loss of wetlands is occurring and therefore it is anticipated that no mitigation would be required as per §257.61(a)(4) of the EPA Final CCR Rule.



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### 4.0 CONCLUSIONS

Based on the assessment outlined herein, Active Ash Pond 2 located at Johnsonville Fossil Plant meets the requirements of §257.61 of the EPA Final CCR Rule for wetlands location restriction.

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**APPENDIX A  
CERTIFICATION OF JOHNSON FOSSIL  
PLANT CCR UNIT OPERATION  
COMPLIANCE WITH THE ENDANGERED  
SPECIES ACT**

**Certification of Johnsonville Fossil Plant CCR Unit Operation compliance with the  
Endangered Species Act -10/9/2018**

The operation of the Johnsonville Fossil Plant (JOF) CCR Unit must not jeopardize the continued existence of endangered or threatened species or critical habitats, as protected under the Endangered Species Act of 1973 (ESA). The ESA provides broad protection for species of fish, wildlife and plants that are listed as threatened or endangered in the United States or elsewhere. The ESA outlines procedures for federal agencies to follow when taking actions that may affect federally listed species or their designated critical habitat.

TVA has examined information contained in the State of Tennessee Natural Heritage Program database, the TVA Regional Natural Heritage database, and the U.S. Fish and Wildlife Service on-line Information for Planning and Consultation (iPaC) database to determine which federally listed species and/or designated critical habitats are potentially present on or adjacent to (within five miles of) the JOF CCR Unit.

Seven federally listed endangered freshwater mussel species; Pink Mucket (*Lampsilis abrupta*), Ring Pink (*Obovaria retusa*), Orange-foot pimpleback (*Plethobasus cooperianus*), Clubshell (*Pleurobema clava*), Rough Pigtoe (*Pleurobema plenum*), Slabside Pearlymussel (*Lexingtonia dolabelloides*), and two federally listed threatened freshwater mussel species; Rabbitsfoot (*Quadrula c. cylindrica*), and Spectaclecase (*Cumberlandia monodonta*) are known to occur within Humphreys County, TN.

One of these mussel species (Pink Mucket) is recorded in the Tennessee River within a 5-mile radius of JOF and is likely present in the Tennessee River in areas adjacent to the JOF CCR area. Designated Critical Habitat for Fluted Kidneyshell, Rabbitsfoot, and Slabside Pearlymussel is present in the Duck River in Humphreys County, TN. No designated critical habitat for these any of these species occurs in the Tennessee River in the vicinity of JOF. Likewise, the federally listed endangered Pygmy Madtom (*Noturus stanauli*) is present in the Duck River but does not occupy the mainstem Tennessee River/Kentucky Reservoir.

Suitable habitat for federally listed aquatic species does not occur within the JOF CCR area; therefore, direct, indirect, or cumulative impacts to state- or federally listed threatened and endangered aquatic species do not occur. Because the JOF CCR Unit does not include any freshwater stream habitat, these species do not occur on-site. All water discharges are through the permitted outfall and would meet existing TDEC permit requirements. Because TDEC requirements are protective of aquatic life (including federally listed mussel species) in receiving waters, effects to federally listed freshwater mussel species near JOF are avoided.

Piping plovers forage in exposed sand flats, mudflats, sandy beaches, stream shorelines, and ephemeral ponds. The populations of piping plover that can be found in the Tennessee Valley Region are rare fall and spring migrants. The frequency of observance of this species within this region has been less than annual, with time spent averaging two days per stay at interior stopover sites. Piping plovers are routinely observed on islands in the Mississippi River near Memphis. Individuals also have been observed at TVA fossil plants and along the Kentucky Reservoir. The closest record of piping plover is from an island directly across the Kentucky Reservoir from JOF, approximately 0.7 mi from the CCR Unit. Suitable habitat for piping plover may exist along the immediate shoreline of Kentucky Reservoir, east of the main JOF complex. However, suitable habitat for the piping plover does not exist within the CCR Unit area at the JOF site. No impacts to Interior Least Tern occur from operation of the JOF CCR Unit.

Bald Eagle (*Haliaeetus leucocephalus*), while not currently listed under the ESA, is protected under the Bald and Golden Eagle Protection Act. No bald eagles have been observed within or adjacent to the JOF CCR Unit. No impacts to this species occur from operation of the JOF CCR Unit.

One bat species federally listed as endangered; Indiana Bat (*Myotis sodalis*), and one bat species federally listed as Threatened; Northern long-eared bat (*Myotis septentrionalis*) are known to be present in Humphreys County, TN. Indiana bat and Northern Long-eared Bat roost in trees and forage in upland and riparian areas during the summer. The terrestrial habitat on the JOF site has been largely converted from forest and agricultural use, and is currently maintained as developed industrial land or mowed fields except for small forested areas. There are no records of caves within 5 miles of the JOF CCR Unit. No suitable roosting habitat for forest-dwelling bats exists within the JOF CCR Unit. However, high quality roosting and foraging habitat for the two forest-dwelling bat species exists immediately adjacent to the JOF plant site in wetlands and streams, and along the Tennessee River. Humphreys County is within the historic range of the federally listed endangered Gray Bat (*Myotis grisescens*). However, this species has not been reported in Humphreys County.

Lack of suitable roosting habitat within the JOF CCR Unit for these species ensures that these species are not present within the JOF CCR Unit. Potential foraging habitat within the JOF CCR Unit is of extremely poor quality as the JOF CCR Unit does not support a diverse aquatic insect community. Neither of the federally listed bat species has been documented using the JOF CCR Unit for roosting or foraging purposes. Therefore, no impacts to threatened and endangered bats result from operation of the JOF CCR Unit.

TVA Environmental Compliance and Operations has determined that the current operation of the JOF CCR Unit would have no direct, indirect or cumulative effects on federally listed species, and therefore is not likely to jeopardize the existence of listed species.

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