

Executive Summary

Environmental Assessment Report – Rev. 2
Cumberland Fossil Plant

Executive Summary

On August 6, 2015, the Tennessee Department of Environment and Conservation (TDEC) issued Commissioner’s Order No. OGC15-0177 (TDEC Order) to Tennessee Valley Authority (TVA) to establish a process for investigating, assessing, and remediating unacceptable risks from management of coal combustion residuals (CCR) at TVA coal-fired plants in the state of Tennessee. There are four CCR management units¹ at the Cumberland Fossil (CUF) Plant included in the TDEC Order: the Stilling Pond (including Retention Pond) and Bottom Ash Pond, which are surface impoundments, and Dry Ash Stack and Gypsum Storage Area, which are landfills. TVA constructed the CUF Plant between 1968 and 1973, and the four CCR management units are currently operational and comprise approximately 326 acres. The CUF Plant location is shown below.

In accordance with the TDEC Order, TVA and Stantec Consulting Services Inc. (Stantec), on behalf of TVA, prepared an Environmental Investigation Plan (EIP) for the CUF Plant to obtain and provide information requested by TDEC. As specified in the TDEC Order, the objective of the EIP was to “identify the extent of soil, surface water, and groundwater contamination by CCR” from onsite management of CCR material in impoundments and landfills. In addition, per TDEC’s information requests, the EIP included assessment of CCR management unit structural stability and integrity.

Between 2018 and 2021, TVA and Stantec conducted the TDEC Order environmental investigations (EI) for the CUF Plant CCR management units. The EI included characterization of the site hydrogeology and investigations of CCR material, groundwater, background soils, seeps, surface streams, sediments, and ecology, as well as a supplemental Phase 2 investigation within an unnamed tributary to Wells Creek (herein called the Unnamed Tributary) and the Water Use Survey. EI activities were implemented in accordance with the approved Sampling and Analysis Plans and Quality Assurance Project Plans, including TVA- and TDEC-approved programmatic and project-specific changes made following approval of the EIP. Based on a comprehensive quality assurance review, the EI data are usable and meet the objectives of the TDEC Order.

The EI data were evaluated along with information collected as part of previous investigations and other ongoing regulatory monitoring programs conducted between the 1970s and 2022. The objectives of the TDEC Order are similar to these other programs, including TDEC landfill permit requirements (Chapter 0400-11-01) and the United States Environmental Protection Agency CCR Rule (Title 40, Code of Federal Regulations Part 257, Subpart D) that cover certain CCR management units. Collectively, these data provide a broad-based characterization of the CCR management units to meet the objectives of the EIP. Geotechnical data were used for CCR management unit stability and integrity evaluations. Environmental sample data were used to characterize the extent of potential impacts and were compared to constituent-specific TDEC-approved levels to identify CCR constituents that require further evaluation in the next phase of the TDEC Order, the Corrective Action / Risk Assessment (CARA) Plan.

This Environmental Assessment Report (EAR) describes the extent of surface stream water, sediment, and groundwater contamination from the CUF Plant CCR management units, and provides the information, data, and evaluations used to make those assessments. As described herein, more than 97% of the environmental sample results from over 1,000 samples were below the approved levels. The EI data indicate impacts to limited groundwater areas related to the CCR management units and potential impacts to surface water and sediment quality in the Unnamed Tributary. Supplemental data have been collected for groundwater and within the Unnamed Tributary for further evaluation in the CARA Plan. The EI data also indicate that the CCR management units have had minimal, if any, potential impacts to sediment and surface

¹ The term “CCR management unit” is used in this document generally and is not intended to be a designation under federal or state regulations.

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stream water quality, and ecological communities in Wells Creek or the Cumberland River. The EI data will be used to evaluate the basis and methods for CCR management unit closure in the CARA Plan and do not preclude evaluation of closure in place as a viable closure method, nor the continued harvesting of gypsum and fly ash for the manufacture of building materials. The following are overall assessment findings based on data as presented in this EAR:

- Surface stream water quality is within ranges protective of human health and aquatic life in the Cumberland River and Wells Creek. Potential risks associated with surface stream water in the Unnamed Tributary will be further evaluated in the CARA Plan to determine if corrective action is needed.
- Sediment quality is within ranges protective of aquatic life in the Cumberland River adjacent to and downstream of the CCR management units. Potential risks associated with sediment at two locations in Wells Creek and sediments in the Unnamed Tributary will be further evaluated in the CARA Plan to determine if corrective actions are needed.
- The EI data indicate that ecological communities are healthy in the Cumberland River and Wells Creek adjacent to and downstream of the CCR management units.
- The CCR management units have adequate structural stability, and slopes are stable under current static and seismic loading conditions (the Gypsum Storage Area will meet seismic global stability criteria as TVA implements targeted regrading as part of its ongoing gypsum harvesting activities). Additional seismic stability assessments are necessary once closure is defined and will be included in the CARA Plan or in the closure design.
- There are no known active seeps onsite. One seep was identified during the EI and mitigated under the NPDES Permit.
- Most CCR constituent concentrations in groundwater are below TDEC approved groundwater screening levels and groundwater impacts are limited to areas downgradient along the perimeter of the CCR management units. However, additional assessments will be included in the CARA Plan to evaluate methods and design for corrective action for targeted groundwater at well locations with constituents above groundwater screening levels.
- Groundwater flow in the unconsolidated materials and bedrock is bounded to the south, west, and north by the Cumberland River and Wells Creek. A northwest-southeast trending groundwater divide to the northeast of the CCR management units separates groundwater flow northeast of the divide to the Cumberland River from groundwater flow to the southwest toward Wells Creek.
- Based on the overall results of the water use survey, current and historical CCR management associated with the CUF Plant have not affected water supply wells or springs located downgradient of the CUF Plant.

Exhibit ES-1 shows overall findings of the investigation and the locations where the environmental assessments concluded that no further evaluation is needed. It also shows where further evaluation is needed in the CARA Plan for sediment and surface water results, and onsite groundwater. The onsite groundwater impacts will require remediation regardless of the CCR management unit closure method, and groundwater remediation can be accomplished along with closure in place or closure by removal.

This EAR has been revised to include the results and evaluation of the Phase 2 sampling in the Unnamed Tributary, evaluation of groundwater quality east of the Gypsum Storage Area, updated seismic stability analyses, and the results of

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the Water Use Survey. Upon TDEC approval of the EAR, and in accordance with the TDEC Order, TVA will further evaluate these findings and prepare a CARA Plan for submittal to TDEC. The CARA Plan, which will be subject to a public review and comment process, will evaluate whether unacceptable risks related to management of CCR material exist at the CUF Plant. TVA continues to evaluate additional means to beneficially reuse these materials in a manner consistent with regulatory requirements while maximizing value to the Tennessee Valley. The CARA Plan will also specify the actions TVA plans to take at the CCR management units and the basis of those actions. It also will incorporate other operational changes planned or in progress by TVA, including details for continued CCR beneficial use operations, modification of the CCR management units as needed to meet regulatory standards for seismic stability and long-term closure and monitoring.



* None of the sediment or surface water sample results in the Cumberland River were above approved levels.

Exhibit No.

ES-1

Title

**Summary of Environmental Assessment Report Findings
Cumberland Fossil Plant**

Client/Project

Tennessee Valley Authority
Cumberland Fossil (CUF) Plant TDEC Order

Project Location

Stewart County, Tennessee

175548209

Prepared by KB on 2023-03-20

Key Findings

The ecological communities are healthy in the Cumberland River and Wells Creek adjacent to and downstream of the CCR management units based on the results of the environmental study and other ongoing monitoring efforts.




Nearly all of the environmental sample results were below the approved levels.

Based on the overall results of the environmental assessment and water use survey, current and historical CCR management associated with the Cumberland Plant have not affected water supply wells or springs located downstream from the plant.

This means that TVA is managing its CCR units in a way that protects the ecological integrity of the Cumberland River, Wells Creek, and their aquatic communities.

Assessment and Monitoring Findings

These symbols illustrate the findings of the assessment and monitoring:

-  No action is needed.
-  Further evaluation is required in this area.
-  Corrective action is being evaluated for onsite groundwater along the perimeter of the unit in this area.

Next Steps

Based on the Key Findings above, with TDEC approval, TVA will use the findings from the environmental assessment to prepare and submit a corrective action plan and will specify all measures TVA plans to take to address unacceptable risk. This corrective action plan will be released for public comment.