AECOM

2022 Annual CCR Rule Groundwater Monitoring and Corrective Action Report Ash Pond Complex

Gallatin Fossil Plant
Gallatin, Tennessee

January 2023

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	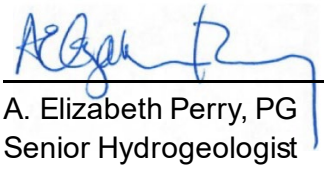	
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1. Overview of Groundwater Monitoring Program Status

In accordance with regulations for management of coal combustion residuals (CCR), 40 CFR 257.90 of the CCR Rule requires "A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit." The specific regulatory requirements of that summary are provided here:

- 257.90(e)(6)(i): At the beginning of the 2022 annual reporting period, the Ash Pond Complex (APC; including Ash Pond A, Ash Pond E, Middle Pond A, and Bottom Ash Pond) was operating under the assessment monitoring program in 257.95.
- 257.90(e)(6)(ii): At the end of the 2022 annual reporting period, the APC was also operating under the assessment monitoring program in 257.95.
- 257.90(e)(6)(iii): It was determined in 2018 that there were statistically significant increases (SSIs) over background for one or more constituents listed in Appendix III pursuant to 257.94(e):
  A. SSIs were identified in 2018 and are provided in the 2017 Annual Report (AECOM, 2018) and summarized on the table in **Appendix D**.
  B. The requirement for assessment monitoring for the APC was identified on April 12, 2018. The assessment monitoring program was established within 90 days, by July 14, 2018.
- 257.90(e)(6)(iv): It has been determined that there is a statistically significant level (SSL) above the groundwater protection standard (GWPS) for one or more constituents listed in Appendix IV pursuant to 257.95(g):
  A. As of the end of 2022, there are SSLs for arsenic in downgradient monitoring wells GAF-410U and GAF-450L. There is also an SSL for cobalt in well GAF-450L, but this has been shown to be related to an alternate source and not to the APC, as detailed in the 2019 Annual Report (AECOM, 2020).
  B. The Assessment of Corrective Measures was initiated for the APC on April 15, 2019.
  C. The public meeting has not yet been held for the Assessment of Corrective Measures for the APC.
  D. The Assessment of Corrective Measures was completed for the APC on July 15, 2019 (AECOM, 2019b).
- 257.90(e)(6)(v): The APC has been in the remedy selection process pursuant to 257.97 throughout the current annual reporting period. The remedy selection has not yet occurred, as described in the most recent Semiannual Remedy Selection Progress Report (AECOM, 2023).
- 257.90(e)(6)(vi): Because the remedy has not yet been selected, remedial activities were not initiated and are not on-going pursuant to 257.98 during the current annual reporting period. However, TVA is making progress towards closure of the APC as described in the Semiannual Progress Reports on Remedy Selection.

2. Introduction

This report documents groundwater compliance monitoring and corrective action activities performed at the Tennessee Valley Authority (TVA) Gallatin Fossil Plant (GAF) Ash Pond Complex (APC) as required under the United States Environmental Protection Agency (USEPA) coal combustion residuals (CCR) Rule (40 Code of Federal Regulations [CFR] 257.90(e)). The groundwater monitoring system at the APC is a multiunit system (40 CFR 257.91(d)) designed to monitor the following four CCR surface impoundments: Ash Pond A, Ash Pond E, Middle Pond A, and the Bottom Ash Pond (**Figure 1**). TVA discontinued sending CCR and process flows to the APC in 2019 and the units are in the process of being closed. This report covers the compliance activities performed in 2022 and presents the monitoring activities planned for 2023.

In 2022, the APC was in the Remedy Selection process in accordance with 40 CFR 257.97. Assessment groundwater monitoring is on-going in accordance with 40 CFR 257.95. At the end of 2022, Statistically Significant Levels (SSLs) above Groundwater Protections Standards (GWPSs) are present in two downgradient wells: arsenic in GAF-410U and arsenic and cobalt in GAF-450L. As described in the 2019 Annual Report for the APC (AECOM, 2020a), the SSL for cobalt in GAF-450L was successfully shown to originate from an Alternate Source (AECOM, 2020). In 2019, TVA prepared an Assessment of Corrective Measures (AECOM, 2019b) to address arsenic above the GWPS and is currently in the remedy selection process.

To comply with the CCR Rule, the following actions were taken in 2022:

- The 2021 Annual CCR Rule Groundwater Monitoring and Corrective Action Report (AECOM, 2022b) was completed in January 2022 and posted on TVA's publicly accessible CCR Rule website as required by 257.90(e) and 257.107(h)(1).
- Two Semiannual Reports on the Progress of Remedy Selection were completed in 2022, in January and July (AECOM, 2022a; AECOM, 2022c), and posted on TVA's publicly accessible CCR Rule website as required by 257.97(a) and 257.107(h)(9).
- Two semiannual assessment monitoring events took place in March and September 2022.
- Two additional wells continue to be sampled during the assessment monitoring events (GAF-418L and GAF-454L) to evaluate potential migration off-site to other properties. The wells are located in the downgradient direction at the GAF facility boundary as required by 257.95(g)(1)(iii).
- The statistical method certification (257.93((f)(6)) was updated for consistency with the statistical methods used at other TVA fossil plants. The revised certification has been placed in TVA's Operating Record and posted on TVA's publicly accessible website in accordance with the requirements of 257.107.
- The site-specific background groundwater protection standard (GWPS) for lithium (257.95(d)(3)) was recalculated using the updated certified statistical methods.
- Assessment monitoring results were evaluated and reported in accordance with the CCR Rule (257.95).
- TVA's third-party Quality Assurance contractor completed training for field sampling personnel, conducted field audits, and performed data verification/validation.

Problems encountered and resolution:

- In September 2022, pandemic-related protocols caused a pause in sampling activities. The sampling was resumed as soon as feasible, including re-gauging of some of the wells. All sampling activities were completed within the month of September.

The following activities are planned for 2023 to comply with CCR Rule groundwater monitoring and corrective action requirements:

- This 2022 Annual Groundwater Monitoring and Corrective Action Report will be posted on TVA's publicly accessible CCR Rule website, as required by 257.90(e) and 257.107(h)(1).
- Assessment monitoring will continue with two semiannual monitoring events in 2023, in accordance with 257.95. The groundwater analytical data obtained in 2023 will be evaluated using the certified statistical methods.
- The remedy selection process will continue. Semiannual progress reports on the progress of designing and selecting a remedy will be prepared in accordance with 257.97(a).
- Alternate source(s), including natural variability, will continue to be evaluated where applicable in accordance with 257.95(g)(3)(ii).
- Further field and desktop Site-Characterization Investigations may be performed to improve the Conceptual Site Model (CSM).
- TVA's third-party Quality Assurance Program to evaluate groundwater analytical data will be continued and improved using best practices concerning field methods and validation techniques, as well as the application of the most appropriate statistical methods.
- Changes to the monitoring program will be implemented, as needed, to maintain compliance with 40 CFR 257.90 through 257.98.
- The APC groundwater monitoring system may be recertified, if deemed necessary, to reflect the most accurate and up-to-date construction/survey information available for the wells.
- TVA will comply with recordkeeping requirements as specified in 40 CFR 257.105(h), notification requirements specified in 40 CFR 257.106(h), and internet requirements as specified in 40 CFR 257.107(h).
- The next annual groundwater monitoring report, which will address groundwater monitoring activities undertaken in 2023, will be completed in January 2024.

3. Groundwater Monitoring System

GAF is located in north-central Tennessee, just south of Gallatin, Tennessee. The GAF property consists of approximately 1,950 acres of land encompassing the majority of Odoms Bend peninsula. GAF is surrounded by the Cumberland River between approximate river miles 240.5 and 246.

The GAF is a coal-fired steam plant that operates four turbo-generating units. Starting in the early 1970s, fly ash and bottom ash (CCR) were sluiced to the Ash Pond Complex (APC). Water from the APC was directed through a series of stilling ponds (Stilling Ponds B, C, and D) prior to discharge to the Cumberland River under a National Pollution Discharge Elimination System (NPDES) permit. In 2016, TVA converted to a dry ash handling process for fly ash and began trucking the combined fly ash and dry flue gas desulphurization (FGD) product from the newly constructed FGD 'scrubber' units to the newly constructed North Rail Loop (NRL) Landfill. In 2019, TVA completed its conversion to dry handling of bottom ash, and CCR and process waters are no longer routed through the APC. More information related to the history of construction for the CCR units comprising the APC can be found on TVA's publicly accessible CCR Rule website at the following links:

- Ash Pond A, Middle Pond A, and Bottom Ash Pond:

https://www.tva.com/docs/default-source/ccr/gaf/surface-impoundment-–ash-pond-a/design-criteria/history-of-construction/257-73(c)-_history-of-construction_gaf_ash-pond-a.pdf?sfvrsn=d47c0b9a_2

- Ash Pond E:

  https://www.tva.com/docs/default-source/ccr/gaf/surface-impoundment-–ash-pond-e/design-criteria/history-of-construction/257-73(c)-_history-of-construction_gaf_ash-pond-e.pdf?sfvrsn=42d8b10e_2

GAF is located within the Central Basin Aquifer area of Middle Tennessee. This aquifer system is formed in Devonian to Ordovician-aged carbonates and shales through the erosion of the Nashville Dome. This aquifer system is an important source of drinking water for Central Tennessee, as it supplies most of the rural domestic wells and many public drinking wells in the Central Basin and surrounding region (Brahana and Bradley, 1986). Groundwater in the Central Basin Aquifer system occurs primarily in a shallow flow system of solution channels. These channels are highly irregular in their distribution throughout the solid rock mass and generally occur within 300 feet of the land surface. The solution channels are openings along joints and bedding planes that locally may be enlarged by dissolution of the limestones. These channels represent zones of secondary porosity and permeability in an otherwise nonporous and impermeable rock mass. Bedding planes are thought to be the major control in the formation of solution cavities, which have typically been found to be horizontally elongated (Brahana and Bradley, 1986).

At GAF, the Devonian and Silurian formations have eroded, leaving the Ordovician formations present, including (from youngest to oldest), the Hermitage Formation, Carters Limestone, and Lebanon Limestone. The primary bedrock units at GAF that have developed water-bearing zones are the Carters and Lebanon Limestones. Bentonite zones in the Carters Limestone play a significant role in the hydrology of the Central Basin Aquifer system. In areas where the bentonite layers are present, the downward movement of groundwater is restricted. Where the bentonite zones are eroded or otherwise breached by open joints or intersecting stream valleys, solution openings can form in the underlying limestone. Groundwater in these openings can receive recharge from precipitation. In contrast, shale units within the formations comprising the aquifer system typically act as local confining units for groundwater (Brahana and Bradley, 1986).

The APC groundwater monitoring well system contains 23 monitoring wells: 7 background monitoring wells and 16 downgradient monitoring wells. The monitoring well locations are shown on **Figure 1** and monitoring well construction information is provided on **Table 1**.

The background monitoring wells (GAF-412C, GAF-412L, GAF-414L, GAF-426C, GAF-426L, GAF-427C, and GAF-427L) represent conditions unaffected by CCR (257.91(a)(1) and (c)(1)). Four of the wells monitor groundwater conditions in the Lebanon Limestone, and three wells monitor groundwater in the shallower Carters Limestone (see **Table 1**). These background wells are not located directly upgradient from the APC. Per the CCR Rule 257.91(a)(1), establishing background water quality may include sampling of wells that are not hydraulically upgradient of the CCR management unit. In the case of the APC, for the Carters Limestone, there is no groundwater present in the formation on the upgradient (south) side of the unit; for the Lebanon Limestone, flow is generally away from the ponds in all directions, so there is not an upgradient direction available for monitoring. As a result, it is necessary to use wells that are not directly hydraulically upgradient to establish background conditions. The background wells are hydraulically separated from the APC by an area of low hydraulic head **(Figures 2 and 3**), so they represent conditions unaffected by CCR.

The downgradient monitoring wells (24, GAF-402C, GAF-402L, GAF-405C, GAF-406L, GAF-410U, GAF-416C, GAF-422C, GAF-446C, GAF-449L, GAF-450C, GAF-450L, GAF-451CR, GAF-452C, GAF-452L, and GAF-453C) monitor groundwater downgradient near the waste boundary (40 CFR 257.91 (a)(2) and (c)(1)). There are ten downgradient monitoring wells completed in the Carters Limestone, five monitoring wells in the Lebanon Limestone, and one monitoring well screened in alluvium/unconsolidated materials (**Table 1**).

The primary target of monitoring is the Carters Limestone, with 10 wells located along the downgradient waste boundary of the unit. At least one well in the Lebanon Limestone on each downgradient side of the unit was also included in the monitoring system, typically paired with Carters wells, or where the first water-bearing zones were encountered in the Lebanon Limestone. Groundwater is typically not encountered in overburden in the area of the APC, but the system does include one overburden well where groundwater was locally encountered.

The certification of the groundwater monitoring system required under 40 CFR 257.91(f) is included in the facility operating record and on the facility CCR Rule website: https://www.tva.com/environment/environmental-stewardship/coal-combustion-residuals/gallatin.

4. Groundwater Sampling and Laboratory Analytical Results

The data obtained during the CCR Rule compliance monitoring in 2022 is presented in this section.

4.1 Groundwater Monitoring

Low-flow groundwater sampling and analysis activities were conducted in accordance with the sampling and analysis program developed per 40 CFR 257.93. The specifics of the sampling conducted in 2022 are presented on **Table 2**.

The 2022 semiannual assessment monitoring events at the APC took place in March and September. To meet the requirements of 257.95(g)(1)(iii) and (iv), two additional wells were sampled during the assessment monitoring events (GAF-418L and GAF-454L, see **Figure 1**) to evaluate potential migration off-site to other properties. The wells are located in the downgradient direction at the GAF facility boundary as required by 257.95(g)(1)(iii). The results of this sampling are discussed below (**Section 4.5**).

4.2 Groundwater Flow

Groundwater levels were measured in each monitoring well prior to well purging/sampling as required by 40 CFR 257.93(c). The water level gauging dates for each event are presented in **Table 2**, and tabulated water level data and calculated hydraulic heads are presented in **Table 3**. **Figure 2** and **Figure 3** present, respectively, groundwater contour maps for the Carters and Lebanon Limestones based on groundwater elevations measured in March 2022. Groundwater contours and hydraulic gradients were characterized using the data in **Table 3** in addition to water levels measured in other wells at the site beyond those in the CCR Rule monitoring system.

As part of the environmental investigation conducted under Tennessee Department of Environment and Conservation (TDEC) oversight, dye trace studies have been performed which provide information on groundwater velocities in the vicinity of the APC. When dye was detected in a potential receptor location, apparent groundwater velocities were calculated. The velocities calculated during the Phase 1 and Phase 2 dye trace studies are presented in **Appendix A**. During the studies, there were dyes introduced at some locations that did not appear to move

away from the introduction locations and were not detected at receptor locations. Because the dyes were not detected, apparent velocities could not be calculated, but these results suggest little flow and low velocities in these areas. Overall, the results of both dye trace studies indicated a wide range of groundwater velocities in the vicinity of the APC.

4.3 Sampling Results

Groundwater samples were submitted to Eurofins and GEL Laboratories for analysis. The parameters measured in the field and the laboratory analytical results are presented in **Table 4**. A summary of background concentrations is provided in **Appendix C**, as specified by 257.95(d)(3).

4.4 Statistical Evaluation

The statistical method certification was updated in 2022 to be more consistent with the methods being used at other TVA fossil plants. Groundwater protection standards (GWPSs) were re-calculated using the updated certified statistical methods. For most parameters, the established GWPS is the Maximum Contaminant Level (MCL) or published value (257.95(h)(1) and (2)). However, background concentrations of lithium are greater than the published GWPS; therefore, in accordance with 257.95(h)(3), the site-specific GWPS for lithium based on background was re-calculated using the updated statistical methods. Current GWPSs are provided in **Appendix B**.

Groundwater monitoring at the APC is currently in the assessment phase. Using the certified statistical methods, concentrations of Appendix IV constituents are compared to GWPSs to identify Statistically Significant Levels (SSLs) above GWPSs in accordance with 257.95(g). The SSLs for March 2022 are provided on **Table 5**, and the September 2022 SSLs are provided on **Table 6**.

There were no new SSLs identified in the 2022 assessment monitoring. The SSLs shown on **Tables 5 and 6** were also reported last year in 2021 (AECOM, 2022b). However, as a result of the updated statistical methods, the GWPS for lithium was updated and there is no longer an SSL for lithium in groundwater at the APC. The previous lithium SSL in one well was successfully attributed to an Alternate Source (e.g., AECOM, 2020). Therefore, this change in the GWPS and identified SSLs does not affect TVA's on-going corrective action and remedy selection process. The APC has been shown to not be the source of the SSL for cobalt in well GAF-450L (AECOM, 2020).

4.5 Downgradient Boundary Wells

As part of the assessment monitoring for the APC, two additional downgradient boundary wells (GAF-418L and GAF-454L) were sampled in March and September. The results of the sampling and the comparisons to the established GWPS are provided on **Table 4**. All concentrations of Appendix IV constituents are below the established GWPSs at these boundary locations.

4.6 Narrative Discussion of Transition between Monitoring Programs

There has been no change in the status of the monitoring program since the previous Annual Report. In 2022, the APC was in the Remedy Selection process in accordance with 40 CFR 257.97. In response to the SSL for arsenic in well GAF-410U, TVA prepared an Assessment of Corrective Measures in 2019 and is currently in the remedy selection process.

The groundwater monitoring itself continues to follow the assessment monitoring requirements of 257.95.

5. Corrective Measures and Remedy Selection

In April 2019, based on the finding of at least one SSL above a GWPS in at least one downgradient well that was not attributed to an Alternate Source, TVA issued a notice initiating the Assessment of Corrective Measures in accordance with 257.95. The Assessment of Corrective Measures (AECOM, 2019b), which addresses arsenic above its GWPS, was completed in July 2019 and placed on the publicly accessible CCR Rule website as specified in 257.107: https://www.tva.com/environment/environmental-stewardship/coal-combustion-residuals/gallatin.

The APC is in the remedy selection process, including semiannual status reporting required by 257.97. Two Semiannual Reports on the Progress of Remedy Selection were completed in 2022, in January and July (AECOM, 2022a; AECOM, 2022c) and were placed on the publicly accessible CCR Rule website as specified in 257.107.

TVA discontinued sending CCR and process flows to the APC in 2019 and the surface impoundments are in the process of being closed. A revised Closure Plan was prepared for the APC as the result of an agreement between TVA and TDEC to close the APC by removing the CCR. This Closure Plan was updated in July 2019 and is available on TVA's CCR Rule Compliance Data and Information website.

TVA will close the APC by following a closure-by-removal approach pursuant to 257.102(c). Closure activities are anticipated to include pond water level drawdown, CCR dewatering, and CCR excavation and removal. At this time, CCR is expected to be transported and disposed of in an on-site permitted landfill, with the commitment to continue evaluating emerging technologies and best practices for beneficial reuse of CCR in the future. The steps TVA has completed to progress towards closure, including obtaining a permit for a new landfill, are detailed in the Semiannual Progress Reports on Remedy Selection (e.g., AECOM, 2023).

Consistent with the requirements of 257.102(c), potentially impacted material underlying the APC will be addressed as part of closure. Post-excavation surfaces will be graded to promote positive drainage, and permanent vegetation or permanent stabilization will be established.

The agreement with TDEC also requires TVA to submit to TDEC a CARA Plan to address groundwater concentrations at the APC above GPWSs. Additional details related to the progress of APC closure and groundwater corrective action are provided in the Semiannual Progress Reports on Remedy Selection (e.g., AECOM, 2023).

6. Additional 257.95(g) Requirements

In addition to initiating an Assessment of Corrective Measures, when at least one SSL is found above GWPSs (that cannot be attributed to a source other than the CCR unit), 257.95(g) includes additional actions to be taken by the facility owner. These requirements and TVA's actions are presented below.

257.95(g)(1)(i) – Install additional wells to define the contaminant plume(s):

> As described in the Assessment of Corrective Measures (AECOM, 2019b), TVA has been conducting a site-wide environmental investigation since 2016 under oversight by TDEC. One of the objectives of the investigation is to characterize the extent of CCR constituents in environmental media, including groundwater, at GAF. Numerous additional monitoring wells have been installed in the vicinity of the APC as part of the investigation. The results of the

investigation were submitted to TDEC in an Environmental Assessment Report (EAR) in 2021. A revised EAR was submitted to TDEC in 2022 (TVA, 2022).

257.95(g)(1)(ii) – Collect data on the nature and estimated quantity of material released

The environmental investigation included characterization of the pore water within the APC (ash pore water) that would be the source of potential impacts to groundwater. These data are presented in the EAR (TVA, 2022). Additional data needed to support remedy selection is discussed in the Assessment of Corrective Measures (AECOM, 2019b) and Semiannual Remedy Selection Progress Report (e.g., AECOM, 2023).

257.95(g)(1)(iii) – Install and sample at least one well at the downgradient property boundary

Two existing wells (GAF-418L and GAF-454L) located near the northern and northwestern property boundaries are being sampled to meet this requirement. These wells are located downgradient from the northern perimeter of the APC (**Figures 2 and 3**), and the results of this sampling are discussed above (**Section 4.5**).

The wells with the SSLs (GAF-410U and GAF-450L) are located close to the western downgradient property boundary, so no wells further downgradient were installed.

257.95(g)(1)(iv) – Sample wells to characterize nature and extent

The CCR Rule monitoring network plus the additional downgradient wells GAF-418L and GAF-454L will continue to be sampled as part of assessment monitoring. The results of the 2022 sampling are provided in **Table 4**. Characterization of nature and extent was also included in the Environmental Assessment Report (see 257.95(g)(1)(i) above).

257.95(g)(2) – Notify surrounding property owners

Concentrations of arsenic above the GWPS that may be related to the CCR unit do not extend off-site beneath other properties. As a result, off-site property notification is not required.

257.95(g)(3) and (4) – Initiate Assessment of Corrective Measures or Alternate Source Demonstration

TVA initiated the Assessment of Corrective Measures (AECOM, 2019b) in April 2019 addressing arsenic in groundwater and completed an Alternate Source Demonstration for other constituents in May 2019. The Alternate Source Demonstration is included in Appendix D of the 2019 Annual Report (AECOM, 2020). The Assessment of Corrective Measures is available on TVA's publicly accessible CCR Rule website.

257.95(g)(5) – Closure requirements for unlined surface impoundments

The individual CCR units comprising the APC are unlined surface impoundments. As noted above and in the Assessment of Corrective Measures (AECOM, 2019b), TVA has discontinued sending CCR and process flows to the APC in anticipation of closure. TVA issued a Notification of Intent to Close in July 2019. The Closure Plan was updated in July 2019 and is available on TVA's publicly accessible CCR Rule website. Additional details related to the progress of APC closure are provided in the Semiannual Progress Reports on Remedy Selection (e.g., AECOM, 2023).

7. References

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Figures

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GAF-414L
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GAF-453C
GAF-454L
GAF-418L
GAF-452C
GAF-452L
24
GAF-422C
GAF-402C
GAF-402L
GAF-406L
Ash
Pond A
Cumberland River/
Old Hickory Lake
Ash
Pond E
GAF-410U
GAF-446C
Middle
Pond A
GAF-449L
Bottom
Ash Pond
GAF-451CR
GAF-405C
GAF-450C
GAF-450L

LEGEND

- CCR Rule Monitoring System - Downgradient Well
- CCR Rule Monitoring System - Background Well
- Other Monitoring Well
- TVA Gallatin Fossil Plant Property Boundary (Approximate)
- Ash Pond Complex
- Stilling Ponds

N

0 1,200 2,400
Feet

NOTE: Aerial image dated February 2017

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Figure 1

ASH POND COMPLEX
MONITORING SYSTEM WELLS

DRAWN BY:	REVIEWED BY:	APPROVED BY:	REVISION NUMBER:
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GALLATIN FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

DATE:	DEPT:
12/7/2022	FOSSIL AND HYDRO ENGINEERING

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GAF-453C
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GAF-452C
24
445
GAF-422C
GAF-402C
450
455
460
Ash Pond A
Cumberland River/
Old Hickory Lake
Ash Pond E
465
470
GAF-446C
Middle Pond A
450
Bottom Ash Pond
GAF-450C
GAF-451CR
GAF-405C
475
480

LEGEND

- CCR Rule Monitoring System - Downgradient Well
- CCR Rule Monitoring System - Background Well
- Hydraulic Head Contour in Aquifer
- TVA Gallatin Fossil Plant Property Boundary (Approximate)
- Ash Pond Complex
- Stilling Ponds
- Estimated Extent of Lower Carters Limestone Aquifer

N

0 1,200 2,400
Feet

NOTE: Aerial image dated February 2017

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Figure 2

HYDRAULIC HEAD CONTOURS – CARTERS AQUIFER, MARCH 2022

DRAWN BY:	REVIEWED BY:	APPROVED BY:	REVISION NUMBER:
A.DUECASTER	C.GARLINGTON	E.PERRY	REV. 2

GALLATIN FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

DATE:	DEPT:
12/7/2022	FOSSIL AND HYDRO ENGINEERING

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GAF-454L
GAF-452L
GAF-418L
GAF-402L
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450
Ash Pond A
460
GAF-406L
470
Cumberland River/
Old Hickory Lake
Ash Pond E
Middle Pond A
GAF-449L
Bottom Ash Pond
GAF-450L
480
450

LEGEND

- CCR Rule Monitoring System - Downgradient Well
- CCR Rule Monitoring System - Background Well
- Other Monitoring Well
- Hydraulic Head Contour in Aquifer
- TVA Gallatin Fossil Plant Property Boundary (Approximate)
- Ash Pond Complex
- North Rail Loop (NRL) Landfill
- Stilling Ponds
- Estimated Extent of Lebanon Limestone Aquifer

N

0 1,200 2,400
Feet

NOTE: Aerial image dated February 2017

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Figure 3

HYDRAULIC HEAD CONTOURS – LEBANON AQUIFER, MARCH 2022

DRAWN BY:	REVIEWED BY:	APPROVED BY:	REVISION NUMBER:
A.DUECASTER	C.GARLINGTON	E.PERRY	REV. 1

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DATE:	DEPT:
12/7/2022	FOSSIL AND HYDRO ENGINEERING

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Tables

Table 1
Well Construction Information – Ash Pond Complex (Multiunit)
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Well ID	UNID #	Position Relative to CCR Unit	Top of Casing Elevation (ft)	Ground Surface Elevation (ft)	Screened Interval (ft btoc)	Screened Formation	Total Well Depth (ft btoc)	Pump Intake Depth (ft btoc)	Well Diameter (in) / Material	Well Coordinates	
										TN State Plane NAD27 Northing (ft)	TN State Plane NAD27 Easting (ft)
24	GAF-00-GW-43-005	Downgradient	464.13	461.6	20.3 - 30.3	Carters Limestone	30.5	25.0	2-in PVC	707910.94	1878249.28
GAF-402C	GAF-00-GW-43-010	Downgradient	464.03	460.3	18.8 - 28.8	Carters Limestone	29.2	24.0	4-in PVC	707480.95	1880331.92
GAF-402L	GAF-00-GW-43-011	Downgradient	464.93	460.8	75.2 - 85.2	Lebanon Limestone	85.7	80.0	2-in PVC	707495.09	1880320.44
GAF-405C	GAF-00-GW-43-014	Downgradient	486.46	482.7	23.2 - 43.2	Carters Limestone	43.5	35.0	2-in PVC	702448.24	1880731.00
GAF-406L	GAF-00-GW-43-015	Downgradient	471.54	467.5	48.0 - 58.0	Lebanon Limestone	58.4	52.0	2-in PVC	706682.96	1877107.19
GAF-410U	GAF-00-GW-43-017	Downgradient	458.51	455.2	22.0 - 32.0	Unconsolidated	32.2	25.0	2-in PVC	704889.21	1877749.93
GAF-412C	GAF-00-GW-43-018	Background	477.64	473.9	43.6 - 63.6	Carters Limestone	63.9	54.0	4-in PVC	710932.13	1880022.78
GAF-412L	GAF-00-GW-43-019	Background	477.58	473.7	109.5 - 129.5	Lebanon Limestone	129.8	123.0	4-in PVC	710930.63	1880028.39
GAF-414L	GAF-00-GW-43-021	Background	481.45	478.6	93.2 - 103.2	Lebanon Limestone	103.2	98.0	4-in PVC	710439.64	1880406.18
GAF-416C	GAF-00-GW-43-023	Downgradient	466.87	464.2	32.0 - 52.0	Carters Limestone	52.3	42.0	2-in PVC	709169.01	1881134.20
GAF-418L (a)	GAF-00-GW-43-024	Downgradient at Facility Boundary	459.59	455.8	39.3 - 49.3	Lebanon Limestone	49.7	44.0	2-in PVC	708113.61	1877578.56
GAF-422C	GAF-00-GW-43-028	Downgradient	463.78	460.1	20.6 - 35.6	Carters Limestone	35.7	28.0	4-in PVC	707542.84	1879331.41
GAF-426C	GAF-00-GW-43-029	Background	505.58	501.7	40.3 - 60.3	Carters Limestone	60.4	57.0	4-in PVC	711269.23	1881638.95
GAF-426L	GAF-00-GW-43-030	Background	506.83	502.6	176.7 - 186.7	Lebanon Limestone	187.0	181.0	2-in PVC	711283.43	1881641.44
GAF-427C	GAF-00-GW-43-031	Background	489.76	485.7	60.5 - 70.5	Carters Limestone	71.0	68.0	4-in PVC	710615.35	1882082.78
GAF-427L	GAF-00-GW-43-032	Background	488.41	484.2	144.4 - 159.4	Lebanon Limestone	159.9	152.0	4-in PVC	710607.73	1882087.46
GAF-446C	GAF-00-GW-43-034	Downgradient	461.06	457.3	23.9 - 33.9	Carters Limestone	34.4	29.0	4-in PVC	704742.37	1877728.72
GAF-449L	GAF-00-GW-43-036	Downgradient	463.09	458.2	61.3 - 71.3	Lebanon Limestone	71.8	66.0	4-in PVC	703983.12	1877823.34
GAF-450C	GAF-00-GW-43-050	Downgradient	466.73	463.7	50.9 - 55.9	Carters Limestone	55.9	53.0	4-in PVC	702528.72	1878185.59
GAF-450L	GAF-00-GW-43-051	Downgradient	466.62	463.6	77.6 - 97.6	Lebanon Limestone	97.8	88.0	3-in PVC	702526.37	1878175.15
GAF-451C (b)	GAF-00-GW-43-037	Downgradient (Closed)	485.62	486.0	48.8 - 58.8	Carters Limestone	59.3	55.8	4-in PVC	702407.28	1879587.39
GAF-451CR	GAF-00-GW-43-087	Downgradient (Replacement for GAF-451C)	482.19	479.4	46.4 - 56.4	Carters Limestone	56.7	52.0	4-in PVC	702485.62	1879518.52
GAF-452C	GAF-00-GW-43-038	Downgradient	484.13	480.6	102.3 - 112.3	Carters Limestone	112.4	107.0	4-in PVC	708456.68	1883010.70
GAF-452L	GAF-00-GW-43-039	Downgradient	484.31	480.7	159.7 - 169.7	Lebanon Limestone	170.4	164.0	4-in PVC	708439.46	1883003.73
GAF-453C	GAF-00-GW-43-040	Downgradient	467.78	464.2	49.5 - 59.5	Carters Limestone	59.8	54.0	4-in PVC	709164.82	1882811.05
GAF-454L (a)	GAF-00-GW-43-041	Downgradient at Facility Boundary	463.91	460.5	38.9 - 48.9	Lebanon Limestone	49.3	44.0	4-in PVC	708510.76	1880478.89

Notes:
Survey information from DDS Survey; elevation in National Geodetic Vertical Datum (NGVD) 1929, coordinates based on North America Datum (NAD) 1927.
ft btoc - feet below top of casing
in - inches (inside diameter)
(a) Well is not part of the certified CCR Rule monitoring system.
(b) As of the 9/2020 re-certification, GAF-451C is no longer part of the certified CCR Rule monitoring system. It is replaced by GAF-451CR.
The information presented here represents current conditions and the most up-to-date information, which may have changed since the initial well installation (e.g., modified TOC, well re-survey, well construction updates based on video survey, etc.).

Table 2
Groundwater Sampling Summary - Ash Pond Complex, 2022
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Sample Dates	Groundwater Gauging Date	Monitoring Program	Constituents Analyzed	Number of Wells Sampled
March 10-16, 2022	March 7, 2022	Assessment Monitoring (257.95)	Appendix III, Appendix IV, Iron, Manganese, major ions, and field parameters	Background: 7 Downgradient: 16 Facility Boundary: 2
September 7-9, 2022 and September 19, 2022	September 6, 2022 and September 19, 2022	Assessment Monitoring (257.95)	Appendix III, Appendix IV, Iron, Manganese, major ions, and field parameters	Background: 7 Downgradient: 16 Facility Boundary: 2

Notes:
Appendix III Constituents: Boron, Calcium, Chloride, Fluoride, pH, Sulfate, Total Dissolved Solids (TDS)
Appendix IV Constituents: Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Fluoride, Lead, Lithium, Mercury, Molybdenum, Radium 226 + 228, Selenium, Thallium
Because samples are to be analyzed for metals, it is important for the turbidity to be low at the conclusion of purging to minimize bias due to the presence of particulates in the samples. If the turbidity is not reduced below the target established by TVA procedures, filtered samples are also collected for analysis of dissolved metals and radium.

Table 3
Groundwater Elevation Summary - Ash Pond Complex, 2022
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Gauging Date	3/7/2022			9/6/2022			9/19/2022		
Well ID	Reference Elevation (ft AMSL)	Water Level Measurement (ft)	Hydraulic Head (ft AMSL)	Reference Elevation (ft AMSL)	Water Level Measurement (ft)	Hydraulic Head (ft AMSL)	Reference Elevation (ft AMSL)	Water Level Measurement (ft)	Hydraulic Head (ft AMSL)
24	464.13	19.04	445.09	464.13	19.21	444.92	464.13	NA	NA
GAF-402C	464.03	13.69	450.34	464.03	16.16	447.87	464.03	NA	NA
GAF-402L	464.93	15.89	449.04	464.93	17.09	447.84	464.93	17.37	447.56
GAF-405C	486.46	6.04	480.42	486.46	11.10	475.36	486.46	12.39	474.07
GAF-406L	471.54	26.62	444.92	471.54	26.61	444.93	471.54	NA	NA
GAF-410U	458.51	2.93	455.58	458.51	8.14	450.37	458.51	NA	NA
GAF-412C	477.64	30.29	447.35	477.64	31.71	445.93	477.64	NA	NA
GAF-412L	477.58	25.45	452.13	477.58	27.99	449.59	477.58	NA	NA
GAF-414L	481.45	32.85	448.60	481.45	34.65	446.80	481.45	NA	NA
GAF-416C	466.87	16.89	449.98	466.87	21.49	445.38	466.87	NA	NA
GAF-418L	459.59	14.75	444.84	459.59	14.82	444.77	459.59	14.82	444.77
GAF-422C	463.78	18.74	445.04	463.78	19.08	444.70	463.78	19.11	444.67
GAF-426C	505.58	37.30	468.28	505.58	48.10	457.48	505.58	NA	NA
GAF-426L	506.83	42.85	463.98	506.83	53.36	453.47	506.83	NA	NA
GAF-427C	489.76	37.85	451.91	489.76	44.60	445.16	489.76	NA	NA
GAF-427L	488.41	29.84	458.57	488.41	42.42	445.99	488.41	NA	NA
GAF-446C	461.06	6.17	454.89	461.06	10.77	450.29	461.06	NA	NA
GAF-449L	463.09	8.59	454.50	463.09	12.68	450.41	463.09	NA	NA
GAF-450C	466.73	18.88	447.85	466.73	20.25	446.48	466.73	20.73	446.00
GAF-450L	466.62	14.30	452.32	466.62	15.96	450.66	466.62	NA	NA
GAF-451CR	482.19	5.98	476.21	482.19	7.72	474.47	482.19	11.42	470.77
GAF-452C	484.13	25.97	458.16	484.13	34.12	450.01	484.13	NA	NA
GAF-452L	484.31	26.16	458.15	484.31	34.23	450.08	484.31	NA	NA
GAF-453C	467.78	8.36	459.42	467.78	18.35	449.43	467.78	NA	NA
GAF-454L	463.91	18.58	445.33	463.91	19.03	444.88	463.91	NA	NA
Surface Water ID									
CUMBERLAND RIVER (a)	NA	NA	444.84	NA	NA	444.81	NA	NA	444.69

Notes:
AMSL - above mean sea level
ft - feet
NA - Not applicable or data not available
(a) Data downloaded from TVA's iSite Central Database

Table 4
Assessment Monitoring Groundwater Analytical Results - Ash Pond Complex, 2022
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well	24				GAF-402C				GAF-402L				GAF-405C			
		Sample Date	10-Mar-22		07-Sep-22		10-Mar-22		07-Sep-22		10-Mar-22		07-Sep-22		14-Mar-22		08-Sep-22	
		Well Location	Downgradient		Downgradient		Downgradient		Downgradient		Downgradient		Downgradient		Downgradient		Downgradient	
		Sample ID	GAF-GW-24-03102022		GAF-GW-24-09072022		GAF-GW-GAF-402C-03102022		GAF-GW-GAF-402C-09072022		GAF-GW-GAF-402L-03102022		GAF-GW-GAF-402L-09072022		GAF-GW-GAF-405C-03142022		GAF-GW-GAF-405C-09082022	
		Sample Type	N		N		N		N		N		N		N		N	
Analyte	CAS	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Field																		
Dissolved Oxygen	DO_%	%	3.7		6.9		16.5		3.6		51.2		24.2		3.4		2.3	
	DO_mg/L	mg/L	0.38		0.70		1.71		0.36		5.15		2.42		0.35		0.22	
ORP	ORP	mV	96.8		209.6		180.3		-13.2		-118.7		-101.5		72.2		26.2	
PH-FIELD	PH-FIELD	pH Units	6.90		6.60		7.37		7.53		7.26		7.33		6.92		6.85	
Specific Cond. (Field)	COND	US/CM	816		1001		454.5		526.3		647		646		979		806	
Temperature	TEMPW	DEG_C	13.6		15.3		12.8		16.5		14.6		18.2		14.7		18.0	
Turbidity, field	TURB-FIELD	NTU	0.26		0.26		0.91		2.42		21.4		43.0		8.39		4.45	
General Chemistry																		
Carbonate as CaCO3	ALKC	mg/L	< 5.00	U	< 2.60	U	< 5.00	U	< 2.60	U	< 5.00	U	< 2.60	U	< 5.00	U	< 2.60	U
Alkalinity as CaCO3	ALK	mg/L	315		343		175		161		256		281		291		313	
Bicarbonate as CaCO3	ALKB	mg/L	315		343		175		161		256		281		291		313	
Total Dissolved Solids	TDS	mg/L	620		735		257		424		364		399		697		604	
Chloride	16887-00-6	mg/L	< 0.713	U	1.43		3.17	J	2.79		14.8		14.7		3.64		7.15	
Fluoride	16984-48-8	mg/L	< 0.0260	U	< 0.0649	U*	0.158		0.234		0.277		0.385		0.172		< 0.113	U*
Sulfate	14808-79-8	mg/L	186		251		64.5		144		58.6		50.9		282		147	
Metals																		
Antimony	7440-36-0	ug/L	< 0.506	U	< 0.506	U	< 0.506	U	< 0.506	U	< 0.506	U	< 0.506	U	< 0.506	U	< 0.506	U
Arsenic	7440-38-2	ug/L	< 0.282	U	< 0.282	U	1.51		2.41		1.19		1.48		0.486	J	< 0.282	U
Barium	7440-39-3	ug/L	15.5		16.5		45.8		73.9		322		339		69.7		69.1	
Beryllium	7440-41-7	ug/L	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U
Boron	7440-42-8	ug/L	< 60.1	U	71.7	J	471		1130		173		184		96.2		< 162	U*
Cadmium	7440-43-9	ug/L	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U
Calcium	7440-70-2	mg/L	185		223		75.9		97.5		78.8		84.9		207		164	
Chromium	7440-47-3	ug/L	< 1.53	U	< 1.53	U	< 1.53	U	< 1.53	U	< 1.53	U	< 1.53	U	< 1.53	U	< 1.53	U
Cobalt	7440-48-4	ug/L	< 0.261	U	< 0.261	U	< 0.261	U	0.387	J	0.291	J	0.274	J	< 0.261	U	< 0.261	U
Iron	7439-89-6	ug/L	< 27.7	U	< 27.7	U	< 27.7	U	58.4		1620		1760		419		290	
Lead	7439-92-1	ug/L	< 0.167	U	< 0.167	U	< 0.167	U	< 0.167	U	0.452	J	0.416	J	0.915	J	0.804	J
Lithium	7439-93-2	ug/L	< 0.831	U	< 0.831	U	1.38	J	1.52	J	11.0		9.05		1.15	J	< 0.831	U
Magnesium	7439-95-4	ug/L	7380		8610		6510		8700		31100		29700		13600		15400	
Manganese	7439-96-5	ug/L	3.70	J	188		62.9		1480		124		148		196		247	
Mercury	7439-97-6	ug/L	< 0.205	U*	< 0.13	U	< 0.145	U*	< 0.130	U	< 0.146	U*	< 0.130	U	< 0.130	U	< 0.130	U
Molybdenum	7439-98-7	ug/L	1.60	J	2.33	J	14.1		35.4		< 0.610	U	< 0.610	U	< 0.610	U	< 0.610	U
Potassium	7440-09-7	ug/L	733		969		2090		2630		2960		3010		1740		2030	
Selenium	7782-49-2	ug/L	< 0.739	U	< 0.739	U	1.56	J	< 0.739	U	< 0.739	U	< 0.739	U	< 0.739	U	< 0.739	U
Sodium	7440-23-5	ug/L	< 1010	U*	1460		7410		13500		13300		16900		4860		9360	
Thallium	7440-28-0	ug/L	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U
Radiological																		
Radium-226	13982-63-3	pCi/L	< -0.143	U	< 0.662	U	< -0.124	U	1.54	J	< 0.257	U	< 0.320	UJ	< 0.538	U	1.11	
Radium 228	15262-20-1	pCi/L	< 0.402	U	< 0.494	U	< 0.574	U	< 0.131	U	< 0.275	U	< 0.373	U	< 0.00499	U	< 0.681	U*
Radium 226 + Radium 228	RA226/228	pCi/L	< 0.402	U	< 1.16	U	< 0.574	U	1.68	J	< 0.532	U	< 0.693	UJ	< 0.543	U	1.79	J

Table 4
Assessment Monitoring Groundwater Analytical Results - Ash Pond Complex, 2022
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well	24				GAF-402C				GAF-402L				GAF-405C			
		Sample Date	10-Mar-22		07-Sep-22		10-Mar-22		07-Sep-22		10-Mar-22		07-Sep-22		14-Mar-22		08-Sep-22	
		Well Location	Downgradient		Downgradient		Downgradient		Downgradient		Downgradient		Downgradient		Downgradient		Downgradient	
		Sample ID	GAF-GW-24-03102022		GAF-GW-24-09072022		GAF-GW-GAF-402C-03102022		GAF-GW-GAF-402C-09072022		GAF-GW-GAF-402L-03102022		GAF-GW-GAF-402L-09072022		GAF-GW-GAF-405C-03142022		GAF-GW-GAF-405C-09082022	
		Sample Type	N		N		N		N		N		N		N		N	
Analyte	CAS	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Metals Dissolved																		
Antimony	7440-36-0	ug/L	--		--		--		--		< 0.506	U	< 0.506	U	< 0.506	U	--	
Arsenic	7440-38-2	ug/L	--		--		--		--		0.911	J	1.49		0.308	J	--	
Barium	7440-39-3	ug/L	--		--		--		--		327		334		64.9		--	
Beryllium	7440-41-7	ug/L	--		--		--		--		< 0.274	U	< 0.274	U	< 0.274	U	--	
Boron	7440-42-8	ug/L	--		--		--		--		158		180		83.7		--	
Cadmium	7440-43-9	ug/L	--		--		--		--		< 0.217	U	< 0.217	U	< 0.217	U	--	
Calcium	7440-70-2	mg/L	--		--		--		--		80.4		84.7		196		--	
Chromium	7440-47-3	ug/L	--		--		--		--		< 1.53	U	< 1.53	U	< 1.53	U	--	
Cobalt	7440-48-4	ug/L	--		--		--		--		< 0.261	U	< 0.261	U	< 0.261	U	--	
Iron	7439-89-6	ug/L	--		--		--		--		1170		1640		< 27.7	U	--	
Lead	7439-92-1	ug/L	--		--		--		--		< 0.167	U	0.234	J	< 0.167	U	--	
Lithium	7439-93-2	ug/L	--		--		--		--		10.6		9.25		0.939	J	--	
Magnesium	7439-95-4	ug/L	--		--		--		--		31300		30500		13000		--	
Manganese	7439-96-5	ug/L	--		--		--		--		120		149		87.2		--	
Mercury	7439-97-6	ug/L	--		--		--		--		< 0.130	U	< 0.130	U	< 0.130	U	--	
Molybdenum	7439-98-7	ug/L	--		--		--		--		0.877	J	< 0.610	U	< 0.610	U	--	
Potassium	7440-09-7	ug/L	--		--		--		--		2730		3120		1620		--	
Selenium	7782-49-2	ug/L	--		--		--		--		< 0.739	U	< 0.739	U	< 0.739	U	--	
Sodium	7440-23-5	ug/L	--		--		--		--		12900		17700		4720		--	
Thallium	7440-28-0	ug/L	--		--		--		--		< 0.472	U	< 0.472	U	< 0.472	U	--	
Radiological Dissolved																		
Radium-226	13982-63-3	pCi/L	--		--		--		--		< -0.179	U	< 1.16	U*	< 0.469	U	--	
Radium 228	15262-20-1	pCi/L	--		--		--		--		< 0.0549	U	< 0.474	U	< 0.331	U	--	
Radium 226 + Radium 228	RA226/228	pCi/L	--		--		--		--		< 0.0549	U	< 1.64	U*	< 0.800	U	--	

Table 4
Assessment Monitoring Groundwater Analytical Results - Ash Pond Complex, 2022
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well	GAF-406L				GAF-410U				GAF-412C				GAF-412L			
		Sample Date	14-Mar-22		07-Sep-22		14-Mar-22		08-Sep-22		11-Mar-22		08-Sep-22		11-Mar-22		08-Sep-22	
		Well Location	Downgradient		Downgradient		Downgradient		Downgradient		Background		Background		Background		Background	
		Sample ID	GAF-GW-GAF-406L-03142022		GAF-GW-GAF-406L-09072022		GAF-GW-GAF-410U-03142022		GAF-GW-GAF-410U-09082022		GAF-GW-GAF-412C-03112022		GAF-GW-GAF-412C-09082022		GAF-GW-GAF-412L-03112022		GAF-GW-GAF-412L-09082022	
		Sample Type	N		N		N		N		N		N		N		N	
Analyte	CAS	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Field																		
Dissolved Oxygen	DO_%	%	78.1		7.3		3.2		6.7		3.1		2.8		2.1		4.0	
	DO_mg/L	mg/L	7.71		0.49		0.32		0.57		0.31		0.28		0.22		0.40	
ORP	ORP	mV	21.7		142.9		-117.6		-25.1		-181.7		-53.8		-360.4		-336.9	
PH-FIELD	PH-FIELD	pH Units	7.07		6.79		7.05		6.78		6.98		7.12		7.79		8.04	
Specific Cond. (Field)	COND	US/CM	740		873		623		665		583.3		652		570.2		698	
Temperature	TEMPW	DEG_C	16.4		16.9		15.4		22.1		15.1		16.2		14.5		16.5	
Turbidity, field	TURB-FIELD	NTU	1.06		1.42		2.58		1.13		3.28		3.31		0.07		0.61	
General Chemistry																		
Carbonate as CaCO3	ALKC	mg/L	< 5.00	U	< 2.60	U	< 5.00	U	< 2.60	U	< 5.00	U	< 2.60	U	< 5.00	U	< 2.60	U
Alkalinity as CaCO3	ALK	mg/L	230		246		264		243		302		330		258		287	
Bicarbonate as CaCO3	ALKB	mg/L	230		246		264		243		302		330		258		287	
Total Dissolved Solids	TDS	mg/L	560		653		439		501		387		454		353		414	
Chloride	16887-00-6	mg/L	2.50		3.76		5.63		6.95		3.75		8.85		32.7		64.8	
Fluoride	16984-48-8	mg/L	< 0.128	U*	< 0.115	U*	0.177		0.143		< 0.127	U*	0.284		1.51		1.72	
Sulfate	14808-79-8	mg/L	191		233		91.3		115		43.7		49.3		23.2		13.2	
Metals																		
Antimony	7440-36-0	ug/L	< 0.506	U	< 0.506	U	< 0.506	U	< 0.506	UJ	< 0.506	U	< 0.506	UJ	< 0.506	U	< 0.506	UJ
Arsenic	7440-38-2	ug/L	0.483	J	< 0.282	U	35.6		31.5		< 0.282	U	0.839	J	< 0.282	U	< 0.282	U
Barium	7440-39-3	ug/L	33.3		36.5		59.4		54.9	J	94.9		146	J	183		223	J
Beryllium	7440-41-7	ug/L	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	UJ	< 0.274	U	< 0.274	UJ
Boron	7440-42-8	ug/L	346		301		9470		9540		< 60.1	U	< 116	U*	< 240	U*	< 317	U*
Cadmium	7440-43-9	ug/L	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	UJ	< 0.217	U	< 0.217	UJ	< 0.217	U	< 0.217	UJ
Calcium	7440-70-2	mg/L	163		175		91.8		97.5	J	130		132	J	32.9		36.5	J
Chromium	7440-47-3	ug/L	1.67	J	< 1.53	U	< 1.53	U	< 1.53	UJ	< 1.53	U	< 1.53	UJ	< 1.53	U	< 1.53	UJ
Cobalt	7440-48-4	ug/L	< 0.261	U	< 0.261	U	1.29		1.18		< 0.261	U	0.404	J	< 0.261	U	< 0.261	U
Iron	7439-89-6	ug/L	51.4		< 27.7	U	2170		2150	J	137		1960	J	< 27.7	U	< 27.7	UJ
Lead	7439-92-1	ug/L	0.215	J	< 0.167	U	< 0.167	U	< 0.167	U	< 0.167	U	< 0.167	U	< 0.167	U	< 0.167	U
Lithium	7439-93-2	ug/L	< 0.831	U	< 0.831	U	< 0.831	U	< 0.831	U	< 0.831	U	12.2	J	92.6		119	J
Magnesium	7439-95-4	ug/L	9900		10500		4920		4840	J	9270		22000	J	17700		18500	J
Manganese	7439-96-5	ug/L	146		110		4660		4610	J	4.36	J	351	J	< 1.34	U	< 1.34	UJ
Mercury	7439-97-6	ug/L	< 0.130	U	< 0.130	U	< 0.130	U	< 0.130	U	< 0.130	U	< 0.130	U	< 0.130	U	< 0.130	U
Molybdenum	7439-98-7	ug/L	1.57	J	1.06	J	63.3		54.7		< 0.610	U	< 0.610	U	< 0.610	U	< 0.610	U
Potassium	7440-09-7	ug/L	2180		2190		2100		2070	J	639		2130	J	5340		5790	J
Selenium	7782-49-2	ug/L	< 0.739	U	< 0.739	U	< 0.739	U	< 0.739	UJ	< 0.739	U	< 0.739	UJ	< 0.739	U	< 0.739	UJ
Sodium	7440-23-5	ug/L	8440		8080		55200		48100	J	2650		11700	J	80800		116000	J
Thallium	7440-28-0	ug/L	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U
Radiological																		
Radium-226	13982-63-3	pCi/L	< 0.607	U	< 0.226	U	< 0.352	U	< 0.114	U	< 0.379	U	< 0.500	U	< -0.0568	U	< 0.264	U
Radium 228	15262-20-1	pCi/L	< 0.333	U	< 0.186	U	0.696		< 0.485	U	2.15		< 0.921	U*	< 0.471	U	< 1.29	U*
Radium 226 + Radium 228	RA226/228	pCi/L	< 0.941	U	< 0.412	U	1.05	J	< 0.598	U	2.53	J	< 1.42	U*	< 0.471	U	< 1.55	U*

Table 4
Assessment Monitoring Groundwater Analytical Results - Ash Pond Complex, 2022
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well	GAF-406L				GAF-410U				GAF-412C				GAF-412L			
		Sample Date	14-Mar-22		07-Sep-22		14-Mar-22		08-Sep-22		11-Mar-22		08-Sep-22		11-Mar-22		08-Sep-22	
		Well Location	Downgradient		Downgradient		Downgradient		Downgradient		Background		Background		Background		Background	
		Sample ID	GAF-GW-GAF-406L-03142022		GAF-GW-GAF-406L-09072022		GAF-GW-GAF-410U-03142022		GAF-GW-GAF-410U-09082022		GAF-GW-GAF-412C-03112022		GAF-GW-GAF-412C-09082022		GAF-GW-GAF-412L-03112022		GAF-GW-GAF-412L-09082022	
		Sample Type	N		N		N		N		N		N		N		N	
Analyte	CAS	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Metals Dissolved																		
Antimony	7440-36-0	ug/L	--		--		--		--		--		--		--		--	
Arsenic	7440-38-2	ug/L	--		--		--		--		--		--		--		--	
Barium	7440-39-3	ug/L	--		--		--		--		--		--		--		--	
Beryllium	7440-41-7	ug/L	--		--		--		--		--		--		--		--	
Boron	7440-42-8	ug/L	--		--		--		--		--		--		--		--	
Cadmium	7440-43-9	ug/L	--		--		--		--		--		--		--		--	
Calcium	7440-70-2	mg/L	--		--		--		--		--		--		--		--	
Chromium	7440-47-3	ug/L	--		--		--		--		--		--		--		--	
Cobalt	7440-48-4	ug/L	--		--		--		--		--		--		--		--	
Iron	7439-89-6	ug/L	--		--		--		--		--		--		--		--	
Lead	7439-92-1	ug/L	--		--		--		--		--		--		--		--	
Lithium	7439-93-2	ug/L	--		--		--		--		--		--		--		--	
Magnesium	7439-95-4	ug/L	--		--		--		--		--		--		--		--	
Manganese	7439-96-5	ug/L	--		--		--		--		--		--		--		--	
Mercury	7439-97-6	ug/L	--		--		--		--		--		--		--		--	
Molybdenum	7439-98-7	ug/L	--		--		--		--		--		--		--		--	
Potassium	7440-09-7	ug/L	--		--		--		--		--		--		--		--	
Selenium	7782-49-2	ug/L	--		--		--		--		--		--		--		--	
Sodium	7440-23-5	ug/L	--		--		--		--		--		--		--		--	
Thallium	7440-28-0	ug/L	--		--		--		--		--		--		--		--	
Radiological Dissolved																		
Radium-226	13982-63-3	pCi/L	--		--		--		--		--		--		--		--	
Radium 228	15262-20-1	pCi/L	--		--		--		--		--		--		--		--	
Radium 226 + Radium 228	RA226/228	pCi/L	--		--		--		--		--		--		--		--	

Table 4
Assessment Monitoring Groundwater Analytical Results - Ash Pond Complex, 2022
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Monitoring Well			GAF-414L		GAF-414L		GAF-416C		GAF-416C		GAF-418L		GAF-418L		GAF-422C		GAF-422C	
Sample Date			11-Mar-22		08-Sep-22		10-Mar-22		07-Sep-22		15-Mar-22		19-Sep-22		10-Mar-22		07-Sep-22	
Well Location			Background		Background		Downgradient		Downgradient		Downgradient at Facility Boundary		Downgradient at Facility Boundary		Downgradient		Downgradient	
Sample ID			GAF-GW-GAF-414L-03112022		GAF-GW-GAF-414L-09082022		GAF-GW-GAF-416C-03102022		GAF-GW-GAF-416C-09072022		GAF-GW-GAF-418L-03152022		GAF-GW-GAF-418L-09192022		GAF-GW-GAF-422C-03102022		GAF-GW-GAF-422C-09072022	
Sample Type			N		N		N		N		N		N		N		N	
Analyte	CAS	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Field																		
Dissolved Oxygen	DO_%	%	3.3		59.8		0.9		45.5		4.1		16.4		1.0		34.4	
	DO_mg/L	mg/L	0.35		5.98		0.09		4.31		0.41		1.64		0.09		3.44	
ORP	ORP	mV	-161.0		-227.1		-30.8		6.9		-13.4		-7.1		-76.0		-10.7	
PH-FIELD	PH-FIELD	pH Units	7.52		7.92		7.40		7.32		6.84		6.96		6.85		6.96	
Specific Cond. (Field)	COND	US/CM	750		762		428.7		420.8		809		946		1229		992	
Temperature	TEMPW	DEG_C	15.0		16.9		17.6		17.8		14.3		15.2		15.8		17.3	
Turbidity, field	TURB-FIELD	NTU	0.48		0.74		2.93		3.20		0.65		1.46		10.0		54.9	
General Chemistry																		
Carbonate as CaCO3	ALKC	mg/L	< 5.00	U	< 2.60	U	< 5.00	U	< 2.60	UJ	< 5.00	U	< 2.60	UJ	< 5.00	U	< 2.60	U
Alkalinity as CaCO3	ALK	mg/L	274		279		191		154	J	308		291	J	275		236	
Bicarbonate as CaCO3	ALKB	mg/L	274		279		191		154	J	308		291	J	275		236	
Total Dissolved Solids	TDS	mg/L	469		454		270		284	J	597		837	J	962		880	
Chloride	16887-00-6	mg/L	90.9		91.2		3.54		4.89	J	1.16		7.35	J	2.46		3.01	
Fluoride	16984-48-8	mg/L	0.438		0.647		0.185		0.204	J	< 0.0553	U*	< 0.0896	U*	0.156		0.181	
Sulfate	14808-79-8	mg/L	10.4		9.33		57.1		69.0	J	190		340	J	419		375	
Metals																		
Antimony	7440-36-0	ug/L	< 0.506	U	< 0.506	U	< 0.506	U	< 0.506	U	< 0.506	U	< 0.506	U	< 0.506	U	< 0.506	U
Arsenic	7440-38-2	ug/L	0.336	J	0.348	J	3.28		2.11		< 0.481	U*	0.909	J	3.68		1.97	
Barium	7440-39-3	ug/L	329		333	J	56.4		54.6		32.0		38.0		50.3		39.2	
Beryllium	7440-41-7	ug/L	< 0.274	U	< 0.274	UJ	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U
Boron	7440-42-8	ug/L	< 200	U*	< 274	U*	823		750		< 60.1	U	104		465		569	
Cadmium	7440-43-9	ug/L	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U
Calcium	7440-70-2	mg/L	60.9		60.6	J	69.1		66.5		182		210		229		233	
Chromium	7440-47-3	ug/L	< 1.53	U	< 1.53	UJ	< 1.53	U	< 1.53	U	< 1.53	U	< 1.53	U	< 1.53	U	< 1.53	U
Cobalt	7440-48-4	ug/L	< 0.261	U	< 0.261	U	0.493	J	0.423	J	1.29		2.27		5.07	J	2.96	
Iron	7439-89-6	ug/L	400		347	J	241		278		287		1070		8890		4150	
Lead	7439-92-1	ug/L	< 0.167	U	< 0.167	U	< 0.167	U	0.198	J	< 0.167	U	< 0.167	U	< 0.167	U	< 0.167	U
Lithium	7439-93-2	ug/L	73.2		65.3	J	< 0.831	U	0.894	J	< 0.831	U	< 0.831	U	0.833	J	< 0.831	U
Magnesium	7439-95-4	ug/L	25000		24300	J	6500		5700		8430		13200		13300		12400	
Manganese	7439-96-5	ug/L	6.11		5.05	J	3010		2190		2380		4090		2110		1610	
Mercury	7439-97-6	ug/L	< 0.130	U	< 0.130	U	< 0.134	U*	< 0.130	U	< 0.130	U	< 0.130	U	< 0.130	U	< 0.130	U
Molybdenum	7439-98-7	ug/L	< 0.610	U	< 0.610	U	52.5		61.2		1.09	J	2.63	J	20.0		12.9	
Potassium	7440-09-7	ug/L	2110		2050	J	2600		2870		1220		1610		2780		2480	
Selenium	7782-49-2	ug/L	< 0.739	U	< 0.739	UJ	< 0.739	U	< 0.739	U	< 0.739	U	< 0.739	U	< 0.739	U	< 0.739	U
Sodium	7440-23-5	ug/L	82100		82000	J	11800		13800		4840		7410		6650		9760	
Thallium	7440-28-0	ug/L	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U
Radiological																		
Radium-226	13982-63-3	pCi/L	< 0.669	U	< 0.490	U	< 0.548	U	< 0.180	U	1.12		< 0.359	U	< -0.105	U	< 0.744	U
Radium 228	15262-20-1	pCi/L	< 0.303	U	< 0.424	U	< 0.272	U	< 0.532	U	< 1.36	U*	< 0.414	U	< 0.363	U	< 0.0492	U
Radium 226 + Radium 228	RA226/228	pCi/L	< 0.972	U	< 0.913	U	< 0.820	U	< 0.712	U	2.48	J	< 0.772	U	< 0.363	U	< 0.793	U

Table 4
Assessment Monitoring Groundwater Analytical Results - Ash Pond Complex, 2022
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well	GAF-414L		GAF-414L		GAF-416C		GAF-416C		GAF-418L		GAF-418L		GAF-422C		GAF-422C	
		Sample Date	11-Mar-22		08-Sep-22		10-Mar-22		07-Sep-22		15-Mar-22		19-Sep-22		10-Mar-22		07-Sep-22	
		Well Location	Background		Background		Downgradient		Downgradient		Downgradient at Facility Boundary		Downgradient at Facility Boundary		Downgradient		Downgradient	
		Sample ID	GAF-GW-GAF-414L-03112022		GAF-GW-GAF-414L-09082022		GAF-GW-GAF-416C-03102022		GAF-GW-GAF-416C-09072022		GAF-GW-GAF-418L-03152022		GAF-GW-GAF-418L-09192022		GAF-GW-GAF-422C-03102022		GAF-GW-GAF-422C-09072022	
		Sample Type	N		N		N		N		N		N		N		N	
Analyte	CAS	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Metals Dissolved																		
Antimony	7440-36-0	ug/L	--		--		--		--		--		--		< 0.506	U	< 0.506	U
Arsenic	7440-38-2	ug/L	--		--		--		--		--		--		3.31		1.89	
Barium	7440-39-3	ug/L	--		--		--		--		--		--		53.1		37.5	
Beryllium	7440-41-7	ug/L	--		--		--		--		--		--		< 0.274	U	< 0.274	U
Boron	7440-42-8	ug/L	--		--		--		--		--		--		504		552	
Cadmium	7440-43-9	ug/L	--		--		--		--		--		--		< 0.217	U	< 0.217	U
Calcium	7440-70-2	mg/L	--		--		--		--		--		--		245		216	
Chromium	7440-47-3	ug/L	--		--		--		--		--		--		< 1.53	U	< 1.53	U
Cobalt	7440-48-4	ug/L	--		--		--		--		--		--		5.78	J	2.50	
Iron	7439-89-6	ug/L	--		--		--		--		--		--		9070		3150	
Lead	7439-92-1	ug/L	--		--		--		--		--		--		< 0.167	U	< 0.167	U
Lithium	7439-93-2	ug/L	--		--		--		--		--		--		< 0.831	U	< 0.831	U
Magnesium	7439-95-4	ug/L	--		--		--		--		--		--		14300		11600	
Manganese	7439-96-5	ug/L	--		--		--		--		--		--		2330		1500	
Mercury	7439-97-6	ug/L	--		--		--		--		--		--		< 0.130	U	< 0.130	U
Molybdenum	7439-98-7	ug/L	--		--		--		--		--		--		21.4		12.9	
Potassium	7440-09-7	ug/L	--		--		--		--		--		--		3010		2390	
Selenium	7782-49-2	ug/L	--		--		--		--		--		--		< 0.739	U	< 0.739	U
Sodium	7440-23-5	ug/L	--		--		--		--		--		--		7050		9790	
Thallium	7440-28-0	ug/L	--		--		--		--		--		--		< 0.472	U	< 0.472	U
Radiological Dissolved																		
Radium-226	13982-63-3	pCi/L	--		--		--		--		--		--		< 0.120	U	< 0.437	U
Radium 228	15262-20-1	pCi/L	--		--		--		--		--		--		< 0.193	U	< 0.00407	U
Radium 226 + Radium 228	RA226/228	pCi/L	--		--		--		--		--		--		< 0.313	U	< 0.441	U

Table 4
Assessment Monitoring Groundwater Analytical Results - Ash Pond Complex, 2022
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well	GAF-426C				GAF-426L				GAF-427C				GAF-427L			
		Sample Date	11-Mar-22		09-Sep-22		11-Mar-22		09-Sep-22		15-Mar-22		09-Sep-22		15-Mar-22		09-Sep-22	
		Well Location	Background		Background		Background		Background		Background		Background		Background		Background	
		Sample ID	GAF-GW-GAF-426C-03112022		GAF-GW-GAF-426C-09092022		GAF-GW-GAF-426L-03112022		GAF-GW-GAF-426L-09092022		GAF-GW-GAF-427C-03152022		GAF-GW-GAF-427C-09092022		GAF-GW-GAF-427L-03152022		GAF-GW-GAF-427L-09092022	
		Sample Type	N		N		N		N		N		N		N		N	
Analyte	CAS	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Field																		
Dissolved Oxygen	DO_%	%	13.3		4.4		11.9		25.4		8.0		4.9		3.4		3.1	
	DO_mg/L	mg/L	1.35		0.43		1.18		2.51		0.79		0.44		0.34		0.32	
ORP	ORP	mV	186.2		160.3		135.0		133.4		-123.9		-54.6		-34.3		-19.7	
PH-FIELD	PH-FIELD	pH Units	6.97		6.89		6.95		6.90		7.11		6.81		7.16		7.09	
Specific Cond. (Field)	COND	US/CM	1129		995		869		829		821		805		637		575.2	
Temperature	TEMPW	DEG_C	13.7		17.0		15.2		16.1		15.3		18.1		14.7		17.8	
Turbidity, field	TURB-FIELD	NTU	0.87		0.25		1.20		1.06		0.15		0.39		0.20		0.54	
General Chemistry																		
Carbonate as CaCO3	ALKC	mg/L	< 5.00	U	< 2.60	U	< 5.00	U	< 2.60	U	< 5.00	U	< 2.60	U	< 5.00	U	< 2.60	U
Alkalinity as CaCO3	ALK	mg/L	379		385		296		325		380		435		303		332	
Bicarbonate as CaCO3	ALKB	mg/L	379		385		296		325		380		435		303		332	
Total Dissolved Solids	TDS	mg/L	770		662		576		568		460		486		368		390	J
Chloride	16887-00-6	mg/L	11.5		10.7		11.9		32.4		21.2		20.2		8.36		9.27	
Fluoride	16984-48-8	mg/L	0.197		0.294		0.262		0.365		1.21		1.27		0.221		0.303	
Sulfate	14808-79-8	mg/L	264		235		170		149		32.1		32.9		40.6		44.8	
Metals																		
Antimony	7440-36-0	ug/L	< 0.506	U	0.856	J	< 0.506	U	0.742	J	< 0.506	U	1.13	J	< 0.506	U	0.699	J
Arsenic	7440-38-2	ug/L	0.345	J	0.296	J	0.423	J	0.398	J	< 0.455	U*	< 0.282	U	< 0.282	U	< 0.282	U
Barium	7440-39-3	ug/L	33.0		49.2		32.4		46.1		527		810		94.9		126	
Beryllium	7440-41-7	ug/L	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U
Boron	7440-42-8	ug/L	< 91.8	U*	< 153	U*	< 65.4	U*	< 102	U*	358		461		101		< 109	U*
Cadmium	7440-43-9	ug/L	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U
Calcium	7440-70-2	mg/L	135		188		141		170		123		178		97.9		116	
Chromium	7440-47-3	ug/L	< 1.53	U	< 1.53	U	< 1.53	U	< 1.53	U	< 1.53	U	2.15		< 1.53	U	< 1.53	U
Cobalt	7440-48-4	ug/L	< 0.261	U	< 0.261	U	< 0.261	U	< 0.261	U	1.06		1.03		0.604		0.762	
Iron	7439-89-6	ug/L	35.8	J	< 27.7	U	49.9	J	36.6	J	469		1400		< 27.7	U	48.3	J
Lead	7439-92-1	ug/L	< 0.167	U	< 0.167	U	< 0.167	U	< 0.167	U	< 0.167	U	< 0.167	U	< 0.167	U	0.209	J
Lithium	7439-93-2	ug/L	15.8		19.2		8.80		13.2		42.1		58.5		9.22		11.4	
Magnesium	7439-95-4	ug/L	50600		74800		24800		29300		36000		51700		28400		36200	
Manganese	7439-96-5	ug/L	3.88	J	5.03		5.72		101		50.7		62.5		117		155	
Mercury	7439-97-6	ug/L	< 0.130	U	< 0.130	U	< 0.130	U	< 0.130	U	< 0.130	U	< 0.130	U	< 0.130	U	< 0.130	U
Molybdenum	7439-98-7	ug/L	1.12	J	2.00	J	2.16	J	7.57		0.676	J	0.687	J	< 0.610	U	< 0.610	U
Potassium	7440-09-7	ug/L	2710		3910		3370		12700		8580		11000		1650		2250	
Selenium	7782-49-2	ug/L	< 0.739	U	0.801	J	< 0.739	U	< 0.739	U	< 0.739	U	< 0.739	U	< 0.739	U	< 0.739	U
Sodium	7440-23-5	ug/L	49100		56100		13100		44600		19300		27300		8890		10700	
Thallium	7440-28-0	ug/L	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U
Radiological																		
Radium-226	13982-63-3	pCi/L	< 0.170	U	< 0.648	U	< 0.325	U	< 0.322	U	< 0.271	U	< 0.884	U	< 0.428	U	< 0.692	U
Radium 228	15262-20-1	pCi/L	< 0.676	U	< 0.228	U	< 0.123	U	< 0.508	U	< 1.34	U*	< 1.41	U*	< 1.26	U*	< 0.780	U
Radium 226 + Radium 228	RA226/228	pCi/L	< 0.846	U	< 0.876	U	< 0.448	U	< 0.830	U	< 1.61	U*	< 2.29	U*	< 1.69	U*	< 1.47	U

Table 4
Assessment Monitoring Groundwater Analytical Results - Ash Pond Complex, 2022
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well	GAF-426C				GAF-426L				GAF-427C				GAF-427L			
		Sample Date	11-Mar-22		09-Sep-22		11-Mar-22		09-Sep-22		15-Mar-22		09-Sep-22		15-Mar-22		09-Sep-22	
		Well Location	Background		Background		Background		Background		Background		Background		Background		Background	
		Sample ID	GAF-GW-GAF-426C-03112022		GAF-GW-GAF-426C-09092022		GAF-GW-GAF-426L-03112022		GAF-GW-GAF-426L-09092022		GAF-GW-GAF-427C-03152022		GAF-GW-GAF-427C-09092022		GAF-GW-GAF-427L-03152022		GAF-GW-GAF-427L-09092022	
		Sample Type	N		N		N		N		N		N		N		N	
Analyte	CAS	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Metals Dissolved																		
Antimony	7440-36-0	ug/L	--		--		--		--		--		--		--		--	
Arsenic	7440-38-2	ug/L	--		--		--		--		--		--		--		--	
Barium	7440-39-3	ug/L	--		--		--		--		--		--		--		--	
Beryllium	7440-41-7	ug/L	--		--		--		--		--		--		--		--	
Boron	7440-42-8	ug/L	--		--		--		--		--		--		--		--	
Cadmium	7440-43-9	ug/L	--		--		--		--		--		--		--		--	
Calcium	7440-70-2	mg/L	--		--		--		--		--		--		--		--	
Chromium	7440-47-3	ug/L	--		--		--		--		--		--		--		--	
Cobalt	7440-48-4	ug/L	--		--		--		--		--		--		--		--	
Iron	7439-89-6	ug/L	--		--		--		--		--		--		--		--	
Lead	7439-92-1	ug/L	--		--		--		--		--		--		--		--	
Lithium	7439-93-2	ug/L	--		--		--		--		--		--		--		--	
Magnesium	7439-95-4	ug/L	--		--		--		--		--		--		--		--	
Manganese	7439-96-5	ug/L	--		--		--		--		--		--		--		--	
Mercury	7439-97-6	ug/L	--		--		--		--		--		--		--		--	
Molybdenum	7439-98-7	ug/L	--		--		--		--		--		--		--		--	
Potassium	7440-09-7	ug/L	--		--		--		--		--		--		--		--	
Selenium	7782-49-2	ug/L	--		--		--		--		--		--		--		--	
Sodium	7440-23-5	ug/L	--		--		--		--		--		--		--		--	
Thallium	7440-28-0	ug/L	--		--		--		--		--		--		--		--	
Radiological Dissolved																		
Radium-226	13982-63-3	pCi/L	--		--		--		--		--		--		--		--	
Radium 228	15262-20-1	pCi/L	--		--		--		--		--		--		--		--	
Radium 226 + Radium 228	RA226/228	pCi/L	--		--		--		--		--		--		--		--	

Table 4
Assessment Monitoring Groundwater Analytical Results - Ash Pond Complex, 2022
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well	GAF-446C				GAF-449L				GAF-450C				GAF-450L			
		Sample Date	15-Mar-22		08-Sep-22		15-Mar-22		08-Sep-22		16-Mar-22		09-Sep-22		16-Mar-22		09-Sep-22	
		Well Location	Downgradient		Downgradient		Downgradient		Downgradient		Downgradient		Downgradient		Downgradient		Downgradient	
		Sample ID	GAF-GW-GAF-446C-03152022		GAF-GW-GAF-446C-09082022		GAF-GW-GAF-449L-03152022		GAF-GW-GAF-449L-09082022		GAF-GW-GAF-450C-03162022		GAF-GW-GAF-450C-09092022		GAF-GW-GAF-450L-03162022		GAF-GW-GAF-450L-09092022	
		Sample Type	N		N		N		N		N		N		N		N	
Analyte	CAS	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Field																		
Dissolved Oxygen	DO_%	%	3.2		43.6		3.1		2.8		4.3		41.8		4.5		3.8	
	DO_mg/L	mg/L	0.30		2.57		0.31		0.26		0.43		4.18		0.44		0.38	
ORP	ORP	mV	22.5		16.8		-91.6		-41.5		-82.7		-71.2		-108.3		-110.2	
PH-FIELD	PH-FIELD	pH Units	6.96		6.88		7.02		6.93		7.01		7.07		7.06		6.81	
Specific Cond. (Field)	COND	US/CM	724		756		611		667		1083		984		914		983	
Temperature	TEMPW	DEG_C	15.4		18.5		15.7		19.8		15.7		18.6		15.5		18.6	
Turbidity, field	TURB-FIELD	NTU	4.05		4.03		0.49		0.52		1.53		2.32		0.21		2.23	
General Chemistry																		
Carbonate as CaCO3	ALKC	mg/L	< 5.00	U	< 2.60	U	< 5.00	U	< 2.60	U	< 5.00	U	< 2.60	U	< 5.00	U	< 2.60	U
Alkalinity as CaCO3	ALK	mg/L	260		261		180		189		251		266		226		262	
Bicarbonate as CaCO3	ALKB	mg/L	260		261		180		189		251		266		226		262	
Total Dissolved Solids	TDS	mg/L	517		558		458		488		741		810		665		782	
Chloride	16887-00-6	mg/L	7.30		7.76		10.2		10.5		16.1		15.5		16.8		16.6	
Fluoride	16984-48-8	mg/L	< 0.0728	U*	< 0.122	U*	< 0.0783	U*	< 0.101	U*	< 0.104	U*	< 0.0911	U*	< 0.159	U*	0.232	
Sulfate	14808-79-8	mg/L	151		147		158		159		307		309		279		312	
Metals																		
Antimony	7440-36-0	ug/L	< 0.506	U	< 0.506	UJ	< 0.506	U	< 0.506	UJ	< 0.506	U	1.17	J	< 0.506	U	< 0.506	U
Arsenic	7440-38-2	ug/L	< 1.35	U*	6.30		2.45		2.24		2.32		4.36		13.0		11.2	
Barium	7440-39-3	ug/L	57.8		64.6	J	37.4		36.8	J	32.2		33.7		35.6		42.3	
Beryllium	7440-41-7	ug/L	< 0.274	U	< 0.274	UJ	< 0.274	U	< 0.274	UJ	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U
Boron	7440-42-8	ug/L	6770		7500		9160		9480		3670		5000		7300		7160	
Cadmium	7440-43-9	ug/L	< 0.217	U	< 0.217	UJ	< 0.217	U	< 0.217	UJ	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U
Calcium	7440-70-2	mg/L	104		109	J	87.3		91.9	J	200		162		109		142	
Chromium	7440-47-3	ug/L	< 1.53	U	< 1.53	UJ	< 1.53	U	< 1.53	UJ	< 1.53	U	< 1.53	U	< 1.53	U	< 1.53	U
Cobalt	7440-48-4	ug/L	1.34		3.71		3.20		2.66		1.32		3.46		6.37		9.07	
Iron	7439-89-6	ug/L	378		1550	J	658		612	J	4370		2780		3420		5360	
Lead	7439-92-1	ug/L	< 0.167	U	< 0.167	U	< 0.220	U*	< 0.167	U	< 0.167	U	< 0.167	U	< 0.167	U	< 0.167	U
Lithium	7439-93-2	ug/L	< 0.831	U	< 0.831	UJ	< 0.831	U	< 0.831	UJ	1.44	J	< 0.831	U	1.01	J	< 0.831	U
Magnesium	7439-95-4	ug/L	5990		6520	J	3120		3220	J	12100		9070		5090		7350	
Manganese	7439-96-5	ug/L	5270		4910	J	3640		3340	J	4480		4130		2820		4200	
Mercury	7439-97-6	ug/L	< 0.130	U	< 0.130	U	< 0.130	U	< 0.130	U	0.176	J	< 0.130	U	< 0.130	U	< 0.130	U
Molybdenum	7439-98-7	ug/L	65.7		65.2		53.7		49.4		3.07	J	16.1		60.0		41.1	
Potassium	7440-09-7	ug/L	2350		2510	J	2580		2680	J	1720		3460		4830		4940	
Selenium	7782-49-2	ug/L	< 0.739	U	< 0.739	UJ	< 0.739	U	< 0.739	UJ	< 0.739	U	< 0.739	U	< 0.739	U	< 0.739	U
Sodium	7440-23-5	ug/L	61400		61100	J	54600		54000	J	38500		55100		92900		79200	
Thallium	7440-28-0	ug/L	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U
Radiological																		
Radium-226	13982-63-3	pCi/L	< 0.0928	U	< 0.677	U	< 0.273	U	< 0.269	U	< 0.223	U	< 0.397	U	< 0.505	U	< 0.487	U
Radium 228	15262-20-1	pCi/L	< 0.731	U*	< 0.413	U	< 0.636	U*	< 1.16	U*	< 0.492	U	< -0.0746	U	< 0.447	U	< 0.0379	U
Radium 226 + Radium 228	RA226/228	pCi/L	< 0.824	U*	< 1.09	U	< 0.910	U*	< 1.42	U*	< 0.715	U	< 0.397	U	< 0.951	U	< 0.524	U

Table 4
Assessment Monitoring Groundwater Analytical Results - Ash Pond Complex, 2022
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well	GAF-446C				GAF-449L				GAF-450C				GAF-450L			
		Sample Date	15-Mar-22		08-Sep-22		15-Mar-22		08-Sep-22		16-Mar-22		09-Sep-22		16-Mar-22		09-Sep-22	
		Well Location	Downgradient		Downgradient		Downgradient		Downgradient		Downgradient		Downgradient		Downgradient		Downgradient	
		Sample ID	GAF-GW-GAF-446C-03152022		GAF-GW-GAF-446C-09082022		GAF-GW-GAF-449L-03152022		GAF-GW-GAF-449L-09082022		GAF-GW-GAF-450C-03162022		GAF-GW-GAF-450C-09092022		GAF-GW-GAF-450L-03162022		GAF-GW-GAF-450L-09092022	
		Sample Type	N		N		N		N		N		N		N		N	
Analyte	CAS	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Metals Dissolved																		
Antimony	7440-36-0	ug/L	--		--		--		--		--		--		--		--	
Arsenic	7440-38-2	ug/L	--		--		--		--		--		--		--		--	
Barium	7440-39-3	ug/L	--		--		--		--		--		--		--		--	
Beryllium	7440-41-7	ug/L	--		--		--		--		--		--		--		--	
Boron	7440-42-8	ug/L	--		--		--		--		--		--		--		--	
Cadmium	7440-43-9	ug/L	--		--		--		--		--		--		--		--	
Calcium	7440-70-2	mg/L	--		--		--		--		--		--		--		--	
Chromium	7440-47-3	ug/L	--		--		--		--		--		--		--		--	
Cobalt	7440-48-4	ug/L	--		--		--		--		--		--		--		--	
Iron	7439-89-6	ug/L	--		--		--		--		--		--		--		--	
Lead	7439-92-1	ug/L	--		--		--		--		--		--		--		--	
Lithium	7439-93-2	ug/L	--		--		--		--		--		--		--		--	
Magnesium	7439-95-4	ug/L	--		--		--		--		--		--		--		--	
Manganese	7439-96-5	ug/L	--		--		--		--		--		--		--		--	
Mercury	7439-97-6	ug/L	--		--		--		--		--		--		--		--	
Molybdenum	7439-98-7	ug/L	--		--		--		--		--		--		--		--	
Potassium	7440-09-7	ug/L	--		--		--		--		--		--		--		--	
Selenium	7782-49-2	ug/L	--		--		--		--		--		--		--		--	
Sodium	7440-23-5	ug/L	--		--		--		--		--		--		--		--	
Thallium	7440-28-0	ug/L	--		--		--		--		--		--		--		--	
Radiological Dissolved																		
Radium-226	13982-63-3	pCi/L	--		--		--		--		--		--		--		--	
Radium 228	15262-20-1	pCi/L	--		--		--		--		--		--		--		--	
Radium 226 + Radium 228	RA226/228	pCi/L	--		--		--		--		--		--		--		--	

Table 4
Assessment Monitoring Groundwater Analytical Results - Ash Pond Complex, 2022
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well	GAF-451CR				GAF-452C				GAF-452L				GAF-453C			
		Sample Date	16-Mar-22		19-Sep-22		14-Mar-22		09-Sep-22		14-Mar-22		09-Sep-22		10-Mar-22		08-Sep-22	
		Well Location	Downgradient		Downgradient		Downgradient		Downgradient		Downgradient		Downgradient		Downgradient		Downgradient	
		Sample ID	GAF-GW-GAF-451CR-03162022		GAF-GW-GAF-451CR-09192022		GAF-GW-GAF-452C-03142022		GAF-GW-GAF-452C-09092022		GAF-GW-GAF-452L-03142022		GAF-GW-GAF-452L-09092022		GAF-GW-GAF-453C-03102022		GAF-GW-GAF-453C-09082022	
		Sample Type	N		N		N		N		N		N		N		N	
Analyte	CAS	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Field																		
Dissolved Oxygen	DO_%	%	3.9		4.2		2.3		45.7		3.7		3.1		2.8		11.4	
	DO_mg/L	mg/L	0.38		0.42		0.23		4.57		0.37		0.31		0.28		1.14	
ORP	ORP	mV	-35.2		-43.5		-109.7		-105.6		-142.7		-114.5		-83.5		-98.2	
PH-FIELD	PH-FIELD	pH Units	6.98		6.99		7.23		7.34		7.22		7.41		7.32		7.25	
Specific Cond. (Field)	COND	US/CM	1294		1206		875		822		611.0		505.6		655		637	
Temperature	TEMPW	DEG_C	15.1		18.5		16.3		18.6		15.5		17.3		16.7		17.6	
Turbidity, field	TURB-FIELD	NTU	0.31		1.57		0.51		2.32		0.28		1.04		1.63		0.48	
General Chemistry																		
Carbonate as CaCO3	ALKC	mg/L	< 5.00	U	< 2.60	UJ	< 5.00	U	< 2.60	U	< 5.00	U	< 2.60	U	11.3		< 2.60	U
Alkalinity as CaCO3	ALK	mg/L	369		372	J	441		480		297		312		259		240	
Bicarbonate as CaCO3	ALKB	mg/L	369		372	J	441		480		297		312		248		240	
Total Dissolved Solids	TDS	mg/L	1020		1040	J	496		525		363		357		452		513	
Chloride	16887-00-6	mg/L	16.7		15.5	J	7.64		12.4		3.78		4.93		4.49		4.67	
Fluoride	16984-48-8	mg/L	< 0.207	U*	0.242	J	0.729		0.793		0.407		0.425		0.232		0.287	
Sulfate	14808-79-8	mg/L	452		422	J	21.9		14.8		31.5		31.1		123		138	
Metals																		
Antimony	7440-36-0	ug/L	< 0.506	U	< 0.506	U	< 0.506	U	< 0.506	U	< 0.506	U	0.536	J	< 0.506	U	< 0.506	UJ
Arsenic	7440-38-2	ug/L	< 0.884	U*	0.976	J	1.17		1.10		1.05		0.718	J	3.97		0.346	J
Barium	7440-39-3	ug/L	34.3		33.9		260		259		75.2		77.2		85.4		84.4	J
Beryllium	7440-41-7	ug/L	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	U	< 0.274	UJ
Boron	7440-42-8	ug/L	86.8		102		250		< 262	U*	107		< 177	U*	69.4	J	< 183	U*
Cadmium	7440-43-9	ug/L	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	U	< 0.217	UJ
Calcium	7440-70-2	mg/L	215		194		71.9		67.2		80.4		79.2		103		115	J
Chromium	7440-47-3	ug/L	< 1.53	U	< 1.53	U	< 1.53	U	< 1.53	U	< 1.53	U	< 1.53	U	< 1.53	U	< 1.53	UJ
Cobalt	7440-48-4	ug/L	< 0.261	U	0.319	J	< 0.261	U	< 0.261	U	< 0.261	U	< 0.261	U	< 0.261	U	< 0.261	U
Iron	7439-89-6	ug/L	1240		1340		158		538		1370		1140		621		1110	J
Lead	7439-92-1	ug/L	< 0.167	U	< 0.167	U	< 0.167	U	< 0.167	U	< 0.167	U	< 0.167	U	< 0.167	U	< 0.167	U
Lithium	7439-93-2	ug/L	8.86		9.52		98.8		94.7		16.1		15.1		4.09	J	2.33	J
Magnesium	7439-95-4	ug/L	62700		60700		26900		27300		26000		26200		14200		14600	J
Manganese	7439-96-5	ug/L	11.6		12.0		76.2		84.1		64.4		49.6		127		150	J
Mercury	7439-97-6	ug/L	< 0.130	U	< 0.130	U	< 0.130	U	< 0.130	U	< 0.130	U	< 0.130	U	< 0.130	U	< 0.130	U
Molybdenum	7439-98-7	ug/L	< 0.610	U	< 0.610	U	< 0.610	U	< 0.610	U	< 0.610	U	< 0.610	U	1.12	J	0.949	J
Potassium	7440-09-7	ug/L	2310		2340		5920		6010		3470		3160		2930		2420	J
Selenium	7782-49-2	ug/L	< 0.739	U	< 0.739	U	< 0.739	U	< 0.739	U	< 0.739	U	< 0.739	U	< 0.739	U	< 0.739	UJ
Sodium	7440-23-5	ug/L	43400		41800		98400		102000		10600		8050		26200		22700	J
Thallium	7440-28-0	ug/L	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U	< 0.472	U
Radiological																		
Radium-226	13982-63-3	pCi/L	1.13		< 0.589	U	0.774		1.23		< 0.392	U	< 0.523	U	< 0.168	U	< 0.130	U
Radium 228	15262-20-1	pCi/L	< 0.843	U*	1.44		1.24		< 0.939	U*	< 0.255	U	< 1.18	U*	< 0.307	U	< 0.103	U
Radium 226 + Radium 228	RA226/228	pCi/L	1.98	J	2.03	J	2.02		2.17	J	< 0.647	U	< 1.70	U*	< 0.475	U	< 0.233	U

Table 4
Assessment Monitoring Groundwater Analytical Results - Ash Pond Complex, 2022
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well	GAF-451CR				GAF-452C				GAF-452L				GAF-453C			
		Sample Date	16-Mar-22		19-Sep-22		14-Mar-22		09-Sep-22		14-Mar-22		09-Sep-22		10-Mar-22		08-Sep-22	
		Well Location	Downgradient		Downgradient		Downgradient		Downgradient		Downgradient		Downgradient		Downgradient		Downgradient	
		Sample ID	GAF-GW-GAF-451CR-03162022		GAF-GW-GAF-451CR-09192022		GAF-GW-GAF-452C-03142022		GAF-GW-GAF-452C-09092022		GAF-GW-GAF-452L-03142022		GAF-GW-GAF-452L-09092022		GAF-GW-GAF-453C-03102022		GAF-GW-GAF-453C-09082022	
		Sample Type	N		N		N		N		N		N		N		N	
Analyte	CAS	Units	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Metals Dissolved																		
Antimony	7440-36-0	ug/L	--		--		--		--		--		--		--		--	
Arsenic	7440-38-2	ug/L	--		--		--		--		--		--		--		--	
Barium	7440-39-3	ug/L	--		--		--		--		--		--		--		--	
Beryllium	7440-41-7	ug/L	--		--		--		--		--		--		--		--	
Boron	7440-42-8	ug/L	--		--		--		--		--		--		--		--	
Cadmium	7440-43-9	ug/L	--		--		--		--		--		--		--		--	
Calcium	7440-70-2	mg/L	--		--		--		--		--		--		--		--	
Chromium	7440-47-3	ug/L	--		--		--		--		--		--		--		--	
Cobalt	7440-48-4	ug/L	--		--		--		--		--		--		--		--	
Iron	7439-89-6	ug/L	--		--		--		--		--		--		--		--	
Lead	7439-92-1	ug/L	--		--		--		--		--		--		--		--	
Lithium	7439-93-2	ug/L	--		--		--		--		--		--		--		--	
Magnesium	7439-95-4	ug/L	--		--		--		--		--		--		--		--	
Manganese	7439-96-5	ug/L	--		--		--		--		--		--		--		--	
Mercury	7439-97-6	ug/L	--		--		--		--		--		--		--		--	
Molybdenum	7439-98-7	ug/L	--		--		--		--		--		--		--		--	
Potassium	7440-09-7	ug/L	--		--		--		--		--		--		--		--	
Selenium	7782-49-2	ug/L	--		--		--		--		--		--		--		--	
Sodium	7440-23-5	ug/L	--		--		--		--		--		--		--		--	
Thallium	7440-28-0	ug/L	--		--		--		--		--		--		--		--	
Radiological Dissolved																		
Radium-226	13982-63-3	pCi/L	--		--		--		--		--		--		--		--	
Radium 228	15262-20-1	pCi/L	--		--		--		--		--		--		--		--	
Radium 226 + Radium 228	RA226/228	pCi/L	--		--		--		--		--		--		--		--	

Table 4
Assessment Monitoring Groundwater Analytical Results - Ash Pond Complex, 2022
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Monitoring Well			GAF-454L			
Sample Date			10-Mar-22		07-Sep-22	
Well Location			Downgradient at Facility Boundary		Downgradient at Facility Boundary	
Sample ID			GAF-GW-GAF-454L-03102022		GAF-GW-GAF-454L-09072022	
Sample Type			N		N	
Analyte	CAS	Units	Result	Q	Result	Q
Field						
Dissolved Oxygen	DO_%	%	4.9		26.0	
	DO_mg/L	mg/L	0.47		2.54	
ORP	ORP	mV	54.0		162.4	
PH-FIELD	PH-FIELD	pH Units	7.44		7.12	
Specific Cond. (Field)	COND	US/CM	543.0		576.1	
Temperature	TEMPW	DEG_C	14.7		18.2	
Turbidity, field	TURB-FIELD	NTU	0.39		0.48	
General Chemistry						
Carbonate as CaCO3	ALKC	mg/L	< 5.00	U	< 2.60	UJ
Alkalinity as CaCO3	ALK	mg/L	263		252	J
Bicarbonate as CaCO3	ALKB	mg/L	263		252	J
Total Dissolved Solids	TDS	mg/L	355		386	J
Chloride	16887-00-6	mg/L	3.08		4.02	J
Fluoride	16984-48-8	mg/L	0.205		0.266	J
Sulfate	14808-79-8	mg/L	67.8		69.2	J
Metals						
Antimony	7440-36-0	ug/L	< 0.506	U	0.537	J
Arsenic	7440-38-2	ug/L	0.355	J	0.328	J
Barium	7440-39-3	ug/L	77.8		81.2	
Beryllium	7440-41-7	ug/L	< 0.274	U	< 0.274	U
Boron	7440-42-8	ug/L	244		262	
Cadmium	7440-43-9	ug/L	< 0.217	U	< 0.217	U
Calcium	7440-70-2	mg/L	92.5		100	
Chromium	7440-47-3	ug/L	< 1.53	U	< 1.53	U
Cobalt	7440-48-4	ug/L	< 0.261	U	< 0.261	U
Iron	7439-89-6	ug/L	< 27.7	U	40.9	J
Lead	7439-92-1	ug/L	< 0.167	U	< 0.167	U
Lithium	7439-93-2	ug/L	1.14	J	1.24	J
Magnesium	7439-95-4	ug/L	14700		17900	
Manganese	7439-96-5	ug/L	1.80	J	6.26	
Mercury	7439-97-6	ug/L	< 0.136	U*	< 0.130	U
Molybdenum	7439-98-7	ug/L	4.97	J	5.04	
Potassium	7440-09-7	ug/L	2420		2490	
Selenium	7782-49-2	ug/L	< 0.739	U	< 0.739	U
Sodium	7440-23-5	ug/L	6250		10500	
Thallium	7440-28-0	ug/L	< 0.472	U	< 0.472	U
Radiological						
Radium-226	13982-63-3	pCi/L	< 0.241	U	< 0.153	U
Radium 228	15262-20-1	pCi/L	< 0.295	U	< 0.181	U
Radium 226 + Radium 228	RA226/228	pCi/L	< 0.536	U	< 0.335	U

Table 4
Assessment Monitoring Groundwater Analytical Results - Ash Pond Complex, 2022
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well	GAF-454L			
		Sample Date	10-Mar-22		07-Sep-22	
		Well Location	Downgradient at Facility Boundary		Downgradient at Facility Boundary	
		Sample ID	GAF-GW-GAF-454L-03102022		GAF-GW-GAF-454L-09072022	
		Sample Type	N		N	
Analyte	CAS	Units	Result	Q	Result	Q
Metals Dissolved						
Antimony	7440-36-0	ug/L	--		--	
Arsenic	7440-38-2	ug/L	--		--	
Barium	7440-39-3	ug/L	--		--	
Beryllium	7440-41-7	ug/L	--		--	
Boron	7440-42-8	ug/L	--		--	
Cadmium	7440-43-9	ug/L	--		--	
Calcium	7440-70-2	mg/L	--		--	
Chromium	7440-47-3	ug/L	--		--	
Cobalt	7440-48-4	ug/L	--		--	
Iron	7439-89-6	ug/L	--		--	
Lead	7439-92-1	ug/L	--		--	
Lithium	7439-93-2	ug/L	--		--	
Magnesium	7439-95-4	ug/L	--		--	
Manganese	7439-96-5	ug/L	--		--	
Mercury	7439-97-6	ug/L	--		--	
Molybdenum	7439-98-7	ug/L	--		--	
Potassium	7440-09-7	ug/L	--		--	
Selenium	7782-49-2	ug/L	--		--	
Sodium	7440-23-5	ug/L	--		--	
Thallium	7440-28-0	ug/L	--		--	
Radiological Dissolved						
Radium-226	13982-63-3	pCi/L	--		--	
Radium 228	15262-20-1	pCi/L	--		--	
Radium 226 + Radium 228	RA226/228	pCi/L	--		--	

Table 4
Assessment Monitoring Groundwater Analytical Results - Ash Pond Complex, 2022
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Notes and Acronymns

Gray shaded wells are background/upgradient wells.

MG/L	-	milligrams per liter
MV	-	millivolts
N	-	primary sample
NA	-	not analyzed for the specified analysis or not applicable for field duplicate (field parameters)
NTU	-	nephelometric turbidity units
pCi/L	-	picoCuries per liter
ug/L	-	micrograms per liter
US/CM	-	microMhos per centimeter
UPL	-	upper prediction limit

Qualifier Definitions

U	-	The analyte was analyzed for but not detected. The associated numerical value is at or below the reporting limit.
U*	-	This result should be considered “not detected” because it was detected in a rinsate blank or laboratory blank at a similar level.
J	-	Quantitation is approximate due to limitations identified during data validation.
UJ	-	This analyte was not detected, but the reporting or detection limit may or may not be higher due to a bias identified during data validation.

Table 5

Statistically Significant Levels (SSLs) above GWPSs

CCR Rule Groundwater Monitoring - Ash Pond Complex, March 2022

TVA Gallatin Fossil Plant

Gallatin, Tennessee

Appendix IV Constituent	GWPS (a)	Downgradient Wells with results above GWPS (b)	Statistically Significant Trend (c)	Calculated LCL on the mean (d)	SSL (e)
Antimony (ug/l)	6	None	NA	NA	NA
Arsenic (ug/l)	10	GAF-410U	Yes	NA	**Yes**
		GAF-450L	Yes	NA	**Yes**
Barium (ug/l)	2,000	None	NA	NA	NA
Beryllium (ug/l)	4	None	NA	NA	NA
Cadmium (ug/l)	5	None	NA	NA	NA
Chromium (ug/l)	100	None	NA	NA	NA
Cobalt (ug/l)	6	GAF-450L	No	7.50	**Yes (f)**
Fluoride (mg/l)	4	None	NA	NA	NA
Lead (ug/l)	15	None	NA	NA	NA
Lithium (ug/l)	224	None	NA	NA	NA
Mercury (ug/l)	2	None	NA	NA	NA
Molybdenum (ug/l)	100	None	NA	NA	NA
Radium-226+228 (pCi/l)	5	None	NA	NA	NA
Selenium (ug/l)	50	None	NA	NA	NA
Thallium (ug/l)	2	None	NA	NA	NA

NA – Not applicable

SSLs identified based on updated statistical method certification (12/15/2022) and may differ from the SSLs reported in initial SSL Notice (dated 6/9/2022).

(a) GWPSs documented in notice dated 12/20/2022.

(b) Assessment monitoring event in March 2022.

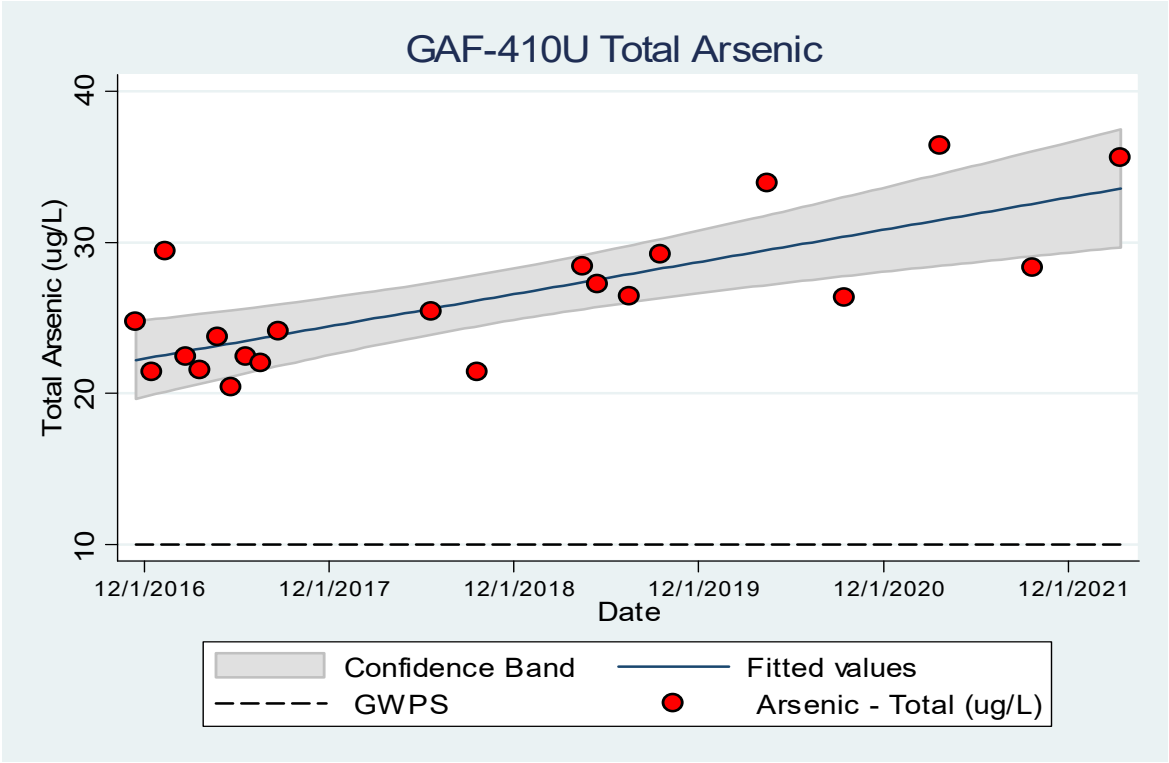
(c) As described in the statistical method certification, if a statistically significant trend is present, a confidence band approach is used to identify SSLs. Graphs showing the data and confidence bands are attached.

(d) As described in the statistical method certification, if no statistically significant trend is identified, a SSL is identified when both the upper and lower confidence limits (UCL and LCL) on the mean of all sampling events (i.e., November 2016 through March 2022) is above the GWPS. UCL not shown as it is greater than LCL.

(e) SSL is statistically significant level over GWPS.

(f) Successful Alternate Source Demonstrations completed, see 2019 Annual Report.

Table 5
Statistically Significant Levels (SSLs) above GWPSs
CCR Rule Groundwater Monitoring - Ash Pond Complex, March 2022
TVA Gallatin Fossil Plant
Gallatin, Tennessee



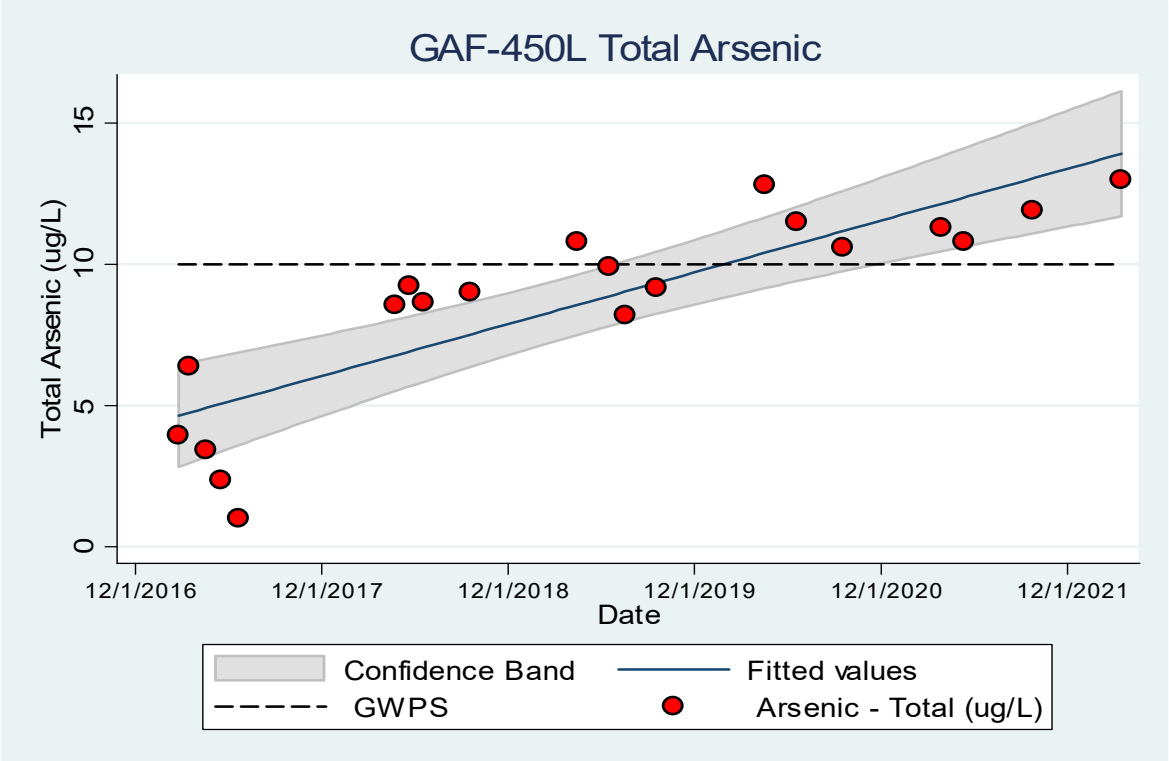


Table 6

Statistically Significant Levels (SSLs) above GWPSs

CCR Rule Groundwater Monitoring - Ash Pond Complex, September 2022

TVA Gallatin Fossil Plant

Gallatin, Tennessee

Appendix IV Constituent	GWPS (a)	Downgradient Wells with results above GWPS (b)	Statistically Significant Trend (c)	Calculated LCL on the mean (d)	SSL (e)
Antimony (ug/l)	6	None	NA	NA	NA
Arsenic (ug/l)	10	GAF-410U	Yes	NA	**Yes**
		GAF-450L	Yes	NA	**Yes**
Barium (ug/l)	2,000	None	NA	NA	NA
Beryllium (ug/l)	4	None	NA	NA	NA
Cadmium (ug/l)	5	None	NA	NA	NA
Chromium (ug/l)	100	None	NA	NA	NA
Cobalt (ug/l)	6	GAF-450L	No	7.62	**Yes (f)**
Fluoride (mg/l)	4	None	NA	NA	NA
Lead (ug/l)	15	None	NA	NA	NA
Lithium (ug/l)	224	None	NA	NA	NA
Mercury (ug/l)	2	None	NA	NA	NA
Molybdenum (ug/l)	100	None	NA	NA	NA
Radium-226+228 (pCi/l)	5	None	NA	NA	NA
Selenium (ug/l)	50	None	NA	NA	NA
Thallium (ug/l)	2	None	NA	NA	NA

NA – Not applicable

(a) GWPSs documented in notice dated 12/20/2022.

(b) Assessment monitoring event in September 2022.

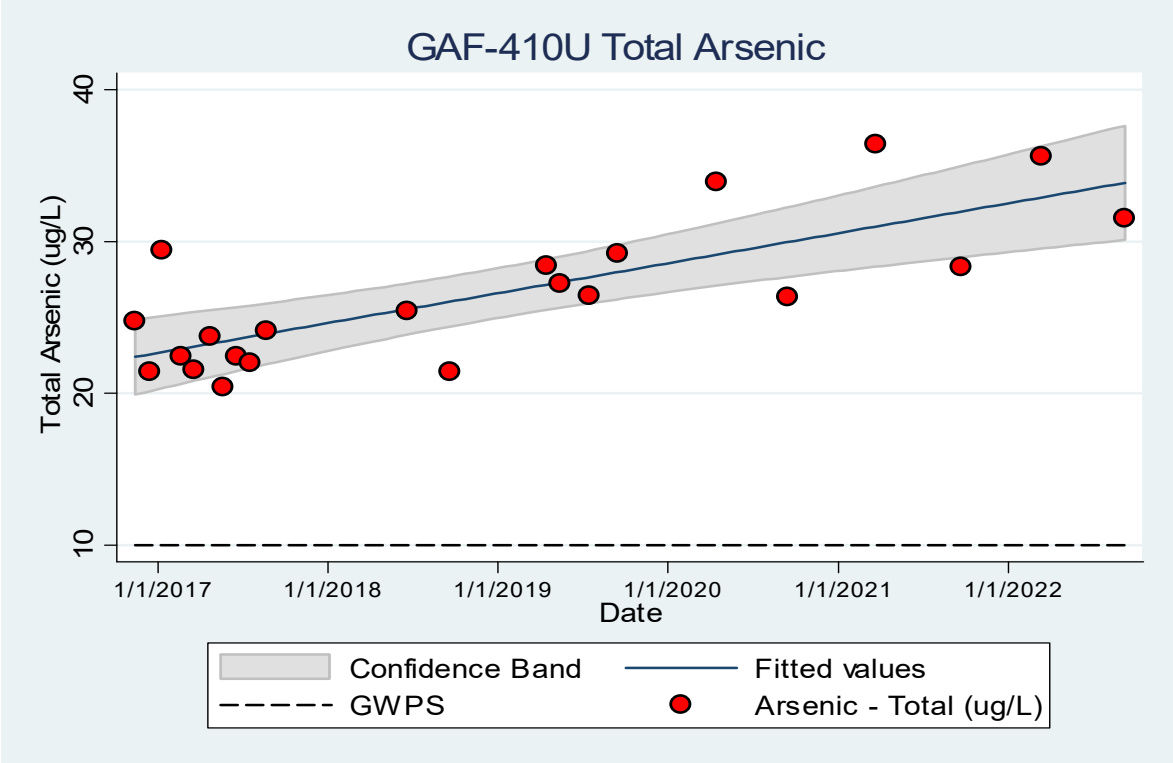
(c) As described in the statistical method certification, if a statistically significant trend is present, a confidence band approach is used to identify SSLs. Graphs showing the data and confidence bands are attached.

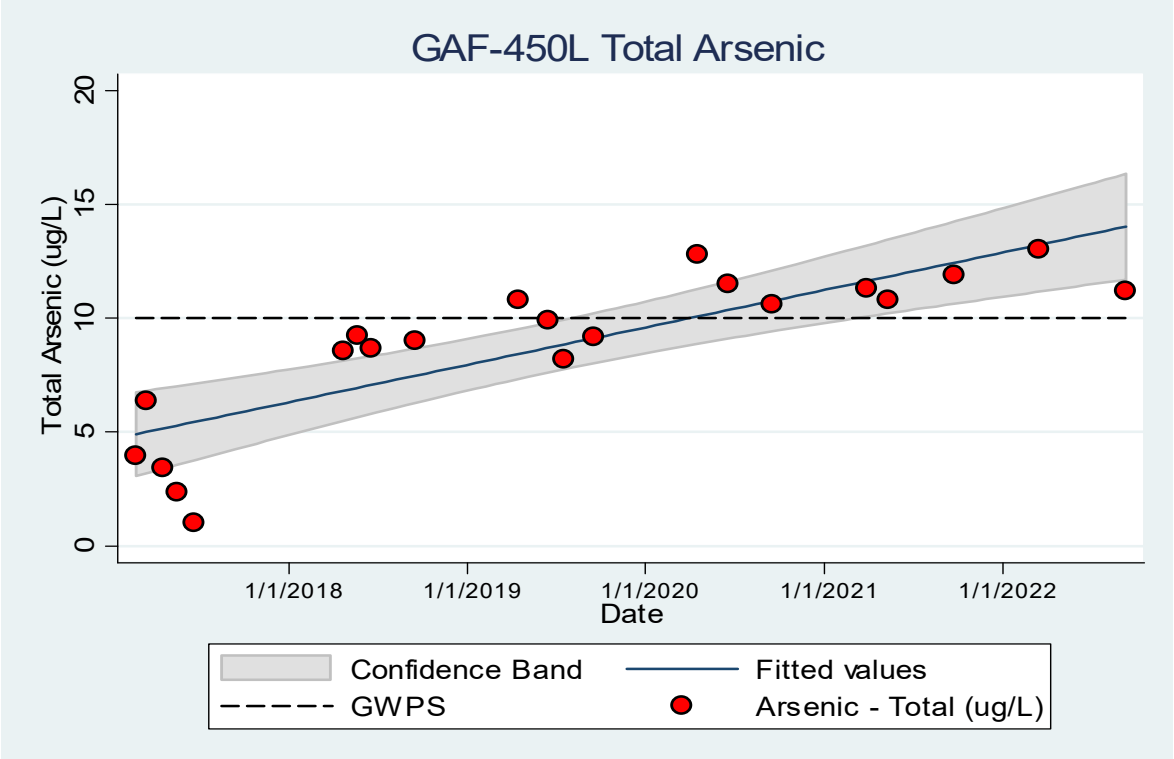
(d) As described in the statistical method certification, if no statistically significant trend is identified, a SSL is identified when both the upper and lower confidence limits (UCL and LCL) on the mean of all sampling events (i.e., November 2016 through September 2022) is above the GWPS. UCL not shown as it is greater than LCL.

(e) SSL is statistically significant level over GWPS.

(f) Successful Alternate Source Demonstrations completed, see 2019 Annual Report.

Table 6
Statistically Significant Levels (SSLs) above GWPSs
CCR Rule Groundwater Monitoring - Ash Pond Complex, September 2022
TVA Gallatin Fossil Plant
Gallatin, Tennessee





Appendix A
Dye Trace Velocity Tables

Table 3
Phase 1 Dye Trace Summary
TVA Gallatin Fossil Plant

Injection Point	Injection Date	Dye	Dye Recovery Location	Dye Recovery Confidence Level	Detection Date	Number Of Detections	Previous Non-detect Sample Date	Straight-line Distance (ft)	Travel Time - Low (days)	Travel Time - High (days)	Apparent Velocity Low (ft/day)	Apparent Velocity High (ft/day)
A0-SH-3	4/11/2017 17:55	Rhodamine WT (3 gallons)	DS-31-1	HIGH	4/12/17 7:30	1	NA	1,311	NA	0.6	2,316	NA
			DS-32-1	HIGH	4/12/2017 7:30	2	NA	1,540	NA	0.6	2,721	NA
			DS-26-3	HIGH	4/14/2017 13:50	1	NA	9,134	NA	2.8	3,228	NA
			DS-26-6	HIGH	4/14/2017 13:50	1	NA	9,134	NA	2.8	3,228	NA
C1-SH-15	4/12/17 7:50	Fluorescein (2 gallons)	DS-1	HIGH	4/20/17 8:40	2	4/14/17 9:40	11,657	8.03	2.1	1,451	5,614
			DS-2	HIGH	4/20/17 8:50	1	4/14/17 9:55	8,147	8.04	2.1	1,013	3,904
			DS-7	HIGH	4/20/17 9:00	1	4/14/17 10:05	6,747	8.05	2.1	838	3,222
			DS-3	HIGH	4/20/17 9:10	2	4/14/17 10:30	6,217	8.06	2.1	772	2,945
			DS-4	HIGH	4/20/17 9:15	2	4/14/17 10:25	6,077	8.06	2.1	754	2,883
			DS-6	HIGH	4/20/17 9:25	2	4/14/17 10:20	6,247	8.07	2.1	774	2,969
			DS-8	HIGH	4/20/17 9:30	2	4/14/17 10:05	5,547	8.07	2.1	687	2,649
			DS-9	HIGH	5/17/17 11:45	1	5/9/17 13:30	5,552	35.16	27.2	158	204
			GAF-414C	HIGH	4/24/2017 13:15	8	4/14/2017 13:18	420	12.23	2.2	34	189
			GAF-415C	HIGH	4/24/2017 12:35	1	4/14/2017 15:45	1,320	12.20	2.3	108	567
			GAF-421L	HIGH	4/24/2017 13:15	11	4/14/2017 16:15	3,020	12.23	2.4	247	1,285
			GAF-419L	HIGH	5/22/2017 9:45	2	5/15/2017 10:05	3,520	40.08	33.1	88	106
			GAF-428L	LOW	5/22/17 11:15	1	5/15/17 11:55	5,150	40.14	33.2	128	155
			D2-CV-1	HIGH	5/31/17 8:15	5	5/22/17 9:45	3,690	49.02	40.1	75	92
			GAF-416C	LOW	6/28/17 9:10	1	6/14/17 10:25	1,625	77.06	63.1	21	26
			GAF-407L	LOW	6/28/17 16:10	1	6/15/17 10:30	2,173	77.35	64.1	28	34
D2-SH-22	4/19/17 10:00	Eosine (2 gallons)	D2-CV-1	HIGH	4/24/17 11:20	7	4/19/17 13:55	230	5.06	0.2	45	1,409
			GAF-23	LOW	5/31/17 16:15	1	5/22/17 11:55	1,960	42.26	33.1	46	59
			DS-16-6	LOW	6/28/17 10:15	1	6/21/17 10:10	6,640	70.01	63.0	95	105
GAF-405C	5/12/17 8:55	Sulphorhodamine B (2 gallons)	Dye Not Recoverd as of 7/6/17	NA	NA	NA	NA	NA	NA	NA	NA	NA
GAF-459C	5/10/17 9:40	Pyranine (2 gallons)	GAF-410U	HIGH	5/15/2017 12:20	7	5/8/2017 13:50	1,120	5.11	NA	219	NA
			GAF-446C	HIGH	5/22/2017 12:05	6	5/15/2017 12:30	1,160	12.10	5.1	96	227
			GAF-458C	HIGH	6/21/2017 12:00	2	6/14/2017 11:50	1,100	42.10	35.1	26	31
GAF-456C	5/23/17 8:55	Phloxine B (8 pounds)	Dye Not Recoverd as of 7/6/17	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table Source:
Hydrogeology Inc, September 2017. *TVA Gallatin Phase Zero/Phase 1 Dye Trace Study*, Table 3, Prepared for AECOM

Estimated Velocities - Phase 2 Dye Trace Study
TVA Gallatin Fossil Plant

Dye Introduction Location and Date	Dye Introduced and Quantity	Dye Recovery Location	Initial Detection Date	Straight-Line Distance from Introduction to Receptor (ft)	Velocity of Initial Dye Arrival (ft/day)	Number of Detections	Final Detection Date
Northeast Trace 3/25/2020	Fluorescein (14 lbs)	DS-4	3/31/2020 9:52	6140	2047	5	4/29/2020 9:34
		DS-6	3/31/2020 9:50	5920 (a)	1973 (a)	5	4/29/2020 9:33
		DS-7	3/31/2020 9:43	6620	2207	3	4/21/2020 9:42
		DS-7C	3/31/2020 9:46	6570	2170	3	4/21/2020 10:01
		DS-47	3/31/2020 9:54	6220	2073	7	5/26/2020 9:29
		DS-47C	3/31/2020 9:56	6210	2070	8	5/26/2020 9:31
		GAF-421L	4/14/2020 8:57	3500	206	5	6/9/2020 9:35
		GAF-511C	4/14/2020 10:30	270	16	2	6/9/2020 10:52
C1-SS-1/C1-SH-15 3/25/2020	Eosine (12 lbs)	C-7	5/11/2020 9:55	4800	109	2	6/16/2020 11:32
		DS-4	3/31/2020 9:52	5470 (a)	1823 (a)	1	4/29/2020 9:34
		DS-6	3/31/2020 9:50	5240 (a)	1733 (a)	1	3/31/2020 9:50
		DS-7	3/31/2020 9:43	5690	1897	1	4/21/2020 9:42
		DS-7C	3/31/2020 9:46	5630	1877	1	4/21/2020 10:01
		DS-10	6/16/2020 9:46	5860	73	1	6/16/2020 9:46
		DS-10C	6/16/2020 9:48	5900	74	1	6/16/2020 9:48
		DS-47	3/31/2020 9:54	5530	1843	1	5/26/2020 9:29
		DS-47C	3/31/2020 9:56	5570	1857	1	5/26/2020 9:31
		GAF-414C	4/14/2020 11:05	430	22	1	4/14/2020 11:05
GAF-455C 3/25/2020	Rhodamine WT (40 lbs)	GAF-401L	4/6/2020 8:26	1690	282	10	6/22/2020 11:50 (b)
		GAF-407L	5/18/2020 11:40	800	16	6	6/23/2020 9:21 (b)
		GAF-415C	4/14/2020 9:38	2240	204	1	4/14/2020 9:38
		GAF-418L	4/13/2020 8:35	5700	356	7	5/26/2020 8:55
		GAF-419L	3/30/2020 8:57	5070	2028	13	6/23/2020 8:40 (b)
		GAF-455N	4/6/2020 11:05	10	NA	12	6/22/2020 11:05 (b)
		GAF-514L	5/12/2020 12:20	6260	142	1	5/12/2020 12:20
D3-SH-42 3/25/2020	Sulforodamine B (16 lbs)	No Detections from Trace					

Notes:

All results are reported in the Phase 2 Dye Trace Report (Rev 1) by the Ozark Underground Laboratory (OUL).

Velocities provided for traces through Lower Carters and/or Lebanon Limestones.

(a) Corrected straight-line travel distances and velocities are shown on OUL's Detection Timeline figures; the values in the text portion of the OUL report reflect the original (uncorrected) distances reported by OUL.

(b) Dye detected on the final sampling event.

Appendix B
Memorandum: Groundwater Protection Standards

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Memorandum

To	Tennessee Valley Authority	Page 1
CC		
Subject	Gallatin Fossil Plant, Ash Pond Complex CCR Rule Groundwater Protection Standards	
From	A. Elizabeth Perry, PG Chris Garlington, PG	
Date	December 20, 2022	

In accordance with federal regulations for management of coal combustion residuals (the CCR Rule; 40 CFR 257), the Tennessee Valley Authority (TVA) is monitoring groundwater at the Ash Pond Complex (APC) at its Gallatin Fossil Plant (GAF) in Gallatin, Tennessee. The APC is currently in the Assessment phase of groundwater monitoring. Groundwater protection standards (GWPSs) for Appendix IV constituents were originally developed in October 2018. This memorandum presents updated GWPSs developed using the current certified statistical method.

The CCR Rule specifies that the GWPS is the published Maximum Contaminant Level (MCL). For parameters without a MCL, the CCR Rule provides published values of the GWPS. Both the MCLs and published GWPSs are provided on Table 1. However, the CCR Rule states that if background is higher than these published values, then a site-specific GWPS is developed based on background.

One constituent, lithium, is greater than the published GWPS in samples from some background wells. Therefore, background concentrations of lithium have been calculated using the statistical methods as certified under the CCR Rule for the GAF Ash Pond Complex (Rev. 1, dated December 15, 2022). The statistical Upper Tolerance Limits (UTLs) calculated for each background monitoring well, and the selected GWPS based on background, are provided on Table 2. As a result, the GWPS for lithium is the background value, as shown on Table 1. GWPSs for all other Appendix IV constituents are the published GWPS/MCL.

Table 1: Groundwater Protection Standards, GAF Ash Pond Complex

Appendix IV Constituent	MCL	Published GWPS (a)	Site-Specific Background	Final GWPS (c)
Antimony (ug/l)	6	NA	NA	6
Arsenic (ug/l)	10	NA	NA	10
Barium (ug/l)	2000	NA	NA	2000
Beryllium (ug/l)	4	NA	NA	4
Cadmium (ug/l)	5	NA	NA	5
Chromium (ug/l)	100	NA	NA	100
Cobalt (ug/l)	NA	6	NA	6
Fluoride (mg/l)	4	NA	NA	4
Lead (ug/l)	NA	15	NA	15
Lithium (ug/l)	NA	40	224 (b)	224
Mercury (ug/l)	2	NA	NA	2
Molybdenum (ug/l)	NA	100	NA	100
Radium-226+228 (pCi/l)	5	NA	NA	5
Selenium (ug/l)	50	NA	NA	50
Thallium (ug/l)	2	NA	NA	2

NA – Not applicable
(a) As published in the Federal Register July 30, 2018; 40 CFR 257.95(h)(2).
(b) See Table 2.
(c) Final GWPS is the maximum of background or the published GWPS/MCL (257.95(h)(3)).

Table 2
Development of Lithium Groundwater Protection Standard
Ash Pond Complex - CCR Rule
TVA Gallatin Fossil Plant

Monitoring Location	Analyte	Units	Number of Samples	Frequency of Detect (FOD) (a)	Minimum Detected Concentration	Maximum Detected Concentration	Data Distribution (b)	USEPA Appendix IV GWPS	Upper Tolerance Limit (UTL) (c)(d)
GAF-412C	Lithium	µg/L	24	18:24	6.88	60.7	Lognormal	40	224
GAF-412L	Lithium	µg/L	24	24:24	92.6	189	Normal	40	212
GAF-414L	Lithium	µg/L	24	24:24	64.9	107	Non-parametric	40	107
GAF-426C	Lithium	µg/L	22	18:22	10.2	19.2	Normal	40	19.5
GAF-426L	Lithium	µg/L	24	15:24	6.7	21.2	Normal	40	21.9
GAF-427C	Lithium	µg/L	24	15:24	6.7	58.5	Normal	40	62.1
GAF-427L	Lithium	µg/L	23	16:23	7.7	11.6	Normal	40	12.0
Background GWPS	**Lithium**	**µg/L**	NA						**224**

Notes:
GWPS = Groundwater Protection Standard
USEPA = United States Environmental Protection Agency
µg/L = micrograms per liter
Background GWPS developed using methods specified in the certified Groundwater Monitoring Statistical Method for the Ash Pond Complex (dated 12/15/2022).
(a) Frequency of Detect (FOD) is the ratio of samples with a detection to the total number of samples analyzed.
(b) Data distribution was evaluated using ProUCL.
(c) Upper Tolerance Limit (UTL) is an intra-well statistic with 95% coverage and 95% confidence (α= 0.05).
(d) ProUCL UTLs have been rounded to three significant figures (as reported by the analytical laboratory).

Appendix C
Appendix III and IV Background Concentration Ranges

Appendix C
Appendix III and IV Background Concentration Ranges
CCR Rule Groundwater Monitoring - Ash Pond Complex, 2016-2022
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Lebanon		Carters	
Appendix III & Appendix IV Constituents	**Units**	**Minimum Concentration**	**Maximum Concentration**	**Minimum Concentration**	**Maximum Concentration**
Antimony	ug/l	ND	0.929 J	ND	4.46
Arsenic	ug/l	ND	2.60 J	ND	1.73
Barium	ug/l	24.7	518	31	810
Beryllium	ug/l	All not detected		All not detected	
Boron	ug/l	32.6 J	455	ND	461
Cadmium	ug/l	All not detected		All not detected	
Calcium	mg/l	22.1	170	84.5	188
Chloride	mg/l	5.89	330	3.21	65.3
Chromium	ug/l	ND	7.74	ND	2.66
Cobalt	ug/l	ND	2.12	ND	2.5
Fluoride	mg/l	0.203	2.30	ND	1.27
Lead	ug/l	ND	2.45	ND	1.16
Lithium	ug/l	6.7	189	ND	60.7
Mercury	ug/l	ND	2.81	All not detected	
Molybdenum	ug/l	ND	10.5	ND	9.31
pH, Field	s.u.	6.52	8.30	6.43	7.71
Radium-226 + Radium-228	pCi/l	ND	2.35	ND	2.53 J
Selenium	ug/l	ND	0.443 J	ND	0.86 J
Sulfate	mg/l	4.49	275	25.6	322
Thallium	ug/l	ND	0.342 J	ND	0.065 J
Total Dissolved Solids	mg/l	332	864	319	843

Notes

J – Estimated value; quantitation is approximate due to limitations identified during data validation.

ND – minimum concentration is not detected. Detection limits vary.

Specific sample results are provided in Table 4 of this report and in the Annual Reports from 2017 to 2021.

Concentration ranges based on samples collected from November 2016 through September 2022.

Results from unfiltered samples only.

Appendix D
Evaluation of SSIs – January 2018

Table 1. Summary of Evaluation for SSIs over Background for Appendix III Constituents

Appendix III Constituent:	Boron	Calcium	pH	Sulfate	TDS
Unit	mg/L	mg/L	SU	mg/L	mg/L
Background Value (UPL)	0.173	147	7.71	322	843
Well ID	*First Detection Monitoring Round Results: Carters*				
24	0.0728 J	**246**	6.61	271 J	811
GAF-402C	**0.365**	76.6	7.12	50.5	276
GAF-405C	0.118	118	7.00	87.7	411
GAF-410U	**7.09**	105	6.73	80.8	437
GAF-416C	**0.523**	54.9	**8.08**	16.2	206
GAF-422C	**0.473**	121	7.05	144 J	421
GAF-446C	**6.11**	129	6.68	138	553
GAF-450C	**6.50**	**185**	6.76	**361**	797
GAF-451C	0.0605 J	**183**	6.82	248	**949**
GAF-452C	**0.247**	77.8	6.98	56.0	506
GAF-453C	0.0913	111	7.32	144	586
Appendix III Constituent:	Boron	Calcium	pH	Sulfate	TDS
Unit	mg/L	mg/L	SU	mg/L	mg/L
Background Value (UPL)	0.455	154	8.09	275	864
Well ID	*First Detection Monitoring Round Results: Lebanon*				
GAF-402L	0.290	90.7	7.19	53.5	398
GAF-406L	0.366	138	6.94	143	510
GAF-449L	**12.1**	98.8	6.78	170	482
GAF-450L	**7.95**	**170**	6.83	**332**	783
GAF-452L	0.0983	79.0	6.97	30.3	341

Bold and underlined concentration indicates an SSI over background (by aquifer).
UPL = Upper Prediction Limit
mg/L = milligrams per liter

Table presented in the 2017 Annual Report (AECOM, 2018). Fluoride and chloride are not listed as there were no SSIs for these constituents. Complete analytical results are provided in the 2017 Annual Report (AECOM, 2018).