AECOM

2021 Annual CCR Rule Groundwater Monitoring and Corrective Action Report Ash Pond Complex

Gallatin Fossil Plant
Gallatin, Tennessee

January 2022 – Rev 0

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	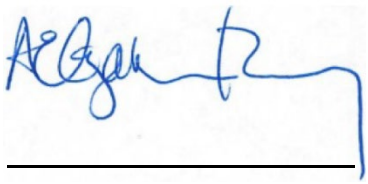	
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Revision History

Revision	Revision Date	Details
Rev. 0	01/28/2022	Initial Issue

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Table of Contents

Figures

Tables

Appendices

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 2021 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 2021 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. Because the unit is currently in Assessment monitoring, SSIs are no longer routinely evaluated.
  - 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. There are SSLs for arsenic in downgradient monitoring wells GAF-410U and GAF-450L. There have also been SSLs for cobalt (well GAF-450L) and lithium (GAF-452C), but these have 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 Semi-Annual Remedy Selection Progress Report (AECOM, 2022).
- 257.90(e)(6)(vi): Remedial activities were not initiated and are not on-going pursuant to 257.98 during the current annual reporting period.

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**). This report covers the compliance activities performed in 2021 and presents the monitoring activities planned for 2022.

In 2021, 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. Statistically Significant Levels (SSLs) above Groundwater Protections Standards (GWPSs) have been found in three downgradient wells. As described in the 2019 Annual Report for the APC, the SSLs for cobalt and lithium in wells GAF-450L and GAF-452C, respectively, were successfully shown to originate from an Alternate Source (AECOM, 2020). 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.

To comply with the CCR Rule, the following actions were taken in 2021:

- The 2020 Annual CCR Rule Groundwater Monitoring and Corrective Action Report (AECOM, 2021b) was completed in January 2021 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 2021, in January and July (AECOM, 2021a; AECOM, 2021c), 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 2021.
- Verification (confirmation) sampling was performed in May 2021.
- 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).
- Assessment monitoring results were evaluated in accordance with the CCR Rule (257.95).

Problems encountered and resolution:

- In 2021, TVA conducted downhole well and pump maintenance activities at many wells. As a result of these activities, well construction information was updated (for example, based on measured total well depths) where appropriate. These changes reflect record-keeping only; there were no changes in the actual wells themselves in 2021. **Table 1** reflects the current well construction details and pump intake settings.

The following activities are planned for 2022 to comply with CCR Rule groundwater monitoring and corrective action requirements:

- This 2021 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 2022, in accordance with 257.95. The groundwater analytical data obtained in 2022 will be evaluated using appropriate 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 2022, will be completed in January 2023.

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 (40 CFR 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, 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 2021 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 2021 are presented on **Table 2**.

The 2021 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**).

Verification (confirmation) sampling was conducted in May 2021 to evaluate a potential SSIs in the sampling results from March.

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, maps for the Carters and Lebanon Limestones showing the generalized direction of the hydraulic gradient based on groundwater elevations measured in March 2021. 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 TestAmerica 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

Groundwater monitoring at the APC is currently in the Assessment phase. Concentrations of Appendix IV constituents are compared to Groundwater Protection Standards (GWPSs) to identify Statistically Significant Levels (SSLs) above GWPSs in accordance with 257.95(g). GWPSs were established in 2018 (AECOM, 2019a), and are provided in **Appendix B**.

For each of the 2021 Assessment monitoring events, Appendix IV constituent results were compared to the established GWPSs to identify SSLs in accordance with 257.95(g). Based on recommendations in the USEPA's Unified Guidance (USEPA, 2009), SSLs were identified where there was 95% confidence that the mean concentration of an Appendix IV constituent in a well exceeded the GWPS. Where an individual Assessment monitoring result was greater than the GWPS, upper and lower confidence levels on the mean were calculated using the most recent two years of data at that well (e.g., for September 2021, the data from September 2019 to September 2021 (including any verification results) were used in the calculation). Where verification sampling was performed, the verification result was used in the initial comparison to the GWPS. The identified SSLs for March 2021 are provided on **Table 5**. The September 2021 SSLs are provided on **Table 6**.

There was one new SSL identified in the 2021 Assessment monitoring, arsenic in well GAF-450L. All other SSLs are the same as those identified in the 2018, 2019, and 2020 monitoring (AECOM, 2021b). The APC has been shown not to be the source of the SSLs for cobalt and lithium in wells GAF-450L and GAF-452C, respectively (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 GWPS 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 2021, 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) 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.

In 2021, one new SSL was identified; arsenic was detected in well GAF-450L at levels statistically greater than the GWPS. The finding of a second well with arsenic above the GWPS does not change the evaluation and conclusions of the Assessment of Corrective Measures. The potential remedial technologies to address the arsenic SSL observed at monitoring wells

GAF-410U presented in the Assessment of Corrective Measures Report also apply to the SSL for arsenic at monitoring well GAF-450L.

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 2021, in January and July (AECOM, 2021a; AECOM, 2021c) and were placed on the publicly accessible CCR Rule website as specified in 257.107.

A revised Closure Plan has been prepared for the APC as a result of an agreement between TVA and the Tennessee Department of Environment and Conservation (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 40 CFR § 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.

Consistent with the requirements of 40 CFR 257.102(c), potentially impacted underlying material will be addressed. Post-excavation surfaces will be graded to promote positive drainage, and permanent vegetation or permanent stabilization will be established.

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 have been provided in an Environmental Assessment Report which was submitted to TDEC in 2021 (TVA, 2021).

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

> The environmental investigation included characterization of the porewater within the APC (ash porewater) that would be the source of potential impacts to groundwater. These data are presented in the Environmental Assessment Report (TVA, 2021). 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, 2022).

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 2021 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 and completed an Alternate Source Demonstration 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 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.

7. References

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Brahana and Bradley, 1986. Preliminary Delineation and Description of the Regional Aquifers of Tennessee – The Central Basin Aquifer System. Prepared by the United States Geological Survey in cooperation with the USEPA. USGS Water Resources Investigations Report 82-4002.

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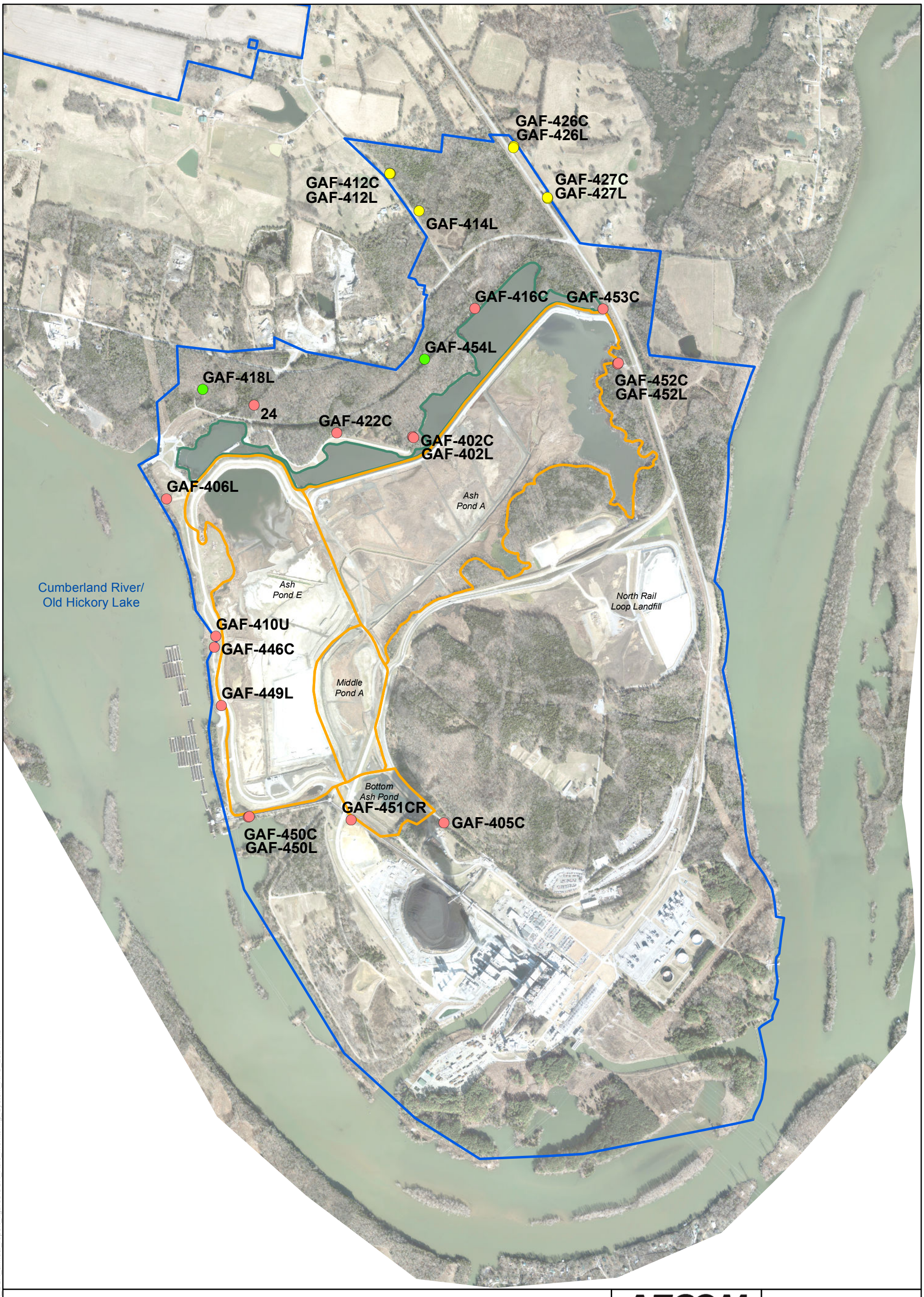
Figures



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

NOTE: Aerial image dated February 2017

N

0 1,200 2,400

Feet

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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:
12/3/2021	FOSSIL AND HYDRO ENGINEERING

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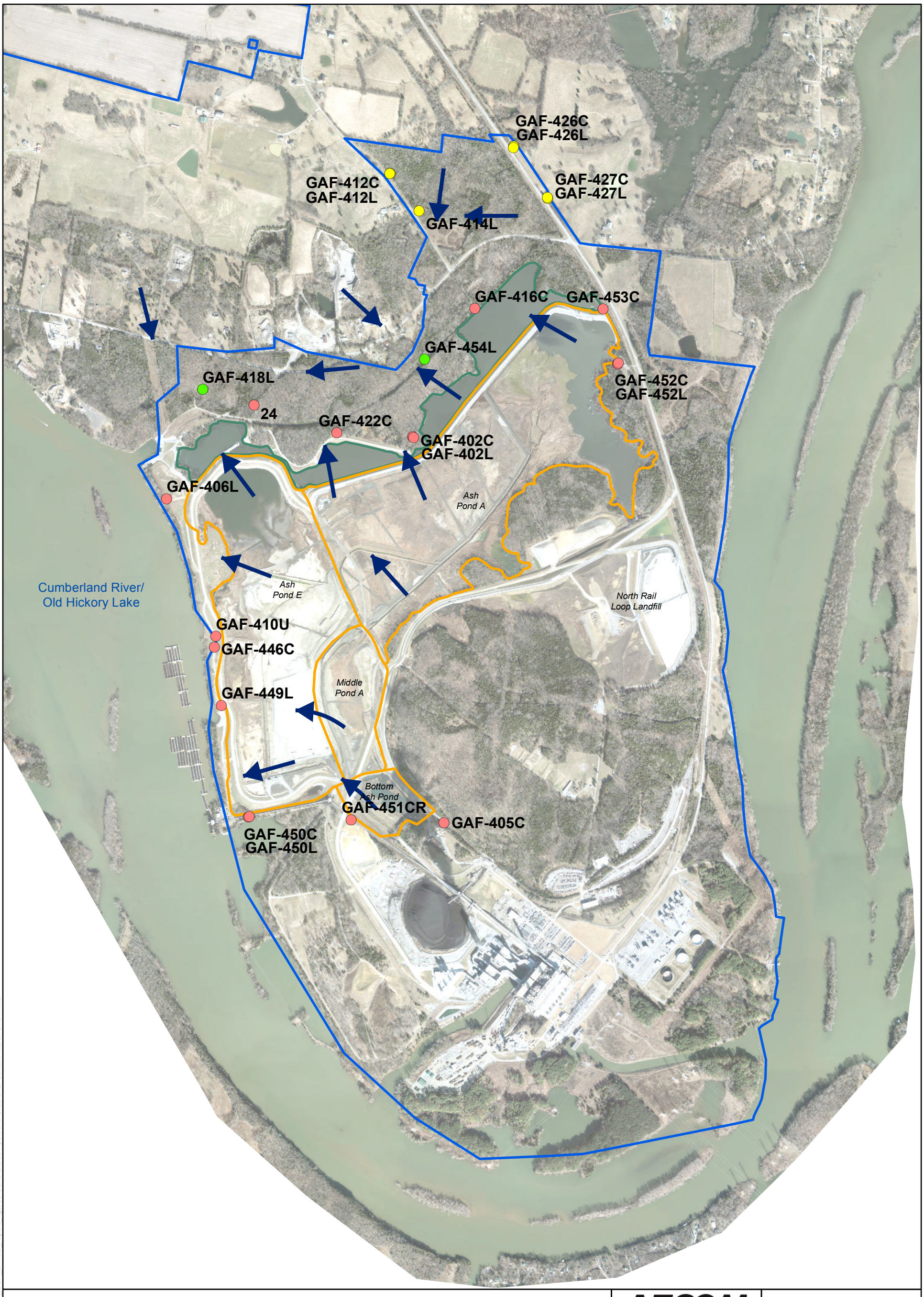

LEGEND

- CCR Rule Monitoring System - Downgradient Well
- CCR Rule Monitoring System - Background Well
- Other Monitoring Well
- Groundwater Flow Direction
- 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 2

GENERALIZED HYDRAULIC GRADIENTS – CARTERS AQUIFER, MARCH 2021

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

DATE:	DEPT:
12/6/2021	FOSSIL AND HYDRO ENGINEERING

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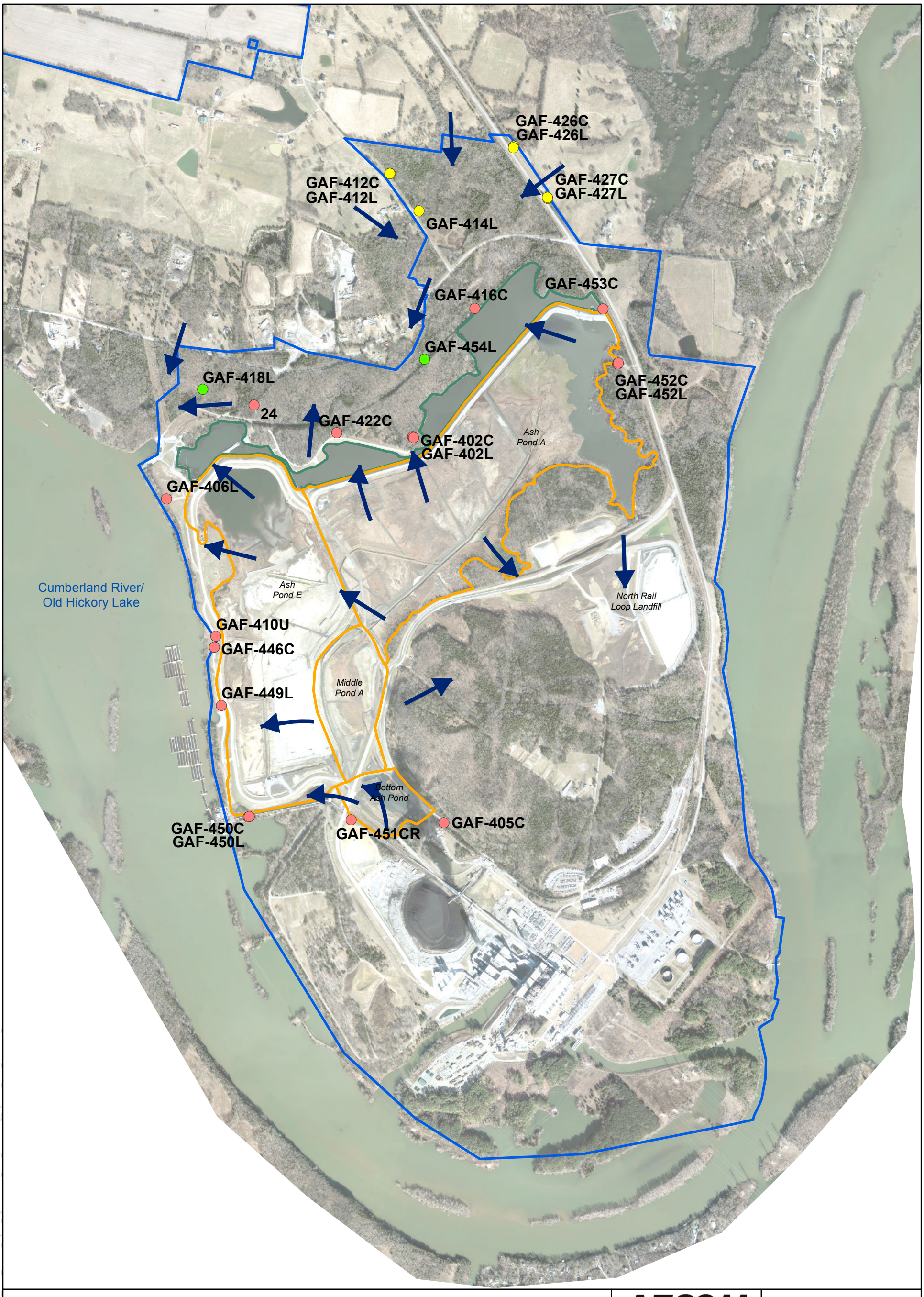

LEGEND

- 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
- Groundwater Flow Direction

N

0 1,200 2,400
Feet

NOTE: Aerial image dated February 2017

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Figure 3

GENERALIZED HYDRAULIC GRADIENTS – LEBANON AQUIFER, MARCH 2021

DRAWN BY:	REVIEWED BY:	APPROVED BY:	REVISION NUMBER:
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GALLATIN FOSSIL PLANT
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12/6/2021	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 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	41.8	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 construction updates based on video survey, etc.).

Table 2
Groundwater Sampling Summary - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Sample Dates	Groundwater Gauging Date	Monitoring Program	Constituents Analyzed	Number of Wells Sampled
March 23-29, 2021	March 22, 2021	Assessment Monitoring (257.95)	Appendix III, Appendix IV, Iron, Manganese, major ions, and field parameters	Background: 7 Downgradient: 16 Facility Boundary: 2
May 12, 2021	May 11, 2021	Verification (Confirmation) Sampling (257.94 (e)(2))	Arsenic and field parameters	Background: 0 Downgradient: 1 Facility Boundary: 0
September 22-27, 2021	September 20, 2021	Assessment Monitoring (257.95)	Appendix III, Appendix IV, Aluminum, Iron, Manganese, Strontium 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

Table 3
Groundwater Elevation Summary - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Gauging Date	3/22/2021			5/11/2021			9/20/2021 (c)		
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	18.57	445.56	464.13	18.31	445.82	464.13	19.54	444.59
GAF-402C	464.03	14.21	449.82	464.03	14.21	449.82	464.03	15.95	448.08
GAF-402L	464.93	15.90	449.03	464.93	15.75	449.18	464.93	17.03	447.90
GAF-405C	486.46	4.87	481.59	486.46	4.21	482.25	486.46	3.51	482.95
GAF-406L	471.54	26.32	445.22	471.54	26.52 (b)	445.02 (b)	471.54	26.84	444.70
GAF-410U	458.51	3.16	455.35	458.51	3.02	455.49	458.51	4.25	454.26
GAF-412C	477.64	29.61	448.03	477.64	29.71	447.93	477.64	28.58	449.06
GAF-412L	477.58	25.72	451.86	477.58	26.11	451.47	477.58	25.95	451.63
GAF-414L	481.45	33.31	448.14	481.45	32.31	449.14	481.45	33.45	448.00
GAF-416C	466.87	18.54	448.33	466.87	19.21	447.66	466.87	20.79	446.08
GAF-418L	459.59	14.62	444.97	459.59	14.25	445.34	459.59	15.35	444.24
GAF-422C	463.78	18.96	444.82	463.78	18.15	445.63	463.78	19.12	444.66
GAF-426C	505.58	36.35	469.23	505.58	39.12	466.46	505.58	45.28	460.30
GAF-426L	506.83	44.31	462.52	506.83	46.72	460.11	506.83	51.45	455.38
GAF-427C	489.76	38.95	450.81	489.76	39.11	450.65	489.76	41.63	448.13
GAF-427L	488.41	32.31	456.10	488.41	33.04	455.37	488.41	37.48	450.93
GAF-446C	461.06	6.22	454.84	461.06	6.05	455.01	461.06	6.74	454.32
GAF-449L	463.09	8.60	454.49	463.09	8.22	454.87	463.09	9.52	453.57
GAF-450C	466.73	19.07	447.66	466.73	18.80	447.93	466.73	19.46	447.27
GAF-450L	466.62	14.66	451.96	466.62	14.39	452.23	466.62	15.42	451.20
GAF-451CR	482.19	6.22	475.97	482.19	6.04	476.15	482.19	6.64	475.55
GAF-452C	484.13	26.42	457.71	484.13	26.84	457.29	484.13	30.92	453.21
GAF-452L	484.31	26.56	457.75	484.31	29.98 (b)	454.33 (b)	484.31	31.03	453.28
GAF-453C	467.78	9.81	457.97	467.78	10.82	456.96	467.78	14.77	453.01
GAF-454L	463.91	18.45	445.46	463.91	18.10	445.81	463.91	19.09	444.82
Surface Water ID									
CUMBERLAND RIVER (a)	NA	NA	444.95	NA	NA	445.46	NA	NA	444.37

Notes:
AMSL - above mean sea level
ft - feet
NA - Not applicable or data not available
(a) Data downloaded from TVA's iSite Central Database
(b) Suspected field measurement error
(c) Substantial precipitation took place during the gauging event. Water levels that appear unusually high are believed to be influenced by rainfall infiltration and not measurement errors.

Table 4
Assessment Monitoring and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	24	24	GAF-402C	GAF-402C	GAF-402C	GAF-402C
		Sample Date	3/23/2021	9/22/2021	3/23/2021	3/23/2021	9/22/2021	9/22/2021
		Well Location	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient
		Sample ID	GAF-GW-GAF-24-03232021	GAF-GW-24-09222021	GAF-GW-GAF-402C-03232021	GAF-GW-FD01-03232021	GAF-GW-GAF-402C-09222021	GAF-GW-FD02-09222021
		Sample Type	N	N	N	FD	N	FD
Analyte	**CAS**	**UNITS**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Field								
Dissolved Oxygen	DO	mg/L	2.54	0.58	2.01	--	1.48	--
Dissolved Oxygen	DO_%	%	--	5.8	--	--	14.9	--
ORP	ORP	mV	40.9	133.7	32.1	--	164.0 J	--
PH-FIELD	PH-FIELD	pH Units	6.80	6.66	7.49	--	7.03 J	--
Specific Cond. (Field)	COND	umhos/cm	890	999.3	494.2	--	549.4	--
Temperature	TEMP	DEG_C	13.9	15.4	13.7	--	16.9	--
Turbidity, field	TURB-FIELD	NTU	0.89	0.33	2.36	--	0.27	--
General Chemistry								
Carbonate as CaCO3	ALKC	mg/L	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
Alkalinity as CaCO3	ALK	mg/L	332	384	184	186	229	229
Bicarbonate as CaCO3	ALKB	mg/L	332	384	184	186	229	229
Total Dissolved Solids	TDS	mg/L	635	718	308	308	367	371
Total Suspended Solids	TSS	mg/L	--	0.500 U	--	--	0.500	0.500 U
Chloride	16887-00-6	mg/L	0.748 J	0.920 J	3.69	3.65	2.63	2.66
Fluoride	16984-48-8	mg/L	0.0276 U*	0.0260 UJ	0.189 U*	0.209 U*	0.218	0.197 U*
Sulfate	14808-79-8	mg/L	195	224	83.9	83.9	80.2 J	82.4 J
Metals								
Antimony	7440-36-0	mg/L	0.000378 U	0.000378 U	0.000378 U	0.000378 U	0.000378 U	0.000378 U
Arsenic	7440-38-2	mg/L	0.000336 J	0.000313 U	0.000733 J	0.000741 J	0.00361	0.00330
Barium	7440-39-3	mg/L	0.0125	0.0188	0.0482	0.0501	0.0792	0.0765
Beryllium	7440-41-7	mg/L	0.000182 U	0.000182 U	0.000182 U	0.000182 U	0.000182 U	0.000182 U
Boron	7440-42-8	mg/L	0.0502 U*	0.0421 U*	0.444	0.456	0.811	0.748
Cadmium	7440-43-9	mg/L	0.000217 U	0.000217 U	0.000217 U	0.000217 U	0.000217 U	0.000217 U
Calcium	7440-70-2	mg/L	188	216	86.0	87.6	104	100
Chromium	7440-47-3	mg/L	0.00153 U	0.00153 U	0.00153 U	0.00153 U	0.00153 U	0.00153 U
Cobalt	7440-48-4	mg/L	0.000134 U	0.000134 U	0.000134 U	0.000134 U	0.00120	0.00108
Iron	7439-89-6	mg/L	0.0195 U	0.0195 U	0.0195 U	0.0195 U	0.213 U*	0.207 U*
Lead	7439-92-1	mg/L	0.000128 U	0.000128 U	0.000128 U	0.000128 U	0.000177 U*	0.000128 U
Lithium	7439-93-2	mg/L	0.00339 U	0.00339 U	0.00339 U	0.00339 U	0.00339 U	0.00339 U
Magnesium	7439-95-4	mg/L	7.60	8.27	6.58	6.62	8.34	8.11
Manganese	7439-96-5	mg/L	0.106	0.00944	0.0576	0.0589	1.74	1.69
Mercury	7439-97-6	mg/L	0.000130 U	0.000130 UJ	0.000130 U	0.000130 U	0.000130 UJ	0.000130 UJ
Molybdenum	7439-98-7	mg/L	0.00175 J	0.00176 J	0.0113	0.0115	0.0247	0.0234
Potassium	7440-09-7	mg/L	0.831	0.898	1.73	1.75	2.48	2.40
Selenium	7782-49-2	mg/L	0.00151 U	0.00151 U	0.00151 U	0.00151 U	0.00151 U	0.00151 U
Sodium	7440-23-5	mg/L	1.09	1.42	8.03	8.19	10.3	10.0
Strontium	7440-24-6	mg/L	0.191	0.224	0.362	0.362	0.481 J	0.470 J
Thallium	7440-28-0	mg/L	0.000357 U*	0.000148 U	0.000148 U	0.000148 U	0.000423 U*	0.000148 U
Radiological								
Radium-226	13982-63-3	pCi/L	-0.103 U	0.0820 U	0.184 U	0.0435 U	0.368 U	-0.487 U
Radium 228	15262-20-1	pCi/L	0.136 U	-0.0623 U	1.29 J	0.471 UJ	0.0416 U	-0.347 U
Radium 226 + Radium 228	RA226/228	pCi/L	0.136 U	0.0820 U	1.47 J	0.515 UJ	0.409 U	0.000 U

Table 4
Assessment Monitoring and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	24	24	GAF-402C	GAF-402C	GAF-402C	GAF-402C
		Sample Date	3/23/2021	9/22/2021	3/23/2021	3/23/2021	9/22/2021	9/22/2021
		Well Location	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient
		Sample ID	GAF-GW-GAF-24-03232021	GAF-GW-24-09222021	GAF-GW-GAF-402C-03232021	GAF-GW-FD01-03232021	GAF-GW-GAF-402C-09222021	GAF-GW-FD02-09222021
		Sample Type	N	N	N	FD	N	FD
Analyte	CAS	UNITS	Result	Result	Result	Result	Result	Result
Metals Dissolved								
Antimony	7440-36-0	mg/L	--	--	--	--	--	--
Arsenic	7440-38-2	mg/L	--	--	--	--	--	--
Barium	7440-39-3	mg/L	--	--	--	--	--	--
Beryllium	7440-41-7	mg/L	--	--	--	--	--	--
Boron	7440-42-8	mg/L	--	--	--	--	--	--
Cadmium	7440-43-9	mg/L	--	--	--	--	--	--
Calcium	7440-70-2	mg/L	--	--	--	--	--	--
Chromium	7440-47-3	mg/L	--	--	--	--	--	--
Cobalt	7440-48-4	mg/L	--	--	--	--	--	--
Iron	7439-89-6	mg/L	--	--	--	--	--	--
Lead	7439-92-1	mg/L	--	--	--	--	--	--
Lithium	7439-93-2	mg/L	--	--	--	--	--	--
Magnesium	7439-95-4	mg/L	--	--	--	--	--	--
Manganese	7439-96-5	mg/L	--	--	--	--	--	--
Mercury	7439-97-6	mg/L	--	--	--	--	--	--
Molybdenum	7439-98-7	mg/L	--	--	--	--	--	--
Potassium	7440-09-7	mg/L	--	--	--	--	--	--
Selenium	7782-49-2	mg/L	--	--	--	--	--	--
Sodium	7440-23-5	mg/L	--	--	--	--	--	--
Thallium	7440-28-0	mg/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 and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	GAF-402L	GAF-402L	GAF-405C	GAF-405C
		Sample Date	3/23/2021	9/22/2021	3/24/2021	9/22/2021
		Well Location	Downgradient	Downgradient	Downgradient	Downgradient
		Sample ID	GAF-GW-GAF-402L-03232021	GAF-GW-GAF-402L-09222021	GAF-GW-GAF-405C-03242021	GAF-GW-GAF-405C-09222021
		Sample Type	N	N	N	N
Analyte	**CAS**	**UNITS**	**Result**	**Result**	**Result**	**Result**
Field						
Dissolved oxygen	DO	mg/L	0.23	0.16	0.30	2.15
Dissolved Oxygen	DO_%	%	--	1.7	--	23.9
ORP	ORP	mV	-160.8	159.6 J	98.8	67.6
PH-FIELD	PH-FIELD	pH Units	7.90	7.13 J	6.93	6.67
Specific Cond. (Field)	COND	umhos/cm	638	628	900	776
Temperature	TEMP	DEG_C	15.2	16.5	16.4	19.6
Turbidity, field	TURB-FIELD	NTU	124.6	66.4	18.6	10.5 J
General Chemistry						
Carbonate as CaCO3	ALKC	mg/L	5.00 U	5.00 U	5.00 U	5.00 U
Alkalinity as CaCO3	ALK	mg/L	234	268	252	320
Bicarbonate as CaCO3	ALKB	mg/L	234	268	252	320
Total Dissolved Solids	TDS	mg/L	350	376	692	494
Total Suspended Solids	TSS	mg/L	--	61.0	--	18.4
Chloride	16887-00-6	mg/L	15.6	16.4	4.58	6.91
Fluoride	16984-48-8	mg/L	0.286	0.282	0.129 U*	0.143 U*
Sulfate	14808-79-8	mg/L	67.8	60.4 J	248	115 J
Metals						
Antimony	7440-36-0	mg/L	0.000378 U	0.000378 U	0.000378 U	0.000378 U
Arsenic	7440-38-2	mg/L	0.00199	0.00158	0.000467 J	0.000313 U
Barium	7440-39-3	mg/L	0.332	0.294	0.0681	0.0615
Beryllium	7440-41-7	mg/L	0.000207 J	0.000182 U	0.000182 U	0.000182 U
Boron	7440-42-8	mg/L	0.229	0.228	0.0666 U*	0.127 U*
Cadmium	7440-43-9	mg/L	0.000217 U	0.000217 U	0.000217 U	0.000217 U
Calcium	7440-70-2	mg/L	82.5	82.1	200	144
Chromium	7440-47-3	mg/L	0.00345	0.00180 J	0.00153 U	0.00153 U
Cobalt	7440-48-4	mg/L	0.00142	0.000849	0.000239 J	0.000395 J
Iron	7439-89-6	mg/L	4.83	2.91	1.25	0.312
Lead	7439-92-1	mg/L	0.00325	0.00171	0.00214	0.000896 J
Lithium	7439-93-2	mg/L	0.0145	0.0116	0.00339 U	0.00339 U
Magnesium	7439-95-4	mg/L	27.6	23.4	13.4	12.7
Manganese	7439-96-5	mg/L	0.247	0.323	0.193	0.603
Mercury	7439-97-6	mg/L	0.000130 U	0.000130 U	0.000130 U	0.000130 UJ
Molybdenum	7439-98-7	mg/L	0.00318 J	0.00367 J	0.000610 U	0.000610 U
Potassium	7440-09-7	mg/L	3.51	2.77	1.50	2.43
Selenium	7782-49-2	mg/L	0.00151 U	0.00151 U	0.00151 U	0.00151 U
Sodium	7440-23-5	mg/L	17.4	18.0	5.10	7.79
Strontium	7440-24-6	mg/L	0.901	0.786 J	0.319	0.346 J
Thallium	7440-28-0	mg/L	0.000148 U	0.000148 U	0.000148 U	0.000148 U
Radiological						
Radium-226	13982-63-3	pCi/L	0.500 U	0.653	0.756 U	0.738
Radium 228	15262-20-1	pCi/L	0.193 UJ	0.0881 U	0.629 U*	0.380 U
Radium 226 + Radium 228	RA226/228	pCi/L	0.693 UJ	0.741 J	1.38 U*	1.12 J

Table 4
Assessment Monitoring and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	GAF-402L	GAF-402L	GAF-405C	GAF-405C
		Sample Date	3/23/2021	9/22/2021	3/24/2021	9/22/2021
		Well Location	Downgradient	Downgradient	Downgradient	Downgradient
		Sample ID	GAF-GW-GAF-402L-03232021	GAF-GW-GAF-402L-09222021	GAF-GW-GAF-405C-03242021	GAF-GW-GAF-405C-09222021
		Sample Type	N	N	N	N
Analyte	CAS	UNITS	Result	Result	Result	Result
Metals Dissolved						
Antimony	7440-36-0	mg/L	0.000378 U	0.000378 U	0.000378 U	0.000378 U
Arsenic	7440-38-2	mg/L	0.00120	0.00140	0.000313 U	0.000313 U
Barium	7440-39-3	mg/L	0.292	0.274	0.0668	0.0603
Beryllium	7440-41-7	mg/L	0.000182 U	0.000182 U	0.000182 U	0.000182 U
Boron	7440-42-8	mg/L	0.234	0.301	0.0640 J	0.109
Cadmium	7440-43-9	mg/L	0.000217 U	0.000217 U	0.000217 U	0.000217 U
Calcium	7440-70-2	mg/L	78.6	83.3	196	145
Chromium	7440-47-3	mg/L	0.00153 U	0.00153 U	0.00153 U	0.00153 U
Cobalt	7440-48-4	mg/L	0.000292 U*	0.000453 J	0.000134 U	0.000287 J
Iron	7439-89-6	mg/L	1.07	1.16	0.0205 J	0.0195 U
Lead	7439-92-1	mg/L	0.000191 U*	0.000443 J	0.000128 U	0.000128 U
Lithium	7439-93-2	mg/L	0.0101	0.0102	0.00339 U	0.00339 U
Magnesium	7439-95-4	mg/L	24.5	22.7	13.4	13.0
Manganese	7439-96-5	mg/L	0.248	0.361	0.168	0.549
Mercury	7439-97-6	mg/L	0.000130 U	0.000130 U	0.000130 U	0.000130 U
Molybdenum	7439-98-7	mg/L	0.00361 J	0.00426 J	0.000610 U	0.000610 U
Potassium	7440-09-7	mg/L	2.34	2.32	1.46	2.40
Selenium	7782-49-2	mg/L	0.00151 U	0.00151 U	0.00151 U	0.00151 U
Sodium	7440-23-5	mg/L	16.2	18.3	5.17	7.82
Thallium	7440-28-0	mg/L	0.000190 U*	0.000259 U*	0.000148 U	0.000148 U
Radiological Dissolved						
Radium-226	13982-63-3	pCi/L	0.311 U	0.504 U	0.645 U	0.00854 U
Radium 228	15262-20-1	pCi/L	2.16 J	0.486 U	0.479 U	0.312 U
Radium 226 + Radium 228	RA226/228	pCi/L	2.47 J	0.989 U	1.12 U	0.320 U

Table 4
Assessment Monitoring and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	GAF-406L	GAF-406L	GAF-406L	GAF-406L	GAF-410U	GAF-410U
		Sample Date	3/23/2021	3/23/2021	9/22/2021	9/22/2021	3/23/2021	9/22/2021
		Well Location	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient
		Sample ID	GAF-GW-GAF-406L-03232021	GAF-GW-FD03-03232021	GAF-GW-GAF-406L-09222021	GAF-GW-FD03-09222021	GAF-GW-GAF-410U-03232021	GAF-GW-GAF-410U-09222021
		Sample Type	N	FD	N	FD	N	N
Analyte	**CAS**	**UNITS**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Field								
Dissolved oxygen	DO	mg/L	0.46	--	0.25	--	0.31	0.85
Dissolved Oxygen	DO_%	%	--	--	2.5	--	--	8.9
ORP	ORP	mV	102.0	--	43.0	--	-48.2	-59.0
PH-FIELD	PH-FIELD	pH Units	7.01	--	6.74	--	6.99	6.59
Specific Cond. (Field)	COND	umhos/cm	737	--	854	--	621	738
Temperature	TEMP	DEG_C	16.2	--	16.9	--	16.1	18.9
Turbidity, field	TURB-FIELD	NTU	1.58	--	1.76 J	--	3.61	1.62 J
General Chemistry								
Carbonate as CaCO3	ALKC	mg/L	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
Alkalinity as CaCO3	ALK	mg/L	234	262	263	259	258	273
Bicarbonate as CaCO3	ALKB	mg/L	234	262	263	259	258	273
Total Dissolved Solids	TDS	mg/L	541	534	583	595	428	450
Total Suspended Solids	TSS	mg/L	--	--	1.50	1.30	--	5.10
Chloride	16887-00-6	mg/L	3.83	3.76	4.33	4.16	6.81	6.37
Fluoride	16984-48-8	mg/L	0.109 U*	0.108 U*	0.100 U*	0.0937 U*	0.148 U*	0.149 U*
Sulfate	14808-79-8	mg/L	186	184	214 J	192 J	97.5	93.6 J
Metals								
Antimony	7440-36-0	mg/L	0.000378 U	0.000378 U	0.000378 U	0.000378 U	0.000378 U	0.000378 U
Arsenic	7440-38-2	mg/L	0.000488 J	0.000346 J	0.000313 U	0.000313 U	0.0364	0.0283
Barium	7440-39-3	mg/L	0.0327	0.0326	0.0331	0.0332	0.0607	0.0610
Beryllium	7440-41-7	mg/L	0.000182 U	0.000182 U	0.000182 U	0.000182 U	0.000182 U	0.000182 U
Boron	7440-42-8	mg/L	0.321	0.315	0.322	0.325	8.42	7.80
Cadmium	7440-43-9	mg/L	0.000217 U	0.000217 U	0.000217 U	0.000217 U	0.000217 U	0.000217 U
Calcium	7440-70-2	mg/L	148	145	163	162	88.4	96.5
Chromium	7440-47-3	mg/L	0.00153 U	0.00153 U	0.00153 U	0.00153 U	0.00153 U	0.00153 U
Cobalt	7440-48-4	mg/L	0.000239 J	0.000217 J	0.000134 U	0.000134 U	0.00131	0.00149
Iron	7439-89-6	mg/L	0.0877 U*	0.0449 U*	0.0207 U*	0.0195 U	2.77	2.64
Lead	7439-92-1	mg/L	0.000213 J	0.000153 J	0.000128 U	0.000141 U*	0.000156 J	0.000128 U
Lithium	7439-93-2	mg/L	0.00339 U	0.00339 U	0.00339 U	0.00339 U	0.00339 U	0.00339 U
Magnesium	7439-95-4	mg/L	9.61	9.58	9.71	9.85	5.12	5.10
Manganese	7439-96-5	mg/L	0.269	0.274	0.133	0.133	5.02	5.35
Mercury	7439-97-6	mg/L	0.000130 U	0.000130 U	0.000130 UJ	0.000130 UJ	0.000130 U	0.000130 UJ
Molybdenum	7439-98-7	mg/L	0.00173 J	0.00171 J	0.00144 J	0.00147 J	0.0564	0.0486
Potassium	7440-09-7	mg/L	2.13	2.13	2.10	2.13	2.00	2.06
Selenium	7782-49-2	mg/L	0.00151 U	0.00151 U	0.00151 U	0.00151 U	0.00151 U	0.00151 U
Sodium	7440-23-5	mg/L	7.68	7.79	8.14	8.23	48.0	45.4
Strontium	7440-24-6	mg/L	0.244	0.244	0.263 J	0.262 J	0.168	0.174 J
Thallium	7440-28-0	mg/L	0.000194 U*	0.000148 U	0.000148 U	0.000148 U	0.000148 U	0.000244 J
Radiological								
Radium-226	13982-63-3	pCi/L	0.374 U	0.400 U	0.253 U	0.656 U	-0.122 U	-0.00597 U
Radium 228	15262-20-1	pCi/L	1.92 J	0.466 UJ	0.360 U	0.275 U	0.618 U	-0.0696 U
Radium 226 + Radium 228	RA226/228	pCi/L	2.29 J	0.866 UJ	0.613 U	0.931 U	0.618 U	0.000 U

Table 4
Assessment Monitoring and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	GAF-406L	GAF-406L	GAF-406L	GAF-406L	GAF-410U	GAF-410U
		Sample Date	3/23/2021	3/23/2021	9/22/2021	9/22/2021	3/23/2021	9/22/2021
		Well Location	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient
		Sample ID	GAF-GW-GAF-406L-03232021	GAF-GW-FD03-03232021	GAF-GW-GAF-406L-09222021	GAF-GW-FD03-09222021	GAF-GW-GAF-410U-03232021	GAF-GW-GAF-410U-09222021
		Sample Type	N	FD	N	FD	N	N
Analyte	**CAS**	**UNITS**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Metals Dissolved								
Antimony	7440-36-0	mg/L	--	--	--	--	--	--
Arsenic	7440-38-2	mg/L	--	--	--	--	--	--
Barium	7440-39-3	mg/L	--	--	--	--	--	--
Beryllium	7440-41-7	mg/L	--	--	--	--	--	--
Boron	7440-42-8	mg/L	--	--	--	--	--	--
Cadmium	7440-43-9	mg/L	--	--	--	--	--	--
Calcium	7440-70-2	mg/L	--	--	--	--	--	--
Chromium	7440-47-3	mg/L	--	--	--	--	--	--
Cobalt	7440-48-4	mg/L	--	--	--	--	--	--
Iron	7439-89-6	mg/L	--	--	--	--	--	--
Lead	7439-92-1	mg/L	--	--	--	--	--	--
Lithium	7439-93-2	mg/L	--	--	--	--	--	--
Magnesium	7439-95-4	mg/L	--	--	--	--	--	--
Manganese	7439-96-5	mg/L	--	--	--	--	--	--
Mercury	7439-97-6	mg/L	--	--	--	--	--	--
Molybdenum	7439-98-7	mg/L	--	--	--	--	--	--
Potassium	7440-09-7	mg/L	--	--	--	--	--	--
Selenium	7782-49-2	mg/L	--	--	--	--	--	--
Sodium	7440-23-5	mg/L	--	--	--	--	--	--
Thallium	7440-28-0	mg/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 and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	GAF-412C	GAF-412C	GAF-412L	GAF-412L	GAF-414L	GAF-414L
		Sample Date	3/24/2021	9/23/2021	3/26/2021	9/23/2021	3/26/2021	9/27/2021
		Well Location	Background	Background	Background	Background	Background	Background
		Sample ID	GAF-GW-GAF-412C-03242021	GAF-GW-GAF-412C-09232021	GAF-GW-GAF-412L-03262021	GAF-GW-GAF-412L-09232021	GAF-GW-GAF-414L-03262021	GAF-GW-GAF-414L-09272021
		Sample Type	N	N	N	N	N	N
Analyte	CAS	UNITS	Result	Result	Result	Result	Result	Result
Field								
Dissolved oxygen	DO	mg/L	1.19	0.03	0.09	0	0.35	1.90
Dissolved Oxygen	DO_%	%	--	0.3	--	-3.0	--	19.8
ORP	ORP	mV	8.2	44.1	-327.2	-331.7	-184.2	179.2 J
PH-FIELD	PH-FIELD	pH Units	6.81	6.94	7.85	7.67	7.54	7.20
Specific Cond. (Field)	COND	umhos/cm	710	546.1	621	908	832	
Temperature	TEMP	DEG_C	17.1	16.0	14.8	16.8	13.9	15.2
Turbidity, field	TURB-FIELD	NTU	4.33	1.90	2.23	2.45	1.31	0.45
General Chemistry								
Carbonate as CaCO3	ALKC	mg/L	5.00 U	5.00 U	5.00 UJ	5.00 U	5.00 U	5.00 U
Alkalinity as CaCO3	ALK	mg/L	313	292	269 J	325	322	298
Bicarbonate as CaCO3	ALKB	mg/L	313	292	269 J	325	322	298
Total Dissolved Solids	TDS	mg/L	415	326	352	524	454	764
Total Suspended Solids	TSS	mg/L	--	1.00	--	0.500 U	--	1.50
Chloride	16887-00-6	mg/L	5.40	3.21	40.0	86.1	99.7	105
Fluoride	16984-48-8	mg/L	0.121 U*	0.136	1.36	1.92	0.764	0.494
Sulfate	14808-79-8	mg/L	57.4	25.6	7.26	9.34	8.78	12.2
Metals								
Antimony	7440-36-0	mg/L	0.000378 U	0.000378 U	0.000378 U	0.000378 U	0.000378 U	0.000378 U
Arsenic	7440-38-2	mg/L	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U
Barium	7440-39-3	mg/L	0.0977	0.123	0.188	0.217	0.335	0.292
Beryllium	7440-41-7	mg/L	0.000182 U	0.000182 U	0.000182 U	0.000182 U	0.000182 U	0.000182 U
Boron	7440-42-8	mg/L	0.0386 U	0.0637 U*	0.288	0.397	0.171 U*	0.149 U*
Cadmium	7440-43-9	mg/L	0.000217 U	0.000217 U	0.000217 U	0.000217 U	0.000217 U	0.000217 U
Calcium	7440-70-2	mg/L	131	110	33.5	33.0	66.9	65.5
Chromium	7440-47-3	mg/L	0.00153 U	0.00153 U	0.00153 U	0.00153 U	0.00153 U	0.00153 U
Cobalt	7440-48-4	mg/L	0.000134 U	0.000134 U	0.000134 U	0.000134 U	0.000134 U	0.000134 U
Iron	7439-89-6	mg/L	0.0195 U*	0.0790 U*	0.0195 U	0.0195 U	0.748	0.337
Lead	7439-92-1	mg/L	0.000128 U	0.000134 U*	0.000128 U	0.000128 U	0.000128 U	0.000128 U
Lithium	7439-93-2	mg/L	0.00339 U	0.00339 U	0.0941	0.144	0.0751	0.0649
Magnesium	7439-95-4	mg/L	11.2	7.93	18.8	18.8	27.9	26.4
Manganese	7439-96-5	mg/L	0.0172	0.0233	0.000936 J	0.000866 U	0.00849	0.00464 J
Mercury	7439-97-6	mg/L	0.000130 U	0.000130 U	0.000130 U	0.000130 U	0.000130 U	0.000130 U
Molybdenum	7439-98-7	mg/L	0.000610 U	0.000610 U	0.000610 U	0.000610 U	0.000610 U	0.000610 U
Potassium	7440-09-7	mg/L	0.736	0.839	5.52	6.17	2.25	2.11
Selenium	7782-49-2	mg/L	0.00151 U	0.00151 U	0.00151 U	0.00151 U	0.00151 U	0.00151 U
Sodium	7440-23-5	mg/L	3.66	3.27	91.9	157	94.1	78.1
Strontium	7440-24-6	mg/L	0.222	0.179	0.974	0.965	0.581	0.536
Thallium	7440-28-0	mg/L	0.000148 U	0.000148 U	0.000148 U	0.000148 U	0.000148 U	0.000148 U
Radiological								
Radium-226	13982-63-3	pCi/L	0.118 U	0.183 U	0.614 U	0.326 U	0.527 U	0.682 U
Radium 228	15262-20-1	pCi/L	-0.0866 U	0.00593 U	0.323 U	0.193 U	0.348 U	0.693 U
Radium 226 + Radium 228	RA226/228	pCi/L	0.118 U	0.189 U	0.937 U	0.518 U	0.875 U	1.38 U

Table 4
Assessment Monitoring and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	GAF-412C	GAF-412C	GAF-412L	GAF-412L	GAF-414L	GAF-414L
		Sample Date	3/24/2021	9/23/2021	3/26/2021	9/23/2021	3/26/2021	9/27/2021
		Well Location	Background	Background	Background	Background	Background	Background
		Sample ID	GAF-GW-GAF-412C-03242021	GAF-GW-GAF-412C-09232021	GAF-GW-GAF-412L-03262021	GAF-GW-GAF-412L-09232021	GAF-GW-GAF-414L-03262021	GAF-GW-GAF-414L-09272021
		Sample Type	N	N	N	N	N	N
Analyte	CAS	UNITS	Result	Result	Result	Result	Result	Result
Metals Dissolved								
Antimony	7440-36-0	mg/L	--	--	--	--	--	--
Arsenic	7440-38-2	mg/L	--	--	--	--	--	--
Barium	7440-39-3	mg/L	--	--	--	--	--	--
Beryllium	7440-41-7	mg/L	--	--	--	--	--	--
Boron	7440-42-8	mg/L	--	--	--	--	--	--
Cadmium	7440-43-9	mg/L	--	--	--	--	--	--
Calcium	7440-70-2	mg/L	--	--	--	--	--	--
Chromium	7440-47-3	mg/L	--	--	--	--	--	--
Cobalt	7440-48-4	mg/L	--	--	--	--	--	--
Iron	7439-89-6	mg/L	--	--	--	--	--	--
Lead	7439-92-1	mg/L	--	--	--	--	--	--
Lithium	7439-93-2	mg/L	--	--	--	--	--	--
Magnesium	7439-95-4	mg/L	--	--	--	--	--	--
Manganese	7439-96-5	mg/L	--	--	--	--	--	--
Mercury	7439-97-6	mg/L	--	--	--	--	--	--
Molybdenum	7439-98-7	mg/L	--	--	--	--	--	--
Potassium	7440-09-7	mg/L	--	--	--	--	--	--
Selenium	7782-49-2	mg/L	--	--	--	--	--	--
Sodium	7440-23-5	mg/L	--	--	--	--	--	--
Thallium	7440-28-0	mg/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 and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	GAF-416C	GAF-416C	GAF-418L	GAF-418L	GAF-422C	GAF-422C
		Sample Date	3/23/2021	9/23/2021	3/23/2021	9/22/2021	3/24/2021	9/23/2021
		Well Location	Downgradient	Downgradient	Downgradient at Facility Boundary	Downgradient at Facility Boundary	Downgradient	Downgradient
		Sample ID	GAF-GW-GAF-416C-03232021	GAF-GW-GAF-416C-09232021	GAF-GW-GAF-418L-03232021	GAF-GW-GAF-418L-09222021	GAF-GW-GAF-422C-03242021	GAF-GW-GAF-422C-09232021
		Sample Type	N	N	N	N	N	N
Analyte	CAS	UNITS	Result	Result	Result	Result	Result	Result
Field								
Dissolved oxygen	DO	mg/L	0.25	0	0.39	0	0.20	1.99
Dissolved Oxygen	DO_%	%	--	-1.8	--	-1.4	--	22.0
ORP	ORP	mV	13.1	-95.6	13.3	-9.2	-29.2	171.9 J
PH-FIELD	PH-FIELD	pH Units	7.31	7.45	6.81	6.79	6.82	6.80 J
Specific Cond. (Field)	COND	umhos/cm	418	422.7	860	881	1128	979
Temperature	TEMP	DEG_C	17.4	17.2	14.5	15.3	15.2	16.4
Turbidity, field	TURB-FIELD	NTU	4.13	4.26	2.37	2.01	42.0	14.2
General Chemistry								
Carbonate as CaCO3	ALKC	mg/L	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
Alkalinity as CaCO3	ALK	mg/L	168	169	317	340	258	234
Bicarbonate as CaCO3	ALKB	mg/L	168	169	317	340	258	234
Total Dissolved Solids	TDS	mg/L	233	246	584	597	940	716
Total Suspended Solids	TSS	mg/L	--	3.40	--	1.40	--	5.90
Chloride	16887-00-6	mg/L	4.49	5.10	1.35	2.46	2.98	3.76
Fluoride	16984-48-8	mg/L	0.192 U*	0.165	0.0527 U*	0.0474 U*	0.169 U*	0.219
Sulfate	14808-79-8	mg/L	44.4	53.1	178	169 J	428	356
Metals								
Antimony	7440-36-0	mg/L	0.000378 U	0.000378 U	0.000378 U	0.000378 U	0.000378 U	0.000378 U
Arsenic	7440-38-2	mg/L	0.00244	0.00439	0.000602 J	0.000622 J	0.00450	0.00501
Barium	7440-39-3	mg/L	0.0512	0.0590	0.0320	0.0322	0.0590	0.0414
Beryllium	7440-41-7	mg/L	0.000182 U	0.000182 U	0.000182 U	0.000182 U	0.000182 U	0.000182 U
Boron	7440-42-8	mg/L	0.551	0.633	0.0547 U*	0.114 U*	0.481	0.605
Cadmium	7440-43-9	mg/L	0.000217 U	0.000217 U	0.000217 U	0.000217 U	0.000217 U	0.000217 U
Calcium	7440-70-2	mg/L	62.4	68.4	175	177	260	196
Chromium	7440-47-3	mg/L	0.00153 U	0.00153 U	0.00153 U	0.00153 U	0.00153 U	0.00153 U
Cobalt	7440-48-4	mg/L	0.000465 J	0.000535	0.00141	0.00153	0.00350	0.00286 J
Iron	7439-89-6	mg/L	0.158 U*	0.984	0.251 U*	0.497	6.61	5.00
Lead	7439-92-1	mg/L	0.000206 J	0.000186 U*	0.000128 U	0.000128 U	0.000128 U	0.000128 U
Lithium	7439-93-2	mg/L	0.00339 U	0.00339 U	0.00339 U	0.00339 U	0.00339 U	0.00339 U
Magnesium	7439-95-4	mg/L	5.82	5.74	8.52	8.59	14.1	11.4
Manganese	7439-96-5	mg/L	2.65	2.33	2.47	2.76	1.81	1.50
Mercury	7439-97-6	mg/L	0.000130 U	0.000130 U	0.000130 U	0.000130 UJ	0.000130 U	0.000130 U
Molybdenum	7439-98-7	mg/L	0.0516	0.0622	0.00113 J	0.00151 J	0.0205	0.0291
Potassium	7440-09-7	mg/L	2.61	2.80	1.34	1.44	2.76	2.45
Selenium	7782-49-2	mg/L	0.00151 U	0.00151 U	0.00151 U	0.00151 U	0.00151 U	0.00151 U
Sodium	7440-23-5	mg/L	10.2	12.3	4.88	5.00	8.96	11.2
Strontium	7440-24-6	mg/L	0.231	0.225	0.223	0.231 J	0.604	0.483
Thallium	7440-28-0	mg/L	0.000481 U*	0.000148 U	0.000148 U	0.000148 U	0.000148 U	0.000148 U
Radiological								
Radium-226	13982-63-3	pCi/L	-0.0627 U	0.715	-0.0125 U	0.552 U	-0.155 U	0.0905 U
Radium 228	15262-20-1	pCi/L	0.320 U	0.254 U	0.429 U	-0.170 U	0.261 U	0.147 U
Radium 226 + Radium 228	RA226/228	pCi/L	0.320 U	0.969 J	0.429 U	0.552 U	0.261 U	0.237 U

Table 4
Assessment Monitoring and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	GAF-416C	GAF-416C	GAF-418L	GAF-418L	GAF-422C	GAF-422C
		Sample Date	3/23/2021	9/23/2021	3/23/2021	9/22/2021	3/24/2021	9/23/2021
		Well Location	Downgradient	Downgradient	Downgradient at Facility Boundary	Downgradient at Facility Boundary	Downgradient	Downgradient
		Sample ID	GAF-GW-GAF-416C-03232021	GAF-GW-GAF-416C-09232021	GAF-GW-GAF-418L-03232021	GAF-GW-GAF-418L-09222021	GAF-GW-GAF-422C-03242021	GAF-GW-GAF-422C-09232021
		Sample Type	N	N	N	N	N	N
Analyte	CAS	UNITS	Result	Result	Result	Result	Result	Result
Metals Dissolved								
Antimony	7440-36-0	mg/L	--	--	--	--	0.000378 U	0.000378 U
Arsenic	7440-38-2	mg/L	--	--	--	--	0.00264	0.00339
Barium	7440-39-3	mg/L	--	--	--	--	0.0589	0.0415
Beryllium	7440-41-7	mg/L	--	--	--	--	0.000182 U	0.000182 U
Boron	7440-42-8	mg/L	--	--	--	--	0.477	0.650
Cadmium	7440-43-9	mg/L	--	--	--	--	0.000217 U	0.000217 U
Calcium	7440-70-2	mg/L	--	--	--	--	257	201
Chromium	7440-47-3	mg/L	--	--	--	--	0.00153 U	0.00153 U
Cobalt	7440-48-4	mg/L	--	--	--	--	0.00367	0.00368 J
Iron	7439-89-6	mg/L	--	--	--	--	3.69	5.37
Lead	7439-92-1	mg/L	--	--	--	--	0.000128 U	0.000269 J
Lithium	7439-93-2	mg/L	--	--	--	--	0.00339 U	0.00339 U
Magnesium	7439-95-4	mg/L	--	--	--	--	14.0	11.7
Manganese	7439-96-5	mg/L	--	--	--	--	1.80	1.65
Mercury	7439-97-6	mg/L	--	--	--	--	0.000130 U	0.000130 U
Molybdenum	7439-98-7	mg/L	--	--	--	--	0.0210	0.0294
Potassium	7440-09-7	mg/L	--	--	--	--	2.74	2.55
Selenium	7782-49-2	mg/L	--	--	--	--	0.00151 U	0.00151 U
Sodium	7440-23-5	mg/L	--	--	--	--	8.31	10.8
Thallium	7440-28-0	mg/L	--	--	--	--	0.000148 U	0.000175 J
Radiological Dissolved								
Radium-226	13982-63-3	pCi/L	--	--	--	--	0.643 U	0.181 U
Radium 228	15262-20-1	pCi/L	--	--	--	--	0.0815 U	0.255 U
Radium 226 + Radium 228	RA226/228	pCi/L	--	--	--	--	0.725 U	0.436 U

Table 4
Assessment Monitoring and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	GAF-426C	GAF-426C	GAF-426L	GAF-426L	GAF-427C	GAF-427C
		Sample Date	3/24/2021	9/24/2021	3/26/2021	9/24/2021	3/24/2021	9/24/2021
		Well Location	Background	Background	Background	Background	Background	Background
		Sample ID	GAF-GW-GAF-426C-03242021	GAF-GW-GAF-426C-09242021	GAF-GW-GAF-426L-03262021	GAF-GW-GAF-426L-09242021	GAF-GW-GAF-427C-03242021	GAF-GW-GAF-427C-09242021
		Sample Type	N	N	N	N	N	N
Analyte	CAS	UNITS	Result	Result	Result	Result	Result	Result
Field								
Dissolved oxygen	DO	mg/L	0.85	2.39	1.15	0.15	0.47	6.89
Dissolved Oxygen	DO_%	%	--	24.0	--	1.5	--	69.1
ORP	ORP	mV	91.8	149.7	-44.6	105.4	-91.2	185.9
PH-FIELD	PH-FIELD	pH Units	6.89	6.89	6.98	6.97	6.88	7.15
Specific Cond. (Field)	COND	umhos/cm	1160	1018	783	964	840	749
Temperature	TEMP	DEG_C	15.1	15.5	15.0	15.5	15.3	15.5
Turbidity, field	TURB-FIELD	NTU	1.44	1.00	1.32	3.35	2.25	2.73
General Chemistry								
Carbonate as CaCO3	ALKC	mg/L	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
Alkalinity as CaCO3	ALK	mg/L	382	399	325	325	422	397
Bicarbonate as CaCO3	ALKB	mg/L	382	399	325	325	422	397
Total Dissolved Solids	TDS	mg/L	794	676	507	623	459	428
Total Suspended Solids	TSS	mg/L	--	0.500 U	--	1.20	--	1.30
Chloride	16887-00-6	mg/L	15.1	8.07	12.5	49.3	12.1	9.88
Fluoride	16984-48-8	mg/L	0.271	0.312	0.355	0.456	0.763	0.690
Sulfate	14808-79-8	mg/L	241	194	113	133	33.4	35.2
Metals								
Antimony	7440-36-0	mg/L	0.000378 U	0.000378 U	0.000378 U	0.000448 J	0.000378 U	0.000554 J
Arsenic	7440-38-2	mg/L	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000353 J	0.000915 J
Barium	7440-39-3	mg/L	0.0352	0.0310	0.0302	0.0292	0.380	0.294
Beryllium	7440-41-7	mg/L	0.000182 U	0.000182 U	0.000182 U	0.000182 U	0.000182 U	0.000182 U
Boron	7440-42-8	mg/L	0.0662 U*	0.0916 U*	0.0784 U*	0.0916 U*	0.190 U*	0.149 U*
Cadmium	7440-43-9	mg/L	0.000217 U	0.000217 U	0.000217 U	0.000217 U	0.000217 U	0.000217 U
Calcium	7440-70-2	mg/L	145	137	142	128	136	114
Chromium	7440-47-3	mg/L	0.00153 U	0.00153 U	0.00153 U	0.00153 U	0.00153 U	0.00153 U
Cobalt	7440-48-4	mg/L	0.000134 U	0.000134 U	0.000134 U	0.000134 U	0.000514	0.000424 J
Iron	7439-89-6	mg/L	0.0195 U	0.0328 U*	0.0195 U	0.112 U*	1.41	0.301
Lead	7439-92-1	mg/L	0.000128 U	0.000128 U	0.000128 U	0.000369 U*	0.000128 U	0.000128 U
Lithium	7439-93-2	mg/L	0.0141	0.0151	0.00775	0.0136	0.0427	0.0394
Magnesium	7439-95-4	mg/L	53.4	56.7	21.2	17.0	32.1	29.9
Manganese	7439-96-5	mg/L	0.000866 U	0.00198 J	0.0104	0.0387	0.0472	0.0176
Mercury	7439-97-6	mg/L	0.000130 U	0.000130 U	0.000130 U	0.000130 U	0.000130 U	0.000130 U
Molybdenum	7439-98-7	mg/L	0.00128 J	0.000756 J	0.00277 J	0.0105	0.000843 J	0.00161 J
Potassium	7440-09-7	mg/L	3.23	2.61	3.10	12.9	13.3	13.7
Selenium	7782-49-2	mg/L	0.00151 U	0.00151 U	0.00151 U	0.00151 U	0.00151 U	0.00151 U
Sodium	7440-23-5	mg/L	46.7	10.8	15.1	54.4	13.6	11.5
Strontium	7440-24-6	mg/L	0.453	0.436	0.398	0.513	2.86	2.21
Thallium	7440-28-0	mg/L	0.000148 U	0.000148 U	0.000148 U	0.000148 U	0.000401 U*	0.000148 U
Radiological								
Radium-226	13982-63-3	pCi/L	0.0242 U	0.433	0.391 U	-0.00852 U	0.943	-0.0477 U
Radium 228	15262-20-1	pCi/L	0.532 U*	-0.0299 U	0.274 U	0.174 U	1.14 U*	-0.0606 U
Radium 226 + Radium 228	RA226/228	pCi/L	0.556 U*	0.433 J	0.665 U	0.174 U	2.09 J	0.000 U

Table 4
Assessment Monitoring and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	GAF-426C	GAF-426C	GAF-426L	GAF-426L	GAF-427C	GAF-427C
		Sample Date	3/24/2021	9/24/2021	3/26/2021	9/24/2021	3/24/2021	9/24/2021
		Well Location	Background	Background	Background	Background	Background	Background
		Sample ID	GAF-GW-GAF-426C-03242021	GAF-GW-GAF-426C-09242021	GAF-GW-GAF-426L-03262021	GAF-GW-GAF-426L-09242021	GAF-GW-GAF-427C-03242021	GAF-GW-GAF-427C-09242021
		Sample Type	N	N	N	N	N	N
Analyte	CAS	UNITS	Result	Result	Result	Result	Result	Result
Metals Dissolved								
Antimony	7440-36-0	mg/L	--	--	--	--	--	--
Arsenic	7440-38-2	mg/L	--	--	--	--	--	--
Barium	7440-39-3	mg/L	--	--	--	--	--	--
Beryllium	7440-41-7	mg/L	--	--	--	--	--	--
Boron	7440-42-8	mg/L	--	--	--	--	--	--
Cadmium	7440-43-9	mg/L	--	--	--	--	--	--
Calcium	7440-70-2	mg/L	--	--	--	--	--	--
Chromium	7440-47-3	mg/L	--	--	--	--	--	--
Cobalt	7440-48-4	mg/L	--	--	--	--	--	--
Iron	7439-89-6	mg/L	--	--	--	--	--	--
Lead	7439-92-1	mg/L	--	--	--	--	--	--
Lithium	7439-93-2	mg/L	--	--	--	--	--	--
Magnesium	7439-95-4	mg/L	--	--	--	--	--	--
Manganese	7439-96-5	mg/L	--	--	--	--	--	--
Mercury	7439-97-6	mg/L	--	--	--	--	--	--
Molybdenum	7439-98-7	mg/L	--	--	--	--	--	--
Potassium	7440-09-7	mg/L	--	--	--	--	--	--
Selenium	7782-49-2	mg/L	--	--	--	--	--	--
Sodium	7440-23-5	mg/L	--	--	--	--	--	--
Thallium	7440-28-0	mg/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 and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	GAF-427L	GAF-427L	GAF-446C	GAF-446C	GAF-449L	GAF-449L
		Sample Date	3/29/2021	9/24/2021	3/24/2021	9/23/2021	3/24/2021	9/23/2021
		Well Location	Background	Background	Downgradient	Downgradient	Downgradient	Downgradient
		Sample ID	GAF-GW-GAF-427L-03292021	GAF-GW-GAF-427L-09242021	GAF-GW-GAF-446C-03242021	GAF-GW-GAF-446C-09232021	GAF-GW-GAF-449L-03242021	GAF-GW-GAF-449L-09232021
		Sample Type	N	N	N	N	N	N
Analyte	CAS	UNITS	Result	Result	Result	Result	Result	Result
Field								
Dissolved oxygen	DO	mg/L	0.46	2.02	0.26	0.67	0.32	0.72
Dissolved Oxygen	DO_%	%	--	20.4	--	7.1	--	8.1
ORP	ORP	mV	-52.6	184.6	23.9	-34.2	36.1	-26.2
PH-FIELD	PH-FIELD	pH Units	7.11	7.11	6.99	6.93	7.04	6.79
Specific Cond. (Field)	COND	umhos/cm	670	660	730	814	600	684
Temperature	TEMP	DEG_C	13.9	15.8	16.4	18.6	16.8	20.2
Turbidity, field	TURB-FIELD	NTU	1.81	0.22	4.16	12.7	0.64	1.94
General Chemistry								
Carbonate as CaCO3	ALKC	mg/L	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
Alkalinity as CaCO3	ALK	mg/L	306	326	282	292	184	197
Bicarbonate as CaCO3	ALKB	mg/L	306	326	282	292	184	197
Total Dissolved Solids	TDS	mg/L	342	373	549	534	464	463
Total Suspended Solids	TSS	mg/L	--	0.500 U	--	4.40	--	2.20
Chloride	16887-00-6	mg/L	9.49	9.89	7.29	6.87	8.08	8.72
Fluoride	16984-48-8	mg/L	0.268	0.340	0.0788 U*	0.0696 J	0.0824 U*	0.0791 J
Sulfate	14808-79-8	mg/L	41.5	43.9	142	136	140	153
Metals								
Antimony	7440-36-0	mg/L	0.000378 U	0.000378 U	0.000378 U	0.000378 U	0.000378 U	0.000378 U
Arsenic	7440-38-2	mg/L	0.000313 U	0.000313 U	0.00152	0.00783	0.00212	0.00197
Barium	7440-39-3	mg/L	0.0937	0.0938	0.0639	0.0598	0.0374	0.0350
Beryllium	7440-41-7	mg/L	0.000182 U	0.000182 U	0.000182 U	0.000182 U	0.000182 U	0.000182 U
Boron	7440-42-8	mg/L	0.106 U*	0.0581 U*	7.16	6.62	9.32	10.7
Cadmium	7440-43-9	mg/L	0.000217 U	0.000217 U	0.000217 U	0.000217 U	0.000217 U	0.000217 U
Calcium	7440-70-2	mg/L	99.8	94.4	106	117	90.7	81.0
Chromium	7440-47-3	mg/L	0.00153 U	0.00153 U	0.00153 U	0.00153 U	0.00153 U	0.00153 U
Cobalt	7440-48-4	mg/L	0.000601	0.000568	0.00177	0.00172	0.00323	0.00289
Iron	7439-89-6	mg/L	0.0361 U*	0.0265 U*	0.404	2.10	0.675	0.624
Lead	7439-92-1	mg/L	0.000128 U	0.000128 U	0.000128 U	0.000196 U*	0.000128 U	0.000128 U
Lithium	7439-93-2	mg/L	0.00860	0.00870	0.00339 U	0.00339 U	0.00339 U	0.00339 U
Magnesium	7439-95-4	mg/L	28.6	28.2	6.59	6.89	3.31	3.09
Manganese	7439-96-5	mg/L	0.123	0.126	5.54	5.04	3.67	3.40
Mercury	7439-97-6	mg/L	0.000130 U	0.000130 U	0.000130 U	0.000130 U	0.000130 U	0.000130 U
Molybdenum	7439-98-7	mg/L	0.000610 U	0.000610 U	0.0602	0.0534	0.0500	0.0462
Potassium	7440-09-7	mg/L	1.70	1.67	2.50	2.22	2.66	2.34
Selenium	7782-49-2	mg/L	0.00151 U	0.00151 U	0.00151 U	0.00151 U	0.00151 U	0.00151 U
Sodium	7440-23-5	mg/L	8.79	8.82	63.2	53.0	53.4	48.6
Strontium	7440-24-6	mg/L	0.647	0.639	0.203	0.199	0.127	0.113
Thallium	7440-28-0	mg/L	0.000148 U	0.000148 U	0.000184 J	0.000148 U	0.000148 U	0.000148 U
Radiological								
Radium-226	13982-63-3	pCi/L	-0.117 U	0.128 U	0.142 U	0.0611 U	0.288 U	0.184 U
Radium 228	15262-20-1	pCi/L	0.781	0.163 U	1.61	0.412 U	0.468 U	0.396 U
Radium 226 + Radium 228	RA226/228	pCi/L	0.781 J	0.291 U	1.75 J	0.473 U	0.756 U	0.580 U

Table 4
Assessment Monitoring and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	GAF-427L	GAF-427L	GAF-446C	GAF-446C	GAF-449L	GAF-449L
		Sample Date	3/29/2021	9/24/2021	3/24/2021	9/23/2021	3/24/2021	9/23/2021
		Well Location	Background	Background	Downgradient	Downgradient	Downgradient	Downgradient
		Sample ID	GAF-GW-GAF-427L-03292021	GAF-GW-GAF-427L-09242021	GAF-GW-GAF-446C-03242021	GAF-GW-GAF-446C-09232021	GAF-GW-GAF-449L-03242021	GAF-GW-GAF-449L-09232021
		Sample Type	N	N	N	N	N	N
Analyte	CAS	UNITS	Result	Result	Result	Result	Result	Result
Metals Dissolved								
Antimony	7440-36-0	mg/L	--	--	--	0.000378 U	--	--
Arsenic	7440-38-2	mg/L	--	--	--	0.00456	--	--
Barium	7440-39-3	mg/L	--	--	--	0.0584	--	--
Beryllium	7440-41-7	mg/L	--	--	--	0.000182 U	--	--
Boron	7440-42-8	mg/L	--	--	--	6.81	--	--
Cadmium	7440-43-9	mg/L	--	--	--	0.000217 U	--	--
Calcium	7440-70-2	mg/L	--	--	--	119	--	--
Chromium	7440-47-3	mg/L	--	--	--	0.00153 U	--	--
Cobalt	7440-48-4	mg/L	--	--	--	0.00163	--	--
Iron	7439-89-6	mg/L	--	--	--	0.908	--	--
Lead	7439-92-1	mg/L	--	--	--	0.000128 U	--	--
Lithium	7439-93-2	mg/L	--	--	--	0.00339 U	--	--
Magnesium	7439-95-4	mg/L	--	--	--	6.96	--	--
Manganese	7439-96-5	mg/L	--	--	--	4.99	--	--
Mercury	7439-97-6	mg/L	--	--	--	0.000130 U	--	--
Molybdenum	7439-98-7	mg/L	--	--	--	0.0527	--	--
Potassium	7440-09-7	mg/L	--	--	--	2.27	--	--
Selenium	7782-49-2	mg/L	--	--	--	0.00151 U	--	--
Sodium	7440-23-5	mg/L	--	--	--	54.3	--	--
Thallium	7440-28-0	mg/L	--	--	--	0.000148 U	--	--
Radiological Dissolved								
Radium-226	13982-63-3	pCi/L	--	--	--	-0.0757 U	--	--
Radium 228	15262-20-1	pCi/L	--	--	--	0.785	--	--
Radium 226 + Radium 228	RA226/228	pCi/L	--	--	--	0.785 J	--	--

Table 4
Assessment Monitoring and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	GAF-450C	GAF-450C	GAF-450L	GAF-450L	GAF-450L	GAF-450L
		Sample Date	3/26/2021	9/24/2021	3/29/2021	5/12/2021	5/12/2021	9/24/2021
		Well Location	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient
		Sample ID	GAF-GW-GAF-450C-03262021	GAF-GW-GAF-450C-09242021	GAF-GW-GAF-450L-03292021	GAF-GW-GAF-450L-05122021	GAF-GW-FD-05122021	GAF-GW-GAF-450L-09242021
		Sample Type	N	N	N	N	FD	N
Analyte	**CAS**	**UNITS**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Field								
Dissolved oxygen	DO	mg/L	0.50	0.64	0.38	0.45	--	1.01
Dissolved Oxygen	DO_%	%	--	6.6	--	4.5	--	10.8
ORP	ORP	mV	-91.3	-58.6	-125.9	-98.7	--	-57.6
PH-FIELD	PH-FIELD	pH Units	6.90	6.89	7.05	6.89	--	6.78
Specific Cond. (Field)	COND	umhos/cm	1180	1150	957	1016	--	1077
Temperature	TEMP	DEG_C	15.7	17.6	14.1	16.8	--	17.8
Turbidity, field	TURB-FIELD	NTU	2.33	4.71	0.43	0.18	--	0.57
General Chemistry								
Carbonate as CaCO3	ALKC	mg/L	5.00 U	5.00 U	5.00 U	--	--	5.00 U
Alkalinity as CaCO3	ALK	mg/L	259	287	235	--	--	252
Bicarbonate as CaCO3	ALKB	mg/L	259	287	235	--	--	252
Total Dissolved Solids	TDS	mg/L	728	805	670	--	--	879
Total Suspended Solids	TSS	mg/L	--	11.0	--	--	--	10.6
Chloride	16887-00-6	mg/L	16.8	16.9	17.5	--	--	16.8
Fluoride	16984-48-8	mg/L	0.130 U*	0.128	0.161 U*	--	--	0.202
Sulfate	14808-79-8	mg/L	270	327	237	--	--	256
Metals								
Antimony	7440-36-0	mg/L	0.000378 U	0.000378 U	0.000378 U	--	--	0.000378 U
Arsenic	7440-38-2	mg/L	0.00603	0.00634	0.0113	0.0108	0.0121	0.0119
Barium	7440-39-3	mg/L	0.0356	0.0400	0.0381	--	--	0.0416
Beryllium	7440-41-7	mg/L	0.000182 U	0.000182 U	0.000182 U	--	--	0.000182 U
Boron	7440-42-8	mg/L	6.86	5.42	8.25	--	--	6.67
Cadmium	7440-43-9	mg/L	0.000217 U	0.000217 U	0.000217 U	--	--	0.000217 U
Calcium	7440-70-2	mg/L	156	185	130	--	--	141
Chromium	7440-47-3	mg/L	0.00153 U	0.00153 U	0.00153 U	--	--	0.00153 U
Cobalt	7440-48-4	mg/L	0.00455	0.00525	0.00739	--	--	0.00919
Iron	7439-89-6	mg/L	3.32	3.56	3.98	--	--	5.27
Lead	7439-92-1	mg/L	0.000128 U	0.000128 U	0.000128 U	--	--	0.000128 U
Lithium	7439-93-2	mg/L	0.00339 U	0.00339 U	0.00339 U	--	--	0.00339 U
Magnesium	7439-95-4	mg/L	8.20	9.94	6.00	--	--	7.24
Manganese	7439-96-5	mg/L	4.21	5.41	3.63	--	--	4.19
Mercury	7439-97-6	mg/L	0.000130 U	0.000130 U	0.000130 U	--	--	0.000130 U
Molybdenum	7439-98-7	mg/L	0.0327	0.0214	0.0558	--	--	0.0437
Potassium	7440-09-7	mg/L	4.06	3.75	5.11	--	--	5.04
Selenium	7782-49-2	mg/L	0.00151 U	0.00151 U	0.00151 U	--	--	0.00151 U
Sodium	7440-23-5	mg/L	75.1	62.7	93.4	--	--	81.0
Strontium	7440-24-6	mg/L	0.227	0.262	0.242	--	--	0.270
Thallium	7440-28-0	mg/L	0.000148 U	0.000148 U	0.000163 J	--	--	0.000148 U
Radiological								
Radium-226	13982-63-3	pCi/L	0.130 U	0.106 U	0.132 U	--	--	0.159 U
Radium 228	15262-20-1	pCi/L	0.148 U	0.0985 U	0.301 U	--	--	0.214 U
Radium 226 + Radium 228	RA226/228	pCi/L	0.279 U	0.205 U	0.433 U	--	--	0.373 U

Table 4
Assessment Monitoring and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	GAF-450C	GAF-450C	GAF-450L	GAF-450L	GAF-450L	GAF-450L
		Sample Date	3/26/2021	9/24/2021	3/29/2021	5/12/2021	5/12/2021	9/24/2021
		Well Location	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient
		Sample ID	GAF-GW-GAF-450C-03262021	GAF-GW-GAF-450C-09242021	GAF-GW-GAF-450L-03292021	GAF-GW-GAF-450L-05122021	GAF-GW-FD-05122021	GAF-GW-GAF-450L-09242021
		Sample Type	N	N	N	N	FD	N
Analyte	CAS	UNITS	Result	Result	Result	Result	Result	Result
Metals Dissolved								
Antimony	7440-36-0	mg/L	--	--	--	--	--	--
Arsenic	7440-38-2	mg/L	--	--	--	0.0117	0.0120	--
Barium	7440-39-3	mg/L	--	--	--	--	--	--
Beryllium	7440-41-7	mg/L	--	--	--	--	--	--
Boron	7440-42-8	mg/L	--	--	--	--	--	--
Cadmium	7440-43-9	mg/L	--	--	--	--	--	--
Calcium	7440-70-2	mg/L	--	--	--	--	--	--
Chromium	7440-47-3	mg/L	--	--	--	--	--	--
Cobalt	7440-48-4	mg/L	--	--	--	--	--	--
Iron	7439-89-6	mg/L	--	--	--	--	--	--
Lead	7439-92-1	mg/L	--	--	--	--	--	--
Lithium	7439-93-2	mg/L	--	--	--	--	--	--
Magnesium	7439-95-4	mg/L	--	--	--	--	--	--
Manganese	7439-96-5	mg/L	--	--	--	--	--	--
Mercury	7439-97-6	mg/L	--	--	--	--	--	--
Molybdenum	7439-98-7	mg/L	--	--	--	--	--	--
Potassium	7440-09-7	mg/L	--	--	--	--	--	--
Selenium	7782-49-2	mg/L	--	--	--	--	--	--
Sodium	7440-23-5	mg/L	--	--	--	--	--	--
Thallium	7440-28-0	mg/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 and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	GAF-451CR	GAF-451CR	GAF-452C	GAF-452C	GAF-452L	GAF-452L
		Sample Date	3/24/2021	9/23/2021	3/29/2021	9/27/2021	3/29/2021	9/27/2021
		Well Location	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient
		Sample ID	GAF-GW-GAF-451CR-03242021	GAF-GW-GAF-451CR-09232021	GAF-GW-GAF-452C-03292021	GAF-GW-GAF-452C-09272021	GAF-GW-GAF-452L-03292021	GAF-GW-GAF-452L-09272021
		Sample Type	N	N	N	N	N	N
Analyte	**CAS**	**UNITS**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Field								
Dissolved oxygen	DO	mg/L	0.45	0.50	0.94	1.54	0.31	1.75
Dissolved Oxygen	DO_%	%	--	5.5	--	16.7	--	16.9
ORP	ORP	mV	-68.4	208.7 J	-192.3	149.9 J	-183.4	146.4 J
PH-FIELD	PH-FIELD	pH Units	6.94	6.77 J	7.22	7.18	7.04	7.14
Specific Cond. (Field)	COND	umhos/cm	1314	1449	847	886	569.8	601
Temperature	TEMP	DEG_C	14.3	20.0	16.0	19.0	15.8	17.0
Turbidity, field	TURB-FIELD	NTU	0.69	0.48	3.57	1.98	0.52	0.52
General Chemistry								
Carbonate as CaCO3	ALKC	mg/L	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
Alkalinity as CaCO3	ALK	mg/L	373	414	473	476	298	327
Bicarbonate as CaCO3	ALKB	mg/L	373	414	473	476	298	327
Total Dissolved Solids	TDS	mg/L	1090	1060	481	688	332	441
Total Suspended Solids	TSS	mg/L	--	2.80	--	0.500	--	3.80
Chloride	16887-00-6	mg/L	21.2	17.9	10.4	10.6	5.07	5.81
Fluoride	16984-48-8	mg/L	0.248 U*	0.262	0.607	0.664	0.310	0.430
Sulfate	14808-79-8	mg/L	454	456	23.9	20.8	29.7	33.8
Metals								
Antimony	7440-36-0	mg/L	0.000378 U	0.000378 U	0.000378 U	0.000378 U	0.000378 U	0.000378 U
Arsenic	7440-38-2	mg/L	0.000760 J	0.000576 J	0.000848 J	0.000823 J	0.000812 J	0.000882 J
Barium	7440-39-3	mg/L	0.0329	0.0341	0.248	0.269	0.0782	0.0802
Beryllium	7440-41-7	mg/L	0.000182 U	0.000182 U	0.000182 U	0.000182 U	0.000182 U	0.000182 U
Boron	7440-42-8	mg/L	0.0722 U*	0.125 U*	0.234	0.247	0.114 U*	0.109 U*
Cadmium	7440-43-9	mg/L	0.000217 U	0.000217 U	0.000217 U	0.000217 U	0.000217 U	0.000217 U
Calcium	7440-70-2	mg/L	221	216	82.1	79.2	89.3	86.6
Chromium	7440-47-3	mg/L	0.00153 U	0.00153 U	0.00153 U	0.00153 U	0.00153 U	0.00153 U
Cobalt	7440-48-4	mg/L	0.000209 J	0.000271 J	0.000134 U	0.000134 U	0.000134 U	0.000134 U
Iron	7439-89-6	mg/L	1.35	1.27	0.200 U*	0.142 U*	1.39	1.26
Lead	7439-92-1	mg/L	0.000128 U	0.000128 U	0.000128 U	0.000128 U	0.000128 U	0.000128 U
Lithium	7439-93-2	mg/L	0.00916	0.00942	0.102	0.0992	0.0156	0.0166
Magnesium	7439-95-4	mg/L	66.7	65.5	30.0	29.1	28.1	27.9
Manganese	7439-96-5	mg/L	0.0117	0.0106	0.0932	0.0912	0.0700	0.0655
Mercury	7439-97-6	mg/L	0.000130 U	0.000130 U	0.000130 U	0.000130 U	0.000130 U	0.000130 U
Molybdenum	7439-98-7	mg/L	0.000610 U	0.000610 U	0.000610 U	0.000610 U	0.000610 U	0.000610 U
Potassium	7440-09-7	mg/L	2.33	2.24	6.90	6.76	3.64	3.57
Selenium	7782-49-2	mg/L	0.00151 U	0.00151 U	0.00151 U	0.00151 U	0.00151 U	0.00151 U
Sodium	7440-23-5	mg/L	42.4	44.5	101	99.2	8.97	9.91
Strontium	7440-24-6	mg/L	1.04	0.966	3.18	2.95	1.40	1.42
Thallium	7440-28-0	mg/L	0.000148 U	0.000148 U	0.000148 U	0.000148 U	0.000148 U	0.000148 U
Radiological								
Radium-226	13982-63-3	pCi/L	0.289 U	0.00221 U	0.673	1.16	0.275 U	0.347 U
Radium 228	15262-20-1	pCi/L	0.204 U	0.418 U	0.457	1.27	0.788	0.651 U
Radium 226 + Radium 228	RA226/228	pCi/L	0.493 U	0.420 U	1.13	2.43	1.06 J	0.998 U

Table 4
Assessment Monitoring and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	GAF-451CR	GAF-451CR	GAF-452C	GAF-452C	GAF-452L	GAF-452L
		Sample Date	3/24/2021	9/23/2021	3/29/2021	9/27/2021	3/29/2021	9/27/2021
		Well Location	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient
		Sample ID	GAF-GW-GAF-451CR-03242021	GAF-GW-GAF-451CR-09232021	GAF-GW-GAF-452C-03292021	GAF-GW-GAF-452C-09272021	GAF-GW-GAF-452L-03292021	GAF-GW-GAF-452L-09272021
		Sample Type	N	N	N	N	N	N
Analyte	CAS	UNITS	Result	Result	Result	Result	Result	Result
Metals Dissolved								
Antimony	7440-36-0	mg/L	--	--	--	--	--	--
Arsenic	7440-38-2	mg/L	--	--	--	--	--	--
Barium	7440-39-3	mg/L	--	--	--	--	--	--
Beryllium	7440-41-7	mg/L	--	--	--	--	--	--
Boron	7440-42-8	mg/L	--	--	--	--	--	--
Cadmium	7440-43-9	mg/L	--	--	--	--	--	--
Calcium	7440-70-2	mg/L	--	--	--	--	--	--
Chromium	7440-47-3	mg/L	--	--	--	--	--	--
Cobalt	7440-48-4	mg/L	--	--	--	--	--	--
Iron	7439-89-6	mg/L	--	--	--	--	--	--
Lead	7439-92-1	mg/L	--	--	--	--	--	--
Lithium	7439-93-2	mg/L	--	--	--	--	--	--
Magnesium	7439-95-4	mg/L	--	--	--	--	--	--
Manganese	7439-96-5	mg/L	--	--	--	--	--	--
Mercury	7439-97-6	mg/L	--	--	--	--	--	--
Molybdenum	7439-98-7	mg/L	--	--	--	--	--	--
Potassium	7440-09-7	mg/L	--	--	--	--	--	--
Selenium	7782-49-2	mg/L	--	--	--	--	--	--
Sodium	7440-23-5	mg/L	--	--	--	--	--	--
Thallium	7440-28-0	mg/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 and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	GAF-453C	GAF-453C	GAF-454L	GAF-454L
		Sample Date	3/24/2021	9/23/2021	3/24/2021	9/23/2021
		Well Location	Downgradient	Downgradient	Downgradient at Facility Boundary	Downgradient at Facility Boundary
		Sample ID	GAF-GW-GAF-453C-03242021	GAF-GW-GAF-453C-09232021	GAF-GW-GAF-454L-03242021	GAF-GW-GAF-454L-09232021
		Sample Type	N	N	N	N
Analyte	**CAS**	**UNITS**	**Result**	**Result**	**Result**	**Result**
Field						
Dissolved oxygen	DO	mg/L	0.36	1.19	4.03	1.32
Dissolved Oxygen	DO_%	%	--	13.2	--	13.3
ORP	ORP	mV	-98.5	-71.5	8.3	184.4 J
PH-FIELD	PH-FIELD	pH Units	7.24	7.10	7.34	7.11 J
Specific Cond. (Field)	COND	umhos/cm	727	792	596	600.6
Temperature	TEMP	DEG_C	16.7	19.4	15.1	16.1
Turbidity, field	TURB-FIELD	NTU	2.50	1.78	2.94	0.44
General Chemistry						
Carbonate as CaCO3	ALKC	mg/L	5.00 U	5.00 U	5.00 U	5.00 U
Alkalinity as CaCO3	ALK	mg/L	267	268	255	274
Bicarbonate as CaCO3	ALKB	mg/L	267	268	255	274
Total Dissolved Solids	TDS	mg/L	485	532	363	361
Total Suspended Solids	TSS	mg/L	--	3.30	--	0.500 U
Chloride	16887-00-6	mg/L	6.14	3.93	3.32	3.69
Fluoride	16984-48-8	mg/L	0.211 U*	0.128	0.246 U*	0.229
Sulfate	14808-79-8	mg/L	143	173	58.3	61.7
Metals						
Antimony	7440-36-0	mg/L	0.000446 J	0.000378 U	0.000413 J	0.000378 U
Arsenic	7440-38-2	mg/L	0.00190	0.000459 J	0.000313 U	0.000313 U
Barium	7440-39-3	mg/L	0.0817	0.0834	0.0895	0.0911
Beryllium	7440-41-7	mg/L	0.000182 U	0.000182 U	0.000182 U	0.000182 U
Boron	7440-42-8	mg/L	0.0876 U*	0.0721 U*	0.261	0.296
Cadmium	7440-43-9	mg/L	0.000217 U	0.000217 U	0.000217 U	0.000217 U
Calcium	7440-70-2	mg/L	103	141	99.4	99.2
Chromium	7440-47-3	mg/L	0.00153 U	0.00153 U	0.00153 U	0.00153 U
Cobalt	7440-48-4	mg/L	0.000134 U	0.000134 U	0.000134 U	0.000134 U
Iron	7439-89-6	mg/L	0.910	1.19	0.0318 U*	0.0195 U
Lead	7439-92-1	mg/L	0.000128 U	0.000128 U	0.000128 U	0.000128 U
Lithium	7439-93-2	mg/L	0.00552	0.00339 U	0.00339 U	0.00339 U
Magnesium	7439-95-4	mg/L	15.3	17.4	16.4	17.7
Manganese	7439-96-5	mg/L	0.107	0.138	0.00386 J	0.00604
Mercury	7439-97-6	mg/L	0.000130 U	0.000130 U	0.000130 U	0.000130 U
Molybdenum	7439-98-7	mg/L	0.00206 J	0.000610 U	0.00490 J	0.00481 J
Potassium	7440-09-7	mg/L	5.97	2.04	4.55	2.72
Selenium	7782-49-2	mg/L	0.00151 U	0.00151 U	0.00151 U	0.00151 U
Sodium	7440-23-5	mg/L	39.7	9.24	8.40	8.90
Strontium	7440-24-6	mg/L	0.275	0.232	0.346	0.360
Thallium	7440-28-0	mg/L	0.000148 U	0.000148 U	0.000148 U	0.000148 U
Radiological						
Radium-226	13982-63-3	pCi/L	0.214 U	0.295 U	0.216 U	0.327 U
Radium 228	15262-20-1	pCi/L	0.000751 U	3.16	0.832 U*	0.404 U
Radium 226 + Radium 228	RA226/228	pCi/L	0.214 U	3.45 J	1.05 U*	0.731 U

Table 4
Assessment Monitoring and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Monitoring Well ID	GAF-453C	GAF-453C	GAF-454L	GAF-454L
		Sample Date	3/24/2021	9/23/2021	3/24/2021	9/23/2021
		Well Location	Downgradient	Downgradient	Downgradient at Facility Boundary	Downgradient at Facility Boundary
		Sample ID	GAF-GW-GAF-453C-03242021	GAF-GW-GAF-453C-09232021	GAF-GW-GAF-454L-03242021	GAF-GW-GAF-454L-09232021
		Sample Type	N	N	N	N
Analyte	CAS	UNITS	Result	Result	Result	Result
Metals Dissolved						
Antimony	7440-36-0	mg/L	--	--	--	--
Arsenic	7440-38-2	mg/L	--	--	--	--
Barium	7440-39-3	mg/L	--	--	--	--
Beryllium	7440-41-7	mg/L	--	--	--	--
Boron	7440-42-8	mg/L	--	--	--	--
Cadmium	7440-43-9	mg/L	--	--	--	--
Calcium	7440-70-2	mg/L	--	--	--	--
Chromium	7440-47-3	mg/L	--	--	--	--
Cobalt	7440-48-4	mg/L	--	--	--	--
Iron	7439-89-6	mg/L	--	--	--	--
Lead	7439-92-1	mg/L	--	--	--	--
Lithium	7439-93-2	mg/L	--	--	--	--
Magnesium	7439-95-4	mg/L	--	--	--	--
Manganese	7439-96-5	mg/L	--	--	--	--
Mercury	7439-97-6	mg/L	--	--	--	--
Molybdenum	7439-98-7	mg/L	--	--	--	--
Potassium	7440-09-7	mg/L	--	--	--	--
Selenium	7782-49-2	mg/L	--	--	--	--
Sodium	7440-23-5	mg/L	--	--	--	--
Thallium	7440-28-0	mg/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 and Verification Sampling Groundwater Analytical Results - Ash Pond Complex, 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Notes and Acronymns

--	-	not analyzed for the specified analysis or insufficient sample volume for analysis
FD	-	field duplicate sample
MG/L	-	milligrams per liter
MV	-	millivolts
N	-	primary sample
NTU	-	nephelometric turbidity units
pCi/L	-	picoCuries per liter
umhos/cm	-	microMhos per centimeter

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 - Ash Pond Complex, March 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Appendix IV Constituent	GWPS (a)	Downgradient wells with results above GWPSs (b)	Calculated LCL on the mean (c)	SSL (d) LCL>GWPS
Antimony (mg/l)	0.006	None	NA	NA
Arsenic (mg/l)	0.010	GAF-410U	0.0268	**Yes**
		GAF-450L	0.0102	**Yes**
Barium (mg/l)	2	None	NA	NA
Beryllium (mg/l)	0.004	None	NA	NA
Cadmium (mg/l)	0.005	None	NA	NA
Chromium (mg/l)	0.100	None	NA	NA
Cobalt (mg/l)	0.006	GAF-450L	0.00714	**Yes (e)**
Fluoride (mg/l)	4	None	NA	NA
Lead (mg/l)	0.015	None	NA	NA
Lithium (mg/l)	Carters: 0.045	GAF-452C	0.0930	**Yes (e)**
	Lebanon: 0.189	None	NA	NA
Mercury (mg/l)	0.002	None	NA	NA
Molybdenum (mg/l)	0.100	None	NA	NA
Radium-226+228 (pCi/l)	5	None	NA	NA
Selenium (mg/l)	0.050	None	NA	NA
Thallium (mg/l)	0.002	None	NA	NA

Notes:
NA – Not applicable
(a) GWPSs documented in notice dated 10/15/2018.
(b) Semi-annual Assessment monitoring event in March 2021 with results from verification sampling in May 2021 where available.
(c) Lower confidence limit (LCL) on the mean of CCR Rule sampling events between April 2019 and March 2021 plus the May 2021 verification sample results where available. Upper confidence limit (UCL) not shown as it is greater than LCL.
(d) SSL is statistically significant level over GWPS.
(e) Successful Alternate Source Demonstrations completed, see 2019 Annual Report.

Table 6
Statistically Significant Levels (SSLs) Above GWPSs - Ash Pond Complex, September 2021
CCR Rule Groundwater Monitoring
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Appendix IV Constituent	GWPS (a)	Downgradient wells with results above GWPSs (b)	Calculated LCL on the mean (c)	SSL (d) LCL>GWPS
Antimony (mg/l)	0.006	None	NA	NA
Arsenic (mg/l)	0.010	GAF-410U	0.0268	**Yes**
		GAF-450L	0.0102	**Yes**
Barium (mg/l)	2	None	NA	NA
Beryllium (mg/l)	0.004	None	NA	NA
Cadmium (mg/l)	0.005	None	NA	NA
Chromium (mg/l)	0.100	None	NA	NA
Cobalt (mg/l)	0.006	GAF-450L	0.00691	**Yes (e)**
Fluoride (mg/l)	4	None	NA	NA
Lead (mg/l)	0.015	None	NA	NA
Lithium (mg/l)	Carters: 0.045	GAF-452C	0.0936	**Yes (e)**
	Lebanon: 0.189	None	NA	NA
Mercury (mg/l)	0.002	None	NA	NA
Molybdenum (mg/l)	0.100	None	NA	NA
Radium-226+228 (pCi/l)	5	None	NA	NA
Selenium (mg/l)	0.050	None	NA	NA
Thallium (mg/l)	0.002	None	NA	NA

Notes:
NA – Not applicable
(a) GWPSs documented in notice dated 10/15/2018.
(b) Semi-annual Assessment monitoring event in September 2021.
(c) Lower confidence limit (LCL) on the mean of CCR Rule sampling events between September 2019 and September 2021. Upper confidence limit (UCL) not shown as it is greater than LCL.
(d) SSL is statistically significant level over GWPS.
(e) Successful Alternate Source Demonstrations completed, see 2019 Annual Report.

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

AECOM
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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	
Date	October 15, 2018	

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 at its Gallatin Fossil Plant (GAF) in Gallatin, Tennessee. The first Assessment groundwater monitoring event was conducted at GAF in June 2018. The CCR Rule requires TVA to develop groundwater protection standards (GWPSs) for Appendix IV parameters that were detected during that sampling event. This memorandum presents those GWPSs.

The samples collected during the Assessment monitoring event in June 2018 were analyzed for (among other things) the parameters listed in the CCR Rule Appendix IV. GWPSs have been developed for all Appendix IV parameters, including those that were detected and those that were not detected. Table 1 lists the Appendix IV parameters, and notes which were detected in at least one monitoring well.

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 the GWPS becomes background.

Background concentrations were calculated using the statistical methods as certified under the CCR Rule for the GAF Ash Pond Complex (dated November 14, 2017). As a result, the GWPS for lithium is the background value, as shown on Table 1. GWPSs for all other Appendix IV parameters are the published GWPS/MCL.

Table 1: Groundwater Protection Standards, GAF Ash Pond Complex

Appendix IV Parameter	Detected June 2018	MCL	Published GWPS (a)	Background	Final GWPS (b)
Antimony (mg/l)	Yes	0.006	NA	NA	0.006
Arsenic (mg/l)	Yes	0.010	NA	NA	0.010
Barium (mg/l)	Yes	2	NA	NA	2
Beryllium (mg/l)	Yes	0.004	NA	NA	0.004
Cadmium (mg/l)	No	0.005	NA	NA	0.005
Chromium (mg/l)	No	0.100	NA	NA	0.100
Cobalt (mg/l)	Yes	NA	0.006	NA	0.006
Fluoride (mg/l)	Yes	4	NA	NA	4
Lead (mg/l)	Yes	NA	0.015	NA	0.015
Lithium (mg/l)	Yes	NA	0.040	0.045/0.189 (c)	0.045/0.189 (c)
Mercury (mg/l)	No	0.002	NA	NA	0.002
Molybdenum (mg/l)	Yes	NA	0.100	NA	0.100
Radium-226+228 (pCi/l)	Yes	5	NA	NA	5
Selenium (mg/l)	No	0.050	NA	NA	0.050
Thallium (mg/l)	Yes	0.002	NA	NA	0.002

NA – Not applicable
(a) As published in the Federal Register July 30, 2018; 257.95(h)(2).
(b) Final GWPS is the maximum of background or the published GWPS/MCL (257.95(h)(3)).
(c) Separate background values are calculated for the two different geologic units: the Carters Limestone and Lebanon Limestone, respectively.

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, 2016-2021
TVA Gallatin Fossil Plant
Gallatin, Tennessee

		Lebanon		Carters	
Appendix III & Appendix IV Constituents	**Units**	**Minimum Concentration**	**Maximum Concentration**	**Minimum Concentration**	**Maximum Concentration**
Antimony	mg/l	ND	0.000929 J	ND	0.00446
Arsenic	mg/l	ND	0.00260 J	ND	0.00173
Barium	mg/l	0.0247	0.518	0.031	0.733
Beryllium	mg/l	All not detected		All not detected	
Boron	mg/l	0.0326 J	0.455	ND	0.404
Cadmium	mg/l	All not detected		All not detected	
Calcium	mg/l	22.1	160	84.5	159
Chloride	mg/l	5.89	330	3.21	65.3
Chromium	mg/l	ND	0.00774	ND	0.00266
Cobalt	mg/l	ND	0.00212	ND	0.0025
Fluoride	mg/l	0.203	2.30	ND	1.17
Lead	mg/l	ND	0.00245	ND	0.00116
Lithium	mg/l	0.0067	0.189	ND	0.0607
Mercury	mg/l	ND	0.00281	All not detected	
Molybdenum	mg/l	ND	0.0105	ND	0.00931
pH, Field	mg/l	6.52	8.30	6.43	7.71
Radium-226 + Radium-228	pCi/l	ND	2.35	ND	2.09 J
Selenium	mg/l	ND	0.000443 J	ND	0.00086 J
Sulfate	mg/l	4.49	275	25.6	322
Thallium	mg/l	ND	0.000342 J	ND	0.000065 J
Total Dissolved Solids	mg/l	332	864	319	843

Notes

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

Specific sample results are provided in Table 4 of this report and in the 2017, 2018, 2019, and 2020 Annual Reports.

Concentration ranges based on samples collected from November 2016 through September 2021.

Results from unfiltered samples only.

Appendix D
Evaluation of SSIs – January 2018

AECOM Imagine it. Delivered.

Date: **January 15, 2018**

To: **Tennessee Valley Authority**

From: **Elizabeth Perry, PG, AECOM**

Subject: **Summary of Statistical Analysis and Evaluation of SSIs**
Gallatin Fossil Plant - Ash Pond Complex
CCR Groundwater Monitoring Network

The Tennessee Valley Authority (TVA) Gallatin Fossil Plant (GAF), located in the town of Gallatin in Sumner County, Tennessee, has four Coal Combustion Residual (CCR) surface impoundments within the Ash Pond Complex that are subject to the U.S. Environmental Protection Agency's (USEPA's) final CCR Rule (40 Code of Federal Regulations [CFR] 257.90): Ash Pond A, Ash Pond E, Middle Pond A, and the Bottom Ash Pond. As required by the CCR Rule, the owner or operator of a CCR unit shall accurately establish background groundwater quality for the detection monitoring program and determine if a statistically significant increase (SSI) over background has occurred in downgradient monitoring wells. This memorandum reports on the statistically-derived background values for the Appendix III constituents, and summarizes the results of testing for SSIs for the Appendix III constituents collected during the detection monitoring rounds at designated in-network downgradient monitoring wells.

The statistical analysis was performed in accordance with the methods described in the *Statistical Methods Certification for Compliance with the Final Coal Combustion Residuals Rule (40 CFR §257.93)* for the GAF Ash Pond Complex. As per the statistical method certification for the Ash Pond Complex (November 14, 2017), background concentrations of Appendix III parameters were calculated using an Upper Prediction Limit (UPL) statistic. UPLs were calculated using the ProUCL software version 5.1.002 (USEPA, May 2016), with a 99% confidence level. Separate background UPLs were calculated for the Carters and Lebanon Limestone formations. Sampling results used to establish background values were obtained during ten monitoring events performed between November 2016 and August 2017. Downgradient sampling results from the first detection monitoring round (October 2017) were used to test for SSIs. The calculated background values and the evaluation for SSIs over background for the Appendix III constituents are provided in Table 1.

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

Clarification (January 2021): Fluoride and chloride are not shown on this table as there were no SSIs for these constituents. See the 2017 Annual Report (AECOM, 2018) for the complete analytical results.