Semiannual Report on the Progress of Remedy Selection – Ash Pond Complex

Gallatin Fossil Plant
Gallatin, Tennessee

Prepared for:
Tennessee Valley Authority
Chattanooga, Tennessee

Prepared by:
AECOM
Raleigh, North Carolina

Revision 1
January 14, 2022

Tennessee Valley Authority
Chattanooga, Tennessee

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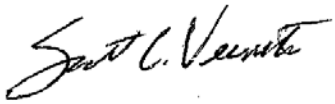
Quality information

Prepared by



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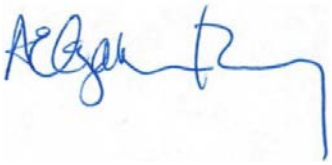
Reviewed by



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Revision History

Revision	Revision Date	Details
Rev 0	01/14/2022	
Rev 1	01/20/2022	Date Correction (Cover Page)

Table of Contents

Acronyms

Figures

Acronyms

ACM	Assessment of Corrective Measures
APC	Ash Pond Complex
ASD	Alternate Source Demonstration
bgs	Below ground surface
CARA	Corrective Action/Risk Assessment
CAGWMP	Corrective Action Groundwater Monitoring Program
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
CRM	Cumberland River Mile
EAR	Environmental Assessment Report
EI	Environmental Investigation
Ft	Feet
GAF	Gallatin Fossil Plant
GWPS	Groundwater Protection Standards
MNA	Monitored Natural Attenuation
Msl	Mean sea level
Mg/L	Milligram per liter
Min	Minute
NPDES	National Pollutant Discharge Elimination System
NRL	North Rail Loop
PRB	Permeable Reactive Barrier
SSL	Statistically Significant Levels
TDEC	Tennessee Department of Environment and Conservation
TVA	Tennessee Valley Authority
USEPA	United States Environmental Protection Agency

1.0 Introduction

In accordance with the requirements in 40 CFR § 257.97(a), this report has been prepared to describe the current progress in selecting and designing a remedy for the Ash Pond Complex (APC) (including Ash Pond A, Ash Pond E, Middle Pond A, and Bottom Ash Pond) (hereinafter collectively referred to as APC Multiunit) at the Tennessee Valley Authority (TVA) Gallatin Fossil Plant (GAF) in Gallatin, Sumner County, Tennessee.

1.1 Regulatory Background

On April 17, 2015, the U.S. Environmental Protection Agency (USEPA) published a rule that set forth national criteria for the management of coal combustion residuals (CCR) produced by electric utilities. The requirements can be found in Title 40, Code of Federal Regulations (40 CFR) Part 257, Subpart D. The rule includes requirements for monitoring groundwater, assessing corrective measures, and selecting a remedy if constituents listed in Appendix IV of the rule are detected in groundwater samples collected from downgradient monitoring wells at statistically significant levels (SSL) greater than groundwater protection standards (GWPS).

In January 2019, TVA completed an evaluation of whether there were SSLs over established GWPS as defined in 40 CFR § 257.95(h) for one or more Appendix IV constituents in accordance with 40 CFR § 257.95(g). At the APC Multiunit, based on the assessment monitoring events in 2018, SSLs greater than the GWPS for arsenic in one well (GAF-410U), for cobalt in one well (GAF-450L), and for lithium in one well (GAF-452C) were detected.

TVA has successfully demonstrated that a source other than the APC Multiunit caused the SSLs above GWPS for cobalt and lithium at wells GAF-450L and GAF-452C, respectively, as allowed under 40 CFR § 257.95(g)(3)(ii). The Appendix IV Alternate Source Demonstration – Ash Pond Complex was included in the 2019 Annual CCR Rule Groundwater Monitoring Report as Appendix D. TVA has not been able to demonstrate that a source other than the APC Multiunit caused the SSL of arsenic.

There continues to be SSLs above the GWPS for arsenic in well GAF-410U. No other SSLs were identified in 2019 or 2020. In June 2021, a new SSL above GWPS for arsenic in well GAF-450L was identified. Refer to SSL notices for each sampling event at GAF on TVA's CCR Rule Compliance Data and Information website:

https://www.tva.com/environment/environmental-stewardship/coal-combustion-residuals/gallatin

In accordance with 40 CFR § 257.96(a), TVA prepared the 2019 Assessment of Corrective Measures (ACM) Report for the APC Multiunit, added it to the operating record on July 15, 2019 and uploaded it to the CCR Rule Compliance Data and Information website on August 14, 2019. The ACM Report provided an assessment of the effectiveness of corrective measures in

accordance with 40 CFR § 257.96(c). As described in Section 1.2 (below), closure of the APC Multiunit is integrated into the ACM process. Four primary strategies were evaluated to address groundwater exhibiting concentrations above the arsenic GWPS:

- Monitored Natural Attenuation (MNA);
- In-Situ Physical/Chemical Treatment;
- Permeable Reactive Barriers (PRB); and
- Hydraulic Containment and Treatment.

Following preparation of the ACM Report, TVA began the process to select a remedy. Semiannual reports are required pursuant to 40 CFR § 257.97(a) to document progress toward remedy selection and design. Semiannual progress reports have been prepared and placed in the operating record since January 2020 and uploaded to the CCR Rule Compliance Data and Information website:

https://www.tva.com/environment/environmental-stewardship/coal-combustion-residuals/gallatin

The CCR Rule contemplates that more investigation and consideration may be needed to evaluate and design the remedy before making the final selection. TVA will continue to review new data as it becomes available and implement changes to the groundwater monitoring and corrective action program as necessary to maintain compliance with 40 CFR § 257.90 through § 257.98.

At least 30 days prior to the selection of the remedy, the owner/operator must discuss the results of the ACM in a public meeting required by 40 CFR § 257.96(e). The selected remedy must, at a minimum, meet the requirements of 40 CFR § 257.97(b) and must consider the evaluation factors set forth in 40 CFR § 257.97(c) in the selection process. Once a final remedy is chosen, a final report describing the remedy and how it meets the standards set forth in 40 CFR § 257.97(b) will be prepared. The owner/operator must also provide a schedule for implementing the selected remedy that takes into account the factors set forth in 40 CFR § 257.97(d).

1.2 Overview of July 2019 Closure Plan

A revised Closure Plan was prepared for the APC Multiunit as a result of an agreement between TVA and the Tennessee Department of Environment and Conservation (TDEC) to close the APC Multiunit by removing the CCR from the APC Multiunit. This Closure Plan was added to the operating record on July 19, 2019, and was posted on TVA's CCR Rule Compliance Data and Information website on August 19, 2019.

TVA is closing the APC Multiunit by following a closure-by-removal approach pursuant to 40 CFR § 257.102(c). Closure activities are anticipated to include pond drawdown, CCR dewatering, and CCR excavation and removal. CCR is expected to be transported and disposed of in an on-site permitted landfill.

Potentially impacted underlying soils will be addressed. Post-excavation surfaces will be graded to promote positive drainage, and permanent vegetation or permanent stabilization will be established.

Implementation of the revised Closure Plan will serve as source control as the CCR will be removed from the APC Multiunit impoundments.

On September 17, 2020, the Record of Decision for the Environmental Impact Statement completed pursuant to the National Environmental Policy Act for closure by removal was published. On September 28, 2020, TVA submitted to TDEC for review and approval a Removal Plan for removal of CCR from the APC Multiunit impoundments. On December 23, 2020, TDEC provided comments on the Removal Plan to TVA and required a revised Removal Plan be submitted. On February 8, 2021, TVA submitted the updated Removal Plan Revision 1 to TDEC for review and approval. Implementation of the Removal Plan, once approved, will be overseen by TDEC.

TVA has also submitted a Solid Waste Permit Application to TDEC for a new on-site landfill for CCR to be removed from the APC Multiunit. As of the date of this report, the permit application remains under review by TDEC.

1.3 Summary of State Required Investigation and Remedy Selection Process

Since 2016, TVA has been conducting an environmental investigation (EI) of CCR disposal sites at its GAF coal-fired site in Tennessee under the oversight of TDEC. TVA submitted an Environmental Assessment Report (EAR) to TDEC on July 9, 2021 for review and approval. The EAR provides an evaluation of the extent of CCR impacts based on data from the EI, including groundwater impacts. After TDEC approval of the EAR and the Removal Plan, TVA will submit a Corrective Action/Risk Assessment (CARA) Plan for groundwater impacts at the APC Multiunit to TDEC for review and approval. The CARA Plan will present the proposed remedy for groundwater corrective action at the site. The CARA plan will specify the actions that TVA proposes, the basis for those actions, and will include a schedule of activities to be completed by TVA. The agreement between TVA and TDEC for closure of the APC Multiunit includes a public comment period on the proposed CARA Plan of at least 30 days. Following the public comment period, TVA will have 30 days to provide TDEC with responses to the public comments. The public comments and TVA responses will be considered in TDEC's review and approval of the CARA Plan. Following TDEC approval of the CARA Plan, TVA will complete remedy selection in accordance with 40 CFR § 257.97.

1.4 Report Contents

Following this introduction, the progress report provides summaries of the GAF site characteristics, the groundwater assessment monitoring program, the findings of the ACM process, and the current progress of groundwater remedy selection.

2.0 Site Background and Characteristics

This section provides a brief overview of the CCR management operations and geologic setting for GAF.

CCR Management Operations

GAF is located at 1499 Steam Plant Road in Gallatin, Sumner County, Tennessee. The facility is located on the north bank of the Cumberland River and between Cumberland River Mile (CRM) 246 and 241.5. The Cumberland River is impounded by the Old Hickory Dam located approximately 25 miles downstream (CRM 216.2). GAF construction began in 1953. GAF began operations in 1956 with full operation in 1959, following completion of the fourth generating unit.

The coal combustion process at GAF historically generated by-products that included fly ash and bottom ash. CCR management units at GAF are depicted in **Figure 1**. The fly ash and bottom ash were managed at the former Non-Registered Site (NRS) from 1956 until approximately 1970. From approximately 1970 until 2019, CCR was managed in the APC Multiunit in accordance with National Pollutant Discharge Elimination System (NPDES) Permit No.TN0005428 issued by TDEC. Approximately 11.9 million cubic yards of CCR material is currently present in the APC Multiunit, with the majority present in Ash Pond A. The APC Multiunit covers approximately 383 acres.

TVA's scrubber system (constructed 2013-2016) and bottom ash dewatering facility (completed 2019) currently produce dry CCR material. The dry CCR material is managed in the 52-acre Class II Landfill (Tennessee Solid Waste Permit IDL83-0219) called the North Rail Loop (NRL) Landfill. The landfill is constructed with both a soil and geosynthetic liner system and groundwater monitoring well network. Cell 1 began receiving CCR in June 2016; Cell 2 began receiving CCR in September 2021.

With the completion of the new Flow Management System in 2019, the APC Multiunit has been removed from service. In accordance with 40 CFR § 257.102(g), the Notice of Intent to Close the APC Multiunit was placed in the Operating Record on July 19, 2019, and posted to the CCR Rule Compliance Data and Information website on August 19, 2019. Process flows and NRL Landfill leachate have been rerouted to the Flow Management System. The Flow Management System effluent is released at Outfall 010.

Hydrogeologic Setting

A hydrogeologic conceptual site model (CSM) is needed to support decision making during Remedy Selection. This section of the report provides a summary of the hydrogeologic conceptual site model. The CSM was updated as the EAR was prepared.

GAF is located within the Central Basin Aquifer system of Middle Tennessee (Brahana and Bradley, 1986). Primary porosity is largely absent from the limestone formations in the Central Basin Aquifer system. Therefore, groundwater within these formations flows through secondary porosity consisting of a network of water-bearing fracture zones that have been developed and enhanced by dissolution of the limestone.

Groundwater in the vicinity of the APC Multiunit is encountered in water-bearing zones within the alluvium/unconsolidated materials (limited to isolated areas west of the APC Multiunit), Carters Limestone and Lebanon Limestone formations. These water-bearing zones have been developed primarily along the nearly flat-lying horizontal bedding planes. The primary water-bearing fracture zone in the Lebanon Limestone occurs at a recognizable stratigraphic horizon, which has been designated as the L1 fracture zone. Water-bearing zones in the Carters Limestone have developed largely where the T-3 bentonite layer has been eroded and the Lower Carters (i.e., bedrock below the T-3) is exposed to weathering and karst activity. As a result, the Lower Carters Limestone does not transmit water (does not form an aquifer) on the southeast side of the APC Multiunit (see Figure 3).

North of the APC Multiunit is a large area where many surficial karst features are present. Hydraulic heads in both aquifers in this area are low (similar to the Cumberland River) with little to no gradient. This area has been termed a hydraulic trough, as there is a gradient towards this area from the north, south, and east. Dye trace studies have verified the trough feature and groundwater flow westward to the Cumberland River.

The highest hydraulic heads in both formations are present in the vicinity of the Bottom Ash Pond and along the southern portion of the APC. In the Lebanon Limestone, the hydraulic gradient is radial from this area to the east, south, and west towards the Cumberland River as well as northward towards the hydraulic trough, as shown in Figures 3 and 4. In the Lower Carters Limestone, the gradient is primarily westward towards the River and northward towards the trough.

3.0 Groundwater Assessment Monitoring Program

Groundwater assessment monitoring for the APC Multiunit is conducted at GAF in accordance with 40 CFR § 257.95. This section of the report summarizes the results of the groundwater assessment monitoring program to date for the APC Multiunit.

3.1 Groundwater Monitoring Network

In compliance with 40 CFR § 257.91, the APC Multiunit certified 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 5**.

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 network, typically paired with Carters wells, or where the first water-bearing zones were encountered in the Lebanon.

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)). The background wells are hydraulically separated from the APC Multiunit 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 10 downgradient monitoring wells completed in the Carters Limestone, five monitoring wells in the Lebanon Limestone, and one monitoring well screened in alluvium/unconsolidated materials.

The certification of the groundwater monitoring system is included in the facility operating record and on the TVA's CCR Rule Compliance and Information website:

https://www.tva.com/environment/environmental-stewardship/coal-combustion-residuals/gallatin

3.2 Groundwater Characterization

Characterization of the nature and extent of the GWPS exceedances for arsenic in groundwater is understood from the EI activities (2016 – 2020) and CCR Rule assessment monitoring that was conducted in 2018 through 2021. Supplemental investigations may be conducted during the selection of remedy process to aid in selection and design of a remedy. Groundwater monitoring results are summarized below:

- Arsenic exceeded the GWPS at GAF-410U again in the first semi-annual assessment monitoring event in 2021. This well is screened in alluvium/unconsolidated materials. The published GWPS for arsenic is 0.010 mg/L. **Figure 6** presents a concentration trend plot for arsenic in this well through September 2021.
- GAF-410U is screened in alluvium, which has a very limited extent in this area (**Figure 2**). Alluvium is not present and/or water-bearing zones are not found in overburden in

the areas surrounding this well. Thus, its horizontal extent in alluvium at and beyond the waste boundary is defined by the limited extent of water in that geologic unit.

- In the vertical direction, a nearby well is screened in the underlying Carters Limestone (GAF-446C, **Figure 3**). This well is already part of the CCR Rule monitoring network, and arsenic is not above the GWPS in this well. Thus, the vertical extent at and beyond the waste boundary is defined by the existing well network.

During the first 2021 semi-annual assessment monitoring event, a new potential SSL was identified for arsenic at GAF-450L[1]. Subsequent sampling and statistical analysis have confirmed the new SSL.

- Arsenic exceeded the GWPS at GAF-450L in the first semi-annual monitoring event in March 2021, in the confirmation monitoring event in May 2021, and in the second semi-annual monitoring event in September 2021.
- The arsenic in GAF-450L was identified as an SSL above the GWPS based on statistical evaluation of data from the well.
- The published GWPS for arsenic is 0.010 mg/L. Figure 7 presents a concentration trend plot for arsenic in this well through September 2021.
- GAF-450L is screened in the Lebanon Limestone bedrock which is the deeper water-bearing zone beneath the APC Multiunit. Horizontal extent at and beyond the waste boundary is bound by the lack of arsenic GWPS exceedances in other CCR Rule monitoring wells along the Cumberland River.
- In the vertical direction, a shallower paired well screened in the Carters limestone (GAF-450C) does not exhibit arsenic above the GWPS.

Refer to SSL notices for each sampling event at GAF on TVA's CCR Rule Compliance Data and Information website:

https://www.tva.com/environment/environmental-stewardship/coal-combustion-residuals/gallatin

4.0 Assessment of Corrective Measures

TVA prepared the 2019 ACM Report for the APC Multiunit, added it to the operating record on July 15, 2019, and posted it on TVA's CCR Rule Compliance Data and Information website on August 14, 2019. The ACM Report provided an assessment of the effectiveness of corrective measures in accordance with 40 CFR § 257.96(c).

[1] 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.

As described in Section 1.2, closure of the APC Multiunit will be by removal of the CCR, and closure represents the key source control measure for the purposes of remedy selection under 40 CFR § 257.97.

4.1 Planned Source Control Measures

The objectives of corrective measures under 40 CFR § 257.96(a) are to "prevent further releases [from the CCR Unit], to remediate any releases, and to restore affected areas to original conditions." Ultimately, in accordance with 40 CFR § 257.97(b)(3), the selected corrective measure must at a minimum "[c]ontrol the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of constituents in appendix IV to this part into the environment."

The Preamble (80 Fed. Reg. 21302, 21406) to the CCR Rule discusses that source control measures may include modifying operational procedures. TVA has already implemented operational changes such as reducing free water in Ash Pond E, constructed a new flow management system, and rerouted flows previously sent to the APC Multiunit.

Closure-by-removal of the APC Multiunit will serve as source control measures as required under 40 CFR § 257.97(b)(3). These measures will eliminate the potential for migration of CCR constituents to groundwater after completion of the removal efforts.

Continued semi-annual groundwater assessment monitoring will be conducted to track changes in groundwater conditions as a result of these closure and operation changes. These data will be considered in the selection and design of a remedy in accordance with 40 CFR § 257.97. Groundwater assessment monitoring as required by 40 CFR § 257.96(b) will continue until a groundwater remedy is selected. Long-term groundwater assessment monitoring is a component of the corrective measure implementation.

4.2 Potential Remedial Technologies

The APC Multiunit will be closed-by-removal in accordance with 40 CFR § 257.102 and applicable state law.

In addition to this source control measure, four primary strategies have been evaluated to address groundwater exhibiting concentrations above the arsenic GWPS including the following:

- MNA;
- In-Situ Physical/Chemical Treatment;
- PRB; and
- Hydraulic Containment and Treatment.

The ACM Report provides a more detailed description of each of these corrective measures. The effectiveness of each potential corrective measure was assessed in accordance with 40 CFR § 257.96(c), and all are considered feasible for remediating groundwater at the APC Multiunit.

5.0 Selection of Remedy: Current Progress

A remedy to address SSLs in groundwater will be selected in accordance with 40 CFR § 257.97 and subject to TDEC's approval of the CARA Plan in accordance with the agreement between TDEC and TVA. At this point in the selection process, each of the corrective measures presented in Section 4.2 meets the requirements of the remedy as defined in 40 CFR § 257.97 and is still being considered. Following agreement on the selected remedy with TDEC (via TDEC's review and approval of the APC CARA Plan), TVA will prepare a Remedy Selection Report describing the selected remedy and how it meets the standards specified below pursuant to 40 CFR § 257.97(b)(1)-(5). Remedies must: (1) Be protective of human health and the environment; (2) Attain the groundwater protection standard as specified pursuant to §257.95(h); (3) Control the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of constituents in appendix IV to this part into the environment; (4) Remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems; (5) Comply with standards for management of wastes as specified in §257.98(d).

In support of the remedy selection process, additional evaluation is needed, as described below.

5.1 Data Requirements for Design of Groundwater Corrective Action

Characterization of the arsenic impacts in accordance with 40 CFR § 257.95(g) is complete beyond the limit of waste at the APC Multiunit. As noted in Section 1.2.1, the EI is complete, and TVA has submitted the EAR to TDEC. The EAR will inform the development of the CARA Plan. Pursuant to the agreement between TDEC and TVA (Consent Order No. 15-23-IV dated July 24, 2019), the groundwater remedy for the APC Multiunit must be approved by TDEC. TVA will implement the APC closure-by-removal pending TDEC's approval of the APC Removal Plan. TVA expects the source removal to improve the conditions in groundwater over time.

Additional groundwater flow modeling and/or fate and transport analysis may be performed to aid in remedy selection.

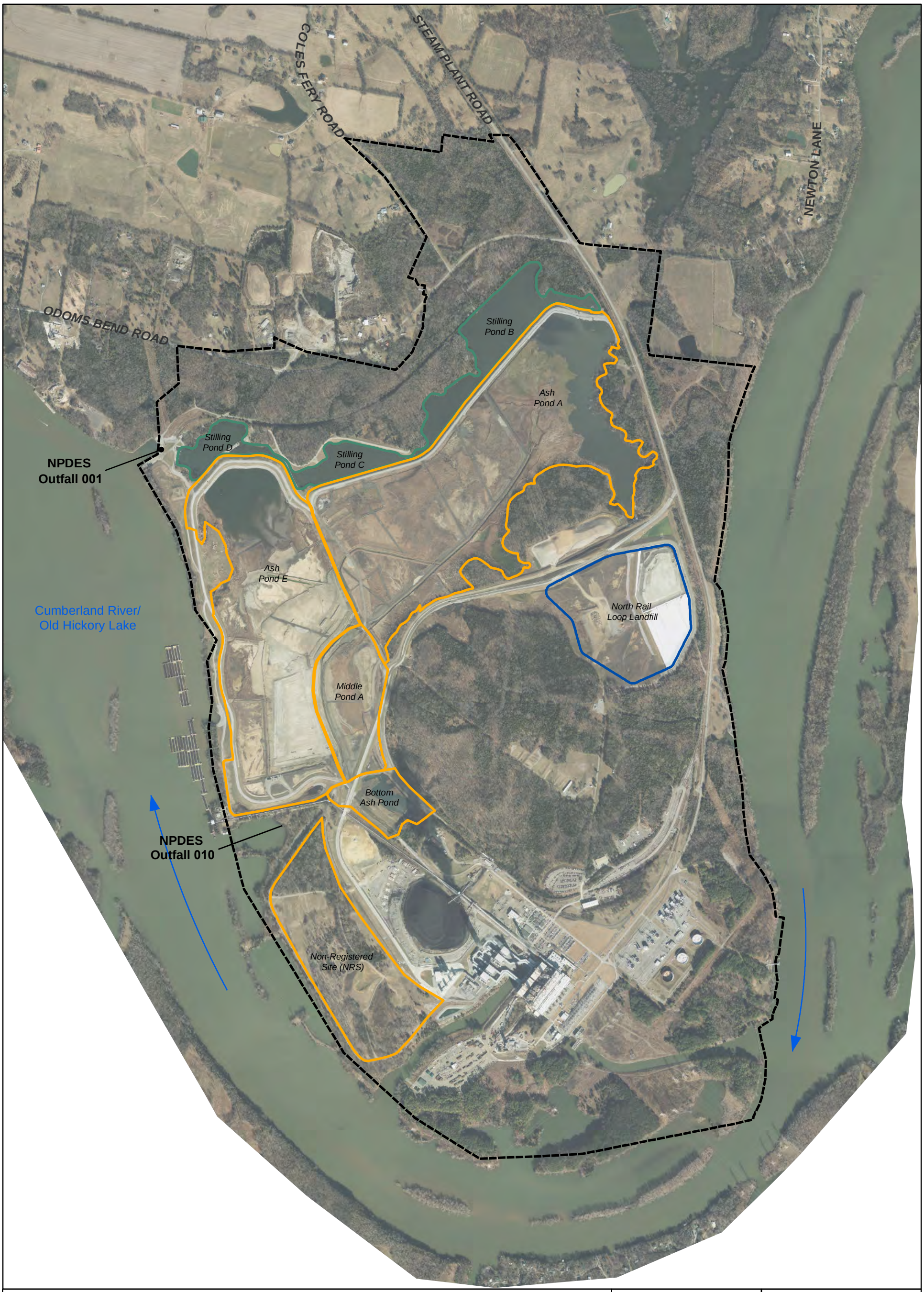
5.2 Semiannual Reporting, Public Meeting, Remedy Selection, and Final Report

Progress toward the selection of the remedy will be documented in semiannual reports in accordance with 40 CFR § 257.97(a). At least 30 days prior to selecting a remedy, a public meeting to discuss the results of the corrective measures assessment will be conducted as required by 40 CFR § 257.96(e). A final report will be produced after the remedy is selected. This final report will describe the remedy and how it meets 40 CFR § 257.97. Recordkeeping requirements specified in 40 CFR § 257.105(h), notification requirements specified in 40 CFR § 257.106(h), and internet requirements specified in 40 CRF § 257.107(h) will be complied with as required by 40 CFR § 257.97(e).

6.0 References

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 U.S. Environmental Protection Agency. USGS Water- Resources Investigations Report 82-4002.

Figures



LEGEND

- Cumberland River Flow Direction
- TVA Gallatin Fossil Plant Property Boundary (Approximate)
- CCR Management Units
- North Rail Loop (NRL) Landfill
- Stilling Ponds

N

0 1,200 2,400

Feet

NOTE: Aerial image dated February 2017

AECOM

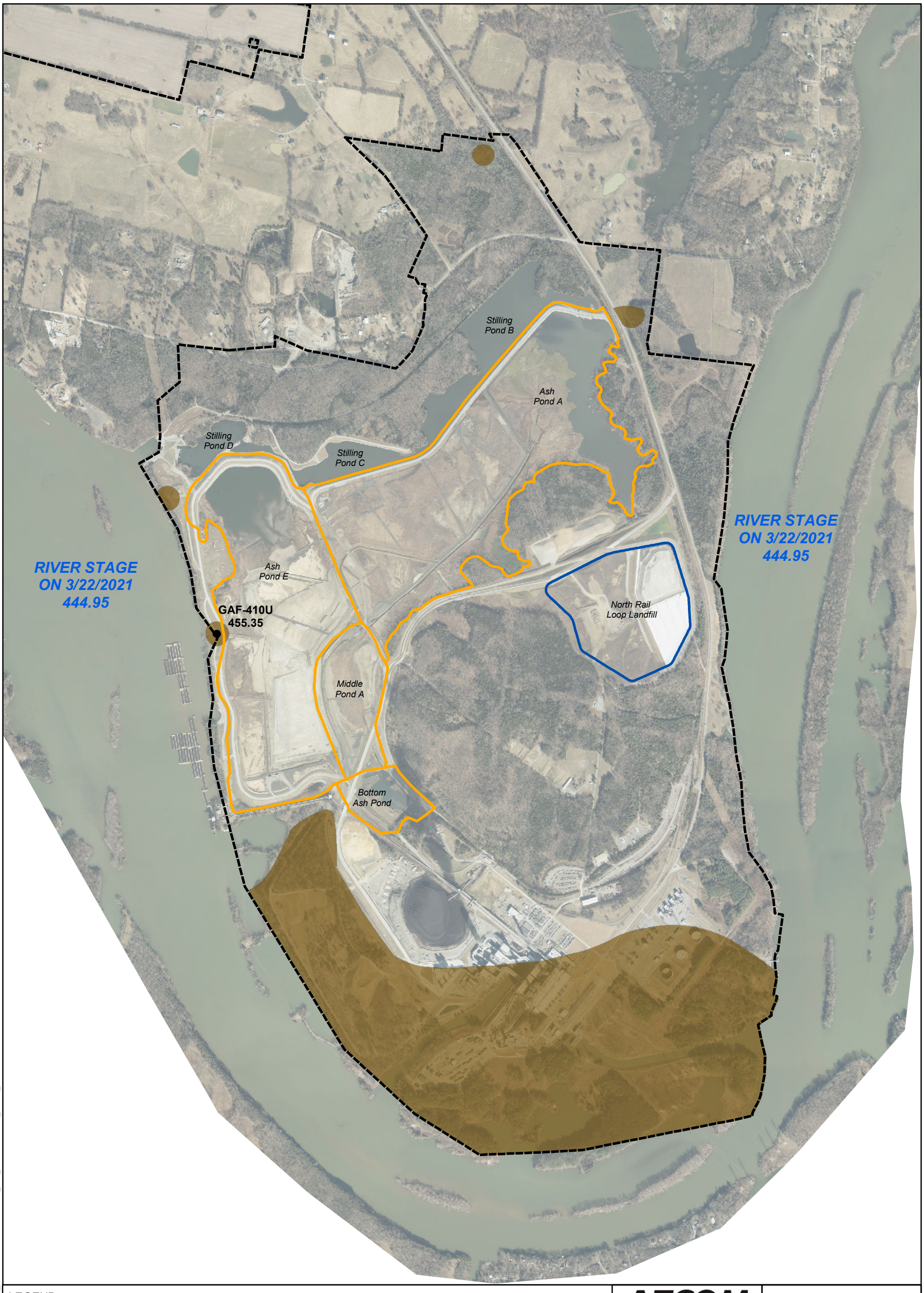
Figure 1

OVERVIEW OF
CCR MANAGEMENT AREAS

DRAWN BY:	REVIEWED BY:	APPROVED BY:	REVISION NUMBER:
MARK.P.SMITH	SCHEIPC		REV. 9

GALLATIN FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

DATE:	DEPT:
4/24/2017	FOSSIL AND HYDRO ENGINEERING



LEGEND:

- **22** Well ID
- **446.95** Groundwater Elevation (feet MSL) on 3/22/2021
- Well Location
- Groundwater Elevation Contour in Unconsolidated Unit, Dashed where Inferred
- TVA Gallatin Fossil Plant Property Boundary (Approximate)
- CCR Management Units
- Estimated Extent of Groundwater in Unconsolidated Unit
- Groundwater Flow Direction

N

0 1,200 2,400
Feet

NOTE: Aerial image dated February 2017

AECOM

Figure 2

HYDRAULIC HEAD
UNCONSOLIDATED UNIT,
MARCH 22,2021

DRAWN BY:	REVIEWED BY:	APPROVED BY:	REVISION NUMBER:
CARRIE.SMITH	C.GARLINGTON		REV. 0

GALLATIN FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

DATE:	DEPT:
6/8/2021	FOSSIL AND HYDRO ENGINEERING

Document Path: M:\EnvData\Vzn\TVA_GAF\11.0 GIS_Groundwater Contours\GAF_GW_Unconsolidated_March_2021.mxd

GAF-426C

GAF-412C
448.03

GAF-427C
450.81

GAF-414C
444.93

GAF-511C
448.86

25
445.00

GAF-498CL
458.47

GAF-415C
448.85

GAF-455C
458.07

GAF-453C
457.97

GAF-416C
448.33

Stilling
Pond B

Ash
Pond A

GAF-452C
457.71

445

24
445.56

GAF-456C
456.94

GAF-422C
444.82

GAF-402C
449.82

Stilling
Pond D

Stilling
Pond C

450

455

460

Ash
Pond E

GAF-458C
463.66

GAF-457C
467.03

465

RIVER STAGE
ON 3/22/2021
444.95

GAF-459C
462.91

North Rail
Loop Landfill

RIVER STAGE
ON 3/22/2021
444.95

GAF-446C
454.84

Middle
Pond A

450

470

475

GAF-450C
447.66

GAF-451CR
475.97

Bottom
Ash Pond

GAF-405C
481.59

480

475

NOTE: Some wells have very low yield and/or represent perched groundwater, and may not be representative of the groundwater flow system.

LEGEND:

GAF-450C Well Screened in Carters Limestone
447.66 Hydraulic Head feet MSL on 3/22/2021

- Well Screened in Carters Limestone
- Hydraulic Head Contour in Aquifer, Dashed where Inferred
- TVA Gallatin Fossil Plant Property Boundary (Approximate)
- Ash Pond Complex
- North Rail Loop (NRL) Landfill
- Stilling Ponds
- Estimated Extent of Lower Carters Limestone Aquifer
- Presence of Carters Aquifer Unknown
- 1st Water Encountered in Lebanon; Contiguous with Carters Aquifer

N

0 1,200 2,400
Feet

NOTE: Aerial image dated February 2017

AECOM

Figure 3

HYDRAULIC HEADS
CARTERS AQUIFER,
MARCH 22, 2021

DRAWN BY:	REVIEWED BY:	APPROVED BY:	REVISION NUMBER:
CARRIE.SMITH	C.GARLINGTON	E.PERRY	REV. 0

GALLATIN FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

DATE:	DEPT:
6/8/2021	FOSSIL AND HYDRO ENGINEERING

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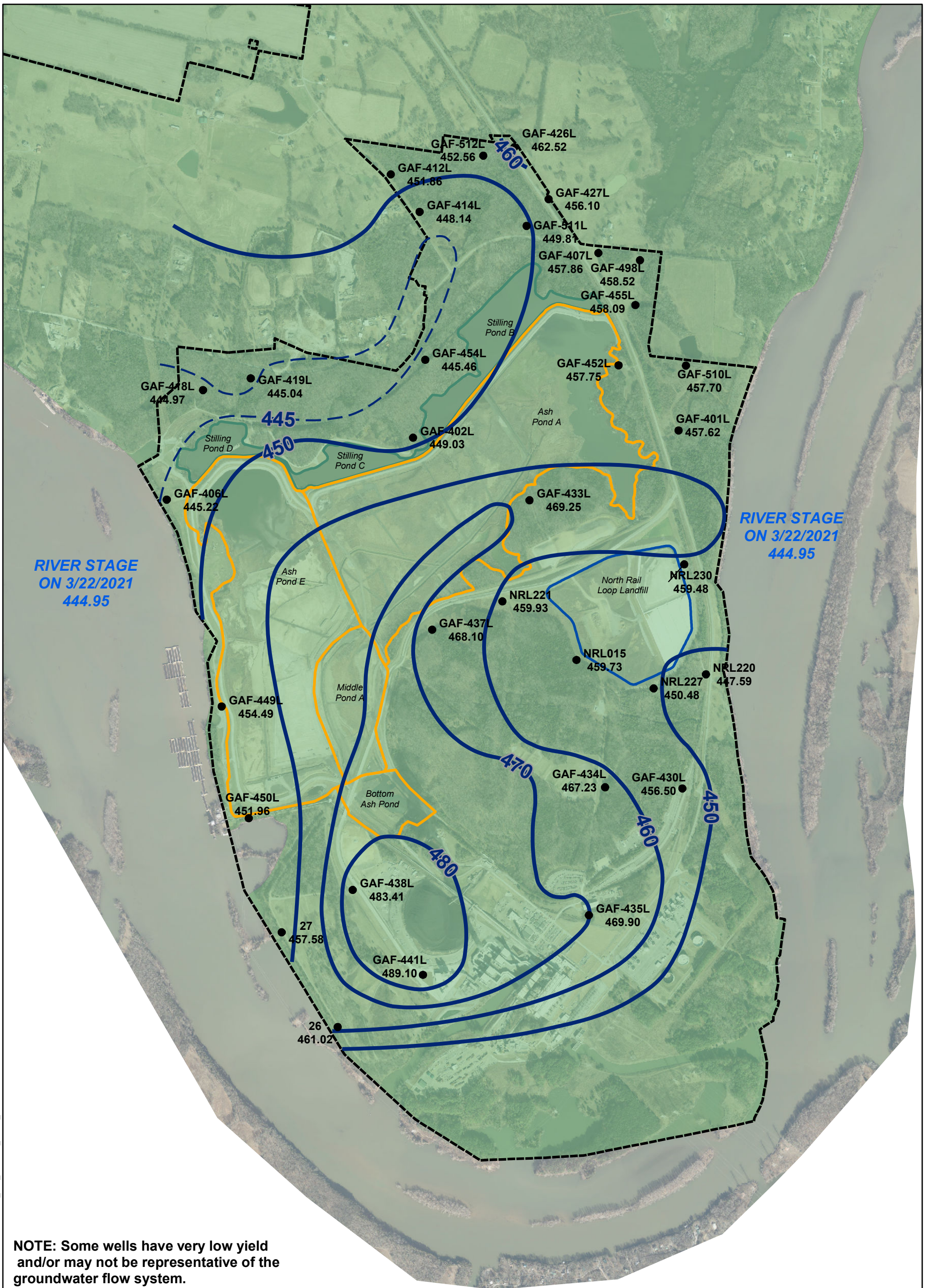


NOTE: Some wells have very low yield and/or may not be representative of the groundwater flow system.

LEGEND:

- **GAF-441L** / **489.10** — Well Screened in Lebanon Limestone; Hydraulic Head feet MSL on 3/22/2021
- Well Screened in Lebanon Limestone
- Hydraulic Head Contour in Aquifer
- TVA Gallatin Fossil Plant Property Boundary (Approximate)
- Ash Pond Complex
- North Rail Loop (NRL) Landfill
- Stilling Ponds
- Estimated Extent of Lebanon Limestone Aquifer

N

0 1,200 2,400
Feet

NOTE: Aerial image dated February 2017

AECOM

Figure 4

HYDRAULIC HEADS
LEBANON AQUIFER,
MARCH 22, 2021

DRAWN BY:	REVIEWED BY:	APPROVED BY:	REVISION NUMBER:
CARRIE.SMITH	C.GARLINGTON	E.PERRY	REV. 0

GALLATIN FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

DATE:	DEPT:
6/9/2021	FOSSIL AND HYDRO ENGINEERING

Document Path: M:\Env\Data\Viz\TVA_GAF\11.0 GIS\ Groundwater Contours\GAF_GW_Lebanon_March_2021.mxd

LEGEND

- CCR Rule Monitoring System Wells
- 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

AECOM

Figure 5

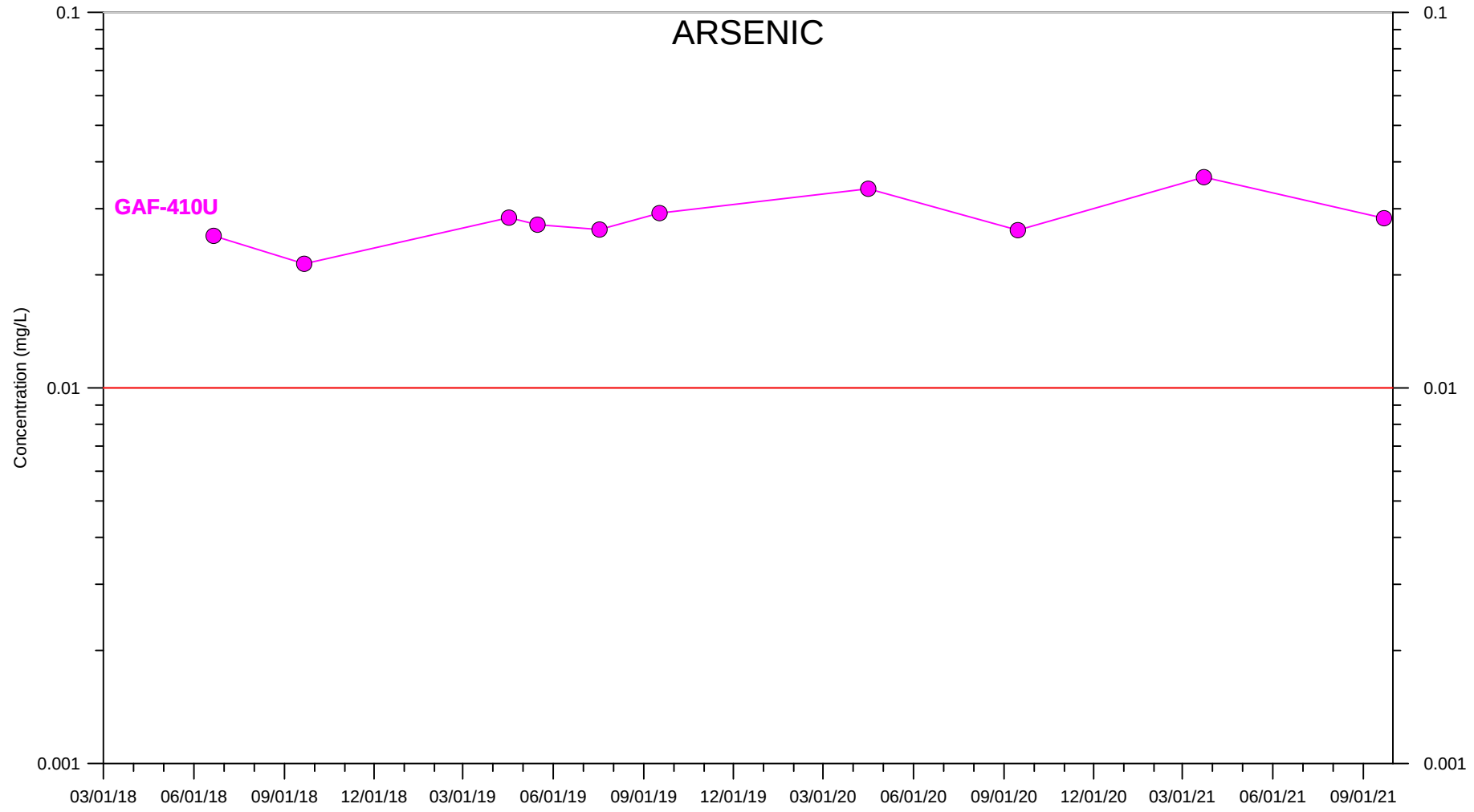
CCR RULE MONITORING SYSTEM
ASH POND COMPLEX (APC)

DRAWN BY:	REVIEWED BY:	APPROVED BY:	REVISION NUMBER:
MARK.P.SMITH	C.GARLINGTON		REV. 2

GALLATIN FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

DATE:	DEPT:
2/20/2020	FOSSIL AND HYDRO ENGINEERING

Document Path: Q:\DCS\Projects\L_URS\Jobs\1_Projects\TVA\Gallatin_General\EIP\11.0 GIS\CCR_MONITORING_WELLS_APC.mxd



Legend

GAF-410U — MCL

NOTES:
Total data only
Does not include U* flagged data

AECOM

Figure 6

Concentration Trend Plot

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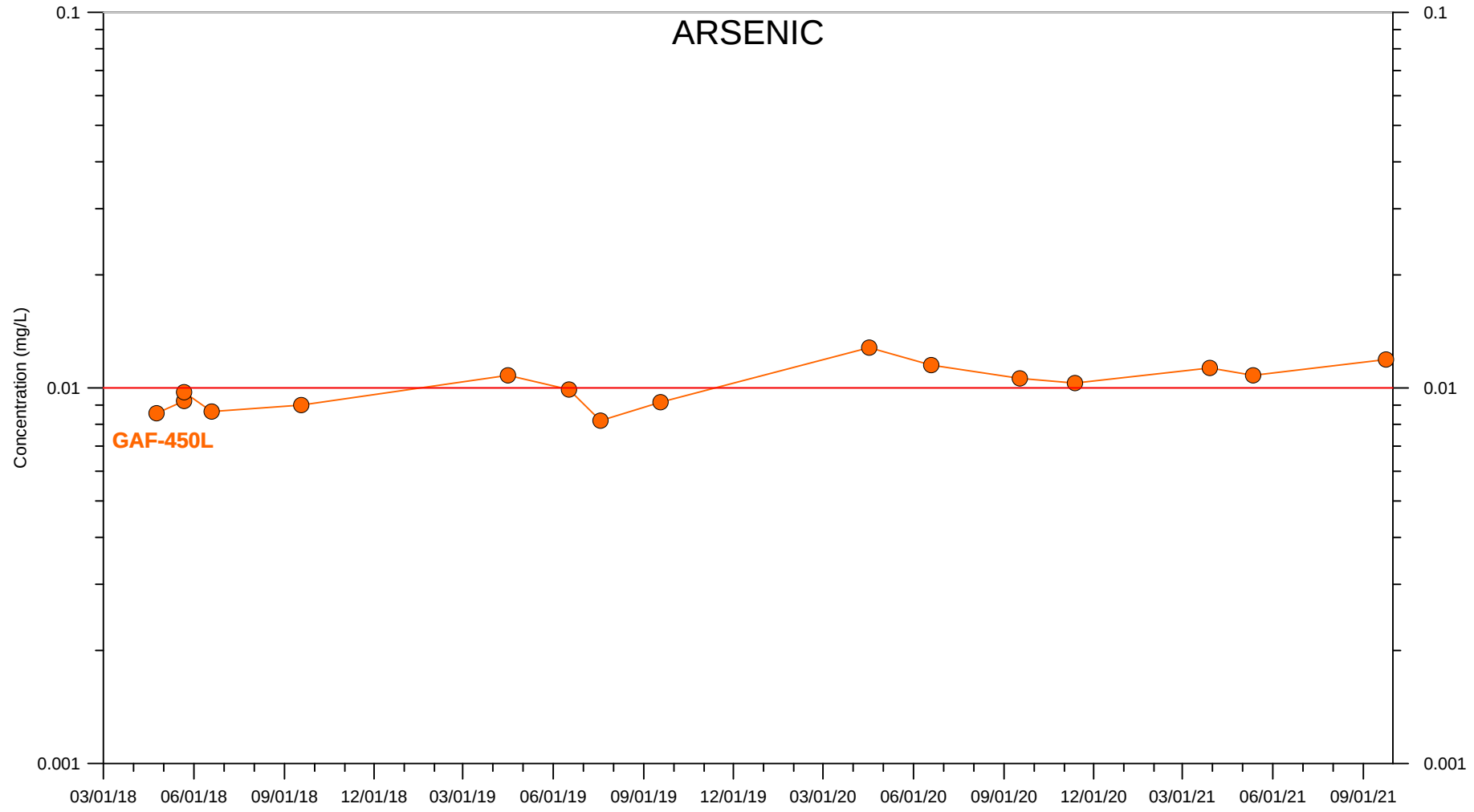
SCOTTD	PERRYAE	PERRYAE	REV. 0

GALLATIN FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

DATE:	DEPT:
2021/11/09	FOSSIL AND HYDRO ENGINEERING



Legend

GAF-450L — MCL

NOTES:
Total data only
Does not include U* flagged data

AECOM

Figure 7

Concentration Trend Plot

DRAWN BY:	REVIEWED BY:	APPROVED BY:	REVISION NUMBER:
SCOTTD	PERRYAE	PERRYAE	REV. 0

GALLATIN FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

DATE:	DEPT:
2021/11/09	FOSSIL AND HYDRO ENGINEERING